

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Aquaculture Technology
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0101030302
Program Type	College Credit Certificate (CCC)
Program Length	26 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	45-1011 – First-Line Supervisors of Farming, Fishing, and Forestry Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Aquaculture Management AS degree program (1101030301).

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 aquaculture industry within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction in ichthyology, fish breeding, fish nutrition, pond maintenance, diagnosis and treatment of diseases in fish, business management of a fish farm, and field experience necessary to operate an aquaculture operation.

See additional information relevant to Career and Technical Education (CTE) program implementation.

Standards

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

- 01.0 Identify important aquaculture plants and animals and describe their culture in various production units.
- 02.0 Perform general aquaculture production unit operations.
- 03.0 Determine methods of fish identification.
- 04.0 Demonstrate an understanding of water quality and aquaculture.
- 05.0 Maintain optimal nutrition for aquaculture organisms.
- 06.0 Diagnose and control common aquaculture maladies.
- 07.0 Operate and maintain aquaculture equipment.
- 08.0 Assist in the maturation, spawning, larval and juvenile rearing of aquaculture organisms.
- 09.0 Perform general aquaculture nursery systems operations.

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**Florida Department of Education
Student Performance Standards**

Program Title: Aquaculture Technology
CIP Number: 0101030302
Program Length: 26 credit hours
SOC Code(s): 45-1011

This certificate program is part of the Aquaculture Management AS degree program (1101030301). At the completion of this program, the student will be able to:

01.0 Identify important aquaculture plants and animals and describe their culture in various production units--The student will be able to:

01.01 Define aquaculture and describe the historical important of aquaculture to local, state, national and international economies.

01.02 List occupations in aquaculture production, processing, distribution, marketing, and service.

01.03 Identify important aquatic species and products produced by aquatic farmers in Florida, U. S., and foreign countries.

01.04 List the types of production units and systems employed by aquaculturist in Florida, U. S. and foreign countries.

01.05 Outline basic techniques for constructing ponds, tanks, raceways, net pens and cages.

01.06 Describe basic production techniques for the culture of plants, mollusks, crustaceans, and finfish.

01.07 List and describe the major factors in growth of aquaculture species.

01.08 List important criteria in selecting a site for an aquaculture farm.

01.09 Describe natural fisheries and aquaculture production trends.

02.0 Perform general aquaculture production unit operations--The student will be able to:

02.01 Identify and describe the general anatomy, biology and life cycles for aquaculture species studied in this program.

02.02 Identify and describe the general morphology of aquatic macro and microalgae.

02.03 List methods to help determine aquatic animal health and behavior for various aquaculture production units.

02.04 List techniques for routine maintenance of aquaculture ponds, cage culture systems, and submerged lands.

02.05	Identify common aquaculture predators and list predator control techniques
02.06	Record production data such as water quality parameters, feed amounts, mortality and other routine information required for a specific operation on data sheets and enter into a computer.
03.0	Determine methods of fish identification--The student will be able to:
03.01	Identify the major families of fish.
03.02	Describe the complexities of fish anatomy for the following systems: Skeletal systems Musculature Nervous system Vascular system Respiratory system Urogenital system Digestive system Reproductive system
03.03	Identify the major anatomical fish structures.
03.04	Describe the physiological characteristics of fish for the following: Color Bioluminescence Sound production Sensory systems Osmoregulation
03.05	Classify fish.
03.06	Describe the aquatic environment.
03.07	Discuss the basics of fish behavior.
03.08	Identify the muscles of a fish.
03.09	Measure the physical characteristics of fish.
03.10	Use a taxonomic key to identify fish.
03.11	Identify the major taxa of fish.
04.0	Demonstrate an understanding of water quality and aquaculture--The student will be able to:
04.01	Define environmental variables and list ranges important for survival and growth of important aquaculture species.
04.02	Demonstrate an understanding of aquifers, water quantity and management, and agricultural water use in Florida.

04.03	Identify water quality measurements necessary for accurately culturing aquaculture organisms.
04.04	Measure water quality parameters in aquaculture production units, record data in logs and computers, and interpret results.
04.05	Describe the nitrogen cycle and identify system equipment and/or processes which reduce nitrogenous wastes.
04.06	Discuss the importance of oxygen to the maintenance of production units and aquatic animal health and the effect of temperature on oxygen concentration.
04.07	Describe processes in aquaculture production units that effect pH, alkalinity, carbon dioxide, oxygen, ammonia, and other environmental parameters.
04.08	Measure primary productivity and discuss its importance in various aquaculture production units.
04.09	Calculate water volumes for various sizes of aquaculture production units.
04.10	List potential sources of aquaculture pollution and describe methods of preventing or abating these problems.
04.11	Identify Best Management Practices for treating waste water from various aquaculture production units.
05.0	Maintain optimal nutrition for aquaculture organisms--The student will be able to:
05.01	Explain the digestive anatomy of fish.
05.02	Explain fish metabolic rates.
05.03	Identify fish food additives
05.04	Outline the basic concepts of nutrition for plants, mollusks, crustaceans, and fish.
05.05	Discuss the importance of nutrition to growth and survival of various aquaculture species.
05.06	Identify feeding habits and practices of a variety of aquaculture species.
05.07	List common ingredients and additives of aquatic feeds and identify practices in feeds formulation and manufacturing.
05.08	Demonstrate an ability to culture live feeds including microalgae, rotifers and artemia and discuss their importance.
05.09	Calculate feeding rates, growth and feed conversion ratios for various aquaculture species stocked at different densities and rates.
05.10	List different feeding methods, measure feed and maintain feed records in logs and computers.
05.11	Discuss and differentiate feeding practices for hatchery, nursery and grow out of mollusks.
05.12	Discuss nutrition practices for culturing aquatic plants.
05.13	Discuss the principles of bioenergetics to growth.

06.0	Diagnose and control common aquaculture maladies--The student will be able to:
06.01	Identify the common diseases that infect aquaculture organisms.
06.02	Understand the basic mechanisms for control of disease.
06.03	Identify common bacterial diseases and treatment options.
06.04	Identify common mycotic diseases and treatment options.
06.05	Identify common viral diseases and treatment options.
06.06	Identify common parasitic diseases and treatment options.
06.07	Discuss the relationship of nutrition, water quality and stress how they may cause disease in aquaculture organisms.
06.08	Prepare an aquatic organism for diagnostic examination or shipment.
06.09	Observe various diseases of aquatic organisms and demonstrate use of a microscope.
06.10	List approved drugs available for use in aquaculture.
06.11	Describe approved chemicals and their use in treating diseases.
06.12	Identify common aquatic parasites found in Florida waters.
06.13	Identify toxic environmental diseases in fish.
07.0	Operate and maintain aquaculture equipment--The student will be able to:
07.01	List equipment used in various production units necessary to raise plants, mollusks, crustaceans, and fish.
07.02	Set up and maintain standard aquaria.
07.03	Set up field aquaculture ponds.
07.04	Measure field parameters such as temperature, salinity, and hardness.
07.05	Set up a system to culture aquatic plants.
07.06	Demonstrate an ability to correctly use aquaculture equipment including, but not limited to, a thermometer, oxygen meter, refractometer, pH meter, pump, graduated cylinder, beaker, nets, siphon, scales, sieves, calipers, secchi disk, and a microscope.
07.07	Set up aquaculture filtration systems.
07.08	List equipment options of a recirculating system including solids removal, biofiltration, sterilization and aeration, and explain their basic functions.

07.09	Operate and perform system maintenance on a recirculating system.
07.10	Estimate pumping requirements and select an appropriately sized pump for a given system and water volume.
07.11	Layout a PVC plumbing scheme for a given aquaculture system with a sufficient number of valves to allow for bypass and isolation and then measure, cut and assemble that water system.
07.12	Layout and put together an aeration system operated on airlift technology.
07.13	Replace and install a pump.
07.14	Perform simple calculations related to water volume, water flow and system loading.
07.15	Use and operate tools and equipment safely.
07.16	Measure productivity in aquaculture systems.
08.0	Assist in the maturation, spawning, larval and juvenile rearing of aquaculture organisms--The student will be able to:
08.01	Describe the reproductive anatomy, function of reproductive organs, and reproductive cycles of selected aquaculture organisms.
08.02	Differentiate between males and females of the same species.
08.03	Relate environmental factors to successful reproduction of various aquaculture species.
08.04	Explain the use of hormones, anesthetics, chemicals, antibiotics, and other techniques to manage broodstock and accelerate reproductive cycles and contrast the difference between environmental conditioning and induced spawning techniques.
08.05	Maintain and care for broodstock and prepare spawning tanks and/or systems.
08.06	Describe maturation, spawning, hatching, and larval rearing techniques for selected aquaculture species.
08.07	Discuss the importance of nutrition at various stages of the larval rearing cycle for selected aquaculture species.
08.08	Use a microscope to examine the stages and condition of eggs and larvae.
08.09	Prepare, stock, feed and maintain larval rearing tanks.
08.10	Culture live feeds and calculate feeding rates.
08.11	Outline a maturation system design for selected aquatic species.
08.12	List important practices and tasks in hatchery management.
08.13	Estimate production numbers from a given spawn of a given species.
08.14	Record hatching date in logs and computers and interpret results.

09.0	Perform general aquaculture nursery systems operations--The student will be able to:
09.01	Maintain, clean and operate a broodstock tank and list important practices in managing broodstock.
09.02	Start, maintain, count and harvest live feeds.
09.03	Maintain a nursery system by demonstrating an ability to clean tanks and filtration equipment, adjust water flow and volume, set aeration, and monitor water quality and feeding levels.
09.04	Describe and differentiate between land-based and field-based nursery systems, equipment and operations.
09.05	Monitor and record routine data such as feed amounts and times, temperature, oxygen, salinity, and ammonia and enter data into a computer or log book.
09.06	List and describe nursery production systems and larval husbandry techniques for fish, crustaceans, and mollusks.
09.07	Demonstrate practical hands-on experience in handling a variety of juvenile aquaculture organisms and operating nursery production units.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

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**Florida Department of Education
Curriculum Framework**

Program Title: Equine Assistant Management
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0101050701
Program Type	College Credit Certificate (CCC)
Program Length	24 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	45-1011 - First-Line Supervisors of Farming, Fishing, and Forestry Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Equine Studies AS degree program (1101050700).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 equine industry within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction to individuals in the areas of planning, organizing, and supervising equine operations with emphasis on the science and care of equine species and the knowledge and understanding necessary for managing equine operations.

The Equine Assistant Management College Credit Certificate should include the requirements specified in the statewide Articulation Manual.

See additional information relevant to Career and Technical Education (CTE) program implementation.

Standards

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

- 01.0 Identify veterinary terminology and illustrate equine health practices
- 02.0 Analyze equine nutrient requirements and evaluate equine diets
- 03.0 Evaluate equine management systems for appropriate animal welfare, including housing, care and regulations
- 04.0 Demonstrate employability skills including interpersonal skills, ethics, communication and responsibility through work based learning activities and a portfolio
- 05.0 Demonstrate techniques in evaluation, selection and breeding of horses
- 06.0 Demonstrate ability to plan, schedule and maintain records and contracts, using appropriate technical information systems
- 07.0 Demonstrate leadership and effective communication in employee management

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**Florida Department of Education
Student Performance Standards**

Program Title: Equine Assistant Management
CIP Number: 0101050701
Program Length: 24 credit hours
SOC Code(s): 45-1011

This certificate program is part of the Equine Studies AS degree program (1101050701). At the completion of this program, the student will be able to:

01.0 Identify veterinary terminology and illustrate equine health practices –The student will be able to:

01.01 Understand equine diseases and establish appropriate wellness programs for equine populations.

01.02 Comprehend equine anatomy and form to function concepts

01.03 Anticipate typical problems of performance and reproductive horses to prevent injury or poor health; effectively follow veterinarian orders to restore health and productivity.

01.04 Identify and describe equine anatomy, with special emphasis on physiology and function.

01.05 Provide first aid for horses.

01.06 Identify equine medications and demonstrate ability to administer as per veterinarian instructions

02.0 Analyze equine nutrient requirements and evaluate equine diets – The student will be able to:

02.01 Evaluate equine diets according to nutrient requirements for different classes of horses (working, growing, lactating).

02.02 Determine economic impact of feedstuff purchasing decisions

02.03 Maintain safe feeding management programs for enhanced equine health

02.04 Prepare a typical diet for horses of different classes

02.05 Understand feed manufacturing techniques and feed analysis systems.

03.0 Evaluate equine management systems for appropriate animal welfare, including housing, care and regulations– The student will be able to:

03.01 Describe housing designs for different equine management systems.

03.02	Identify appropriate levels of care and welfare for equines.
03.03	Develop a health care program for an equine farm including vaccination protocols, deworming schedules/programs, biosecurity and first aid.
04.0	Demonstrate employability skills including interpersonal skills, ethics, communication and responsibility through work based learning activities and a portfolio – The student will be able to:
04.01	Demonstrate punctuality, initiative, courtesy, dependability, flexibility and honesty.
04.02	Demonstrate ability to work as part of a team.
04.03	Conduct a job search, write a resume and practice interview techniques.
04.04	Understand legal requirements for employees including hiring, firing, and documentation.
04.05	Develop managerial skills such as mentoring, management by objectives, balanced feedback, critical appraisal and promotion.
05.0	Demonstrate techniques in evaluation, selection and breeding of horses – The student will be able to:
05.01	Evaluate equine conformation according to use and purpose.
05.02	Understand basic genetics and selection techniques for effective animal breeding.
05.03	Show ability to manage reproductive health and efficiency.
05.04	Develop appropriate management techniques for equine breeding farm, including stallion management, estrus detection, breeding, foaling and foal management.
06.0	Demonstrate ability to plan, schedule and maintain records and contracts, using appropriate technical information systems – The student will be able to:
06.01	Maintain and analyze equine records and basic business records (health, breeding, inventory, equipment, purchases, and depreciation).
06.02	Understand contract language and different types of contracts.
06.03	Maintain machinery, equipment and facility inventory records.
06.04	Understand legal requirements, rules and regulations concerning horses and agribusiness.
06.05	Manage farm inventory (horses, feed, equipment) for optimum efficiency and profitability.
07.0	Demonstrate leadership and effective communication in employee management – The student will be able to:
07.01	Demonstrate punctuality, initiative, courtesy, dependability, flexibility and honesty.
07.02	Select and hire farm managers who will work with various levels of farm workers, work well in a team environment and care about equine.

07.03 Develop effective oral and written communication skills.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Equine Technician
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0101050703
Program Type	College Credit Certificate (15 credits)
Program Length	15 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	45-1011 – First Line Supervisors of Farming, Fishing & Forestry Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Equine Studies AS degree program (1101050700).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 equine industry within the Agriculture, Food and Natural Resources career cluster.

The Equine Technician, a 15-credit hour college certificate program, introduces students to equine care and entry-level employment. The content includes but is not limited to instruction to individuals in the area of basic equine care. The program includes the requirements specified in the statewide Articulation Manual.

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

Standards

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

- 01.0 Identify veterinary terminology and illustrate equine health practices.
- 02.0 Analyze equine nutrient requirements and evaluate equine diets.
- 03.0 Identify, analyze and apply basic concepts related to normal and abnormal equine behaviors.
- 04.0 Perform safe horse handling techniques.
- 05.0 Evaluate equine management systems for appropriate animal welfare, including housing, care and regulations.

**Florida Department of Education
Student Performance Standards**

Program Title: Equine Technician
CIP Numbers: College Certificate (15 credits)
Program Length: 15 credit hours
SOC Code(s): 45-1011

This certificate program is part of the Equine Studies AS degree program (1101050700). At the completion of this program, the student will be able to:

01.0	Identify veterinary terminology and illustrate equine health practices—The student will be able to:
01.01	Understand equine diseases and establish appropriate wellness programs for equine populations.
01.02	Comprehend equine anatomy and form to function concepts.
01.03	Anticipate typical problems of performance and reproductive horses to prevent injury or poor health; effectively follow veterinarian orders to restore health and productivity.
01.04	Identify and describe equine anatomy, with special emphasis on physiology and function.
01.05	Provide first aid for horses.
01.06	Identify equine medications and demonstrate ability to administer as per veterinarian instructions.
02.0	Analyze equine nutrient requirements and evaluate equine diets—The student will be able to:
02.01	Evaluate equine diets according to nutrient requirements for different classes of horses (working, growing, and lactating).
02.02	Determine economic impact of feedstuff purchasing decisions.
02.03	Maintain safe feeding management programs for enhanced equine health.
02.04	Prepare a typical diet for horses of different classes.
02.05	Understand feed manufacturing techniques and feed analysis systems.
03.0	Identify, analyze and apply basic concepts related to normal and abnormal equine behaviors—The student will be able to:
03.01	Understand and recognize natural horse behaviors.
03.02	Identify and resolve abnormal equine behaviors.

03.03	Utilize horse learning behaviors to improve management and safe handling of horses.
04.0	Perform safe horse handling techniques--The student will be able to:
04.01	Safely catch, lead, tie, groom, restrain and work around horses of various levels of training.
04.02	Safely administer health and medical practices, such as leg wraps, vital signs, injections and restraint for such treatments.
04.03	Evaluate safe transportation techniques and equipment for transportation.
04.04	Evaluate training equipment and demonstrate application of training equipment.
05.0	Evaluate equine management systems for appropriate animal welfare, including housing, care and regulations--The student will be able to:
05.01	Describe housing designs for different equine management systems.
05.02	Identify appropriate levels of care and welfare for equines.
05.03	Develop a health care program for an equine farm including vaccination protocols, deworming schedules/programs, biosecurity and first aid.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Landscape and Horticulture Specialist
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0101060503
Program Type	College Credit Certificate (CCC)
Program Length	12 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	37-3011- Landscaping and Groundskeeping Workers 45-2092 - Farmworkers and Laborers, Crop, Nursery, and Greenhouse
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Landscape and Horticulture Technology AS degree program (1101060500).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 landscape and horticulture sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction pertaining to an understanding of plant physiology and growth, plant classification and identification, maintenance of landscape plants and employability and human relations skills.

See additional information relevant to Career and Technical Education (CTE) program implementation.

Standards

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

- 01.0 Demonstrate an understanding of plant physiology and growth.
- 02.0 Classify plants.
- 03.0 Maintain landscape plants
- 04.0 Demonstrate employability skills.

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**Florida Department of Education
Student Performance Standards**

Program Title: Landscape and Horticulture Specialist
CIP Number: 0101060503
Program Length: 12 credit hours
SOC Code(s): 37-3011, 45-2092

This certificate program is part of the Landscape and Horticulture Technology AS degree program (1101060500). At the completion of this program, the student will be able to:

01.0 Demonstrate an understanding of plant physiology and growth--The student will be able to:

01.01 Describe the process of photosynthesis.

01.02 Identify and describe the functions of all parts of the plant.

01.03 Describe an asexual reproduction process.

01.04 Explain the differences between angiosperms and gymnosperms.

01.05 Identify the differences between woody and herbaceous plants.

02.0 Classify plants--The student will be able to:

02.01 Identify and group shade and flowering trees.

02.02 Identify and group fruit trees and plants.

02.03 Identify and group annuals, vegetables, and herbs.

02.04 Identify and group woody ornamentals, vines, and ground covers.

02.05 Identify and group tropical foliage plants.

02.06 Identify and group turf and ornamental grasses.

03.0 Maintain landscape plants--The student will be able to:

03.01 Determine water requirements and apply at proper rates.

03.02	Identify weeds and apply herbicides safely.
03.03	Determine fertilization requirements and apply at proper rates.
03.04	Identify plant pest problems and apply corrective measures.
03.05	Regulate the growth of landscape plants through chemical or mechanical needs.
03.06	Maintain turf viability (mow at proper height and frequency, aerate, edge, clip, and remove trash).
03.07	Cultivate and mulch plants.
03.08	Brace and repair trees.
04.0	Demonstrate employability skills--The student will be able to:
04.01	Conduct a job search.
04.02	Secure information about a job.
04.03	Identify documents that may be required when applying for a job.
04.04	Complete a job application form.
04.05	Demonstrate competency in job interview techniques.
04.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other person.
04.07	Identify acceptable work habits.
04.08	Demonstrate knowledge of how to make job changes.
04.09	Demonstrate acceptable employee health habits.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Landscape and Horticulture Professional
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0101060504
Program Type	College Credit Certificate (CCC)
Program Length	18 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	37-1012- First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Landscape and Horticulture Technology AS degree program (1101060500).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 landscape and horticulture sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to , instruction pertaining to an understanding of plant physiology and growth, plant nutrition and fertilization, plant classification and identification, pest control, pruning and shaping plants, maintenance of landscape plants and employability and human relations skills. This program also prepares for certification and licensure as a horticulture professional.

See additional information relevant to Career and Technical Education (CTE) program implementation.

Standards

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

- 01.0 Demonstrate an understanding of plant physiology and growth.
- 02.0 Classify plants.
- 03.0 Maintain landscape plants
- 04.0 Demonstrate employability skills.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Landscape and Horticulture Professional
CIP Number: 0101060504
Program Length: 18 credit hours
SOC Code(s): 37-1012

This certificate program is part of the Landscape and Horticulture Technology AS degree program (1101060500). At the completion of this program, the student will be able to:

01.0 Demonstrate an understanding of plant physiology and growth--The student will be able to:

01.01 Describe the process of photosynthesis.

01.02 Identify and describe the functions of all parts of the plant.

01.03 Describe an asexual reproduction process.

01.04 Explain the differences between angiosperms and gymnosperms.

01.05 Identify the differences between woody and herbaceous plants.

02.0 Classify plants--The student will be able to:

02.01 Identify and group shade and flowering trees.

02.02 Identify and group fruit trees and plants.

02.03 Identify and group annuals, vegetables, and herbs.

02.04 Identify and group woody ornamentals, vines, and ground covers.

02.05 Identify and group tropical foliage plants.

02.06 Identify and group turf and ornamental grasses.

03.0 Fertilize plants--The student will be able to:

03.01 Evaluate influences of nutrients on plant growth.

03.02	Apply fertilizers, using appropriate methods (dry, liquid, slow-release, injection, etc.).
03.03	Demonstrate proper handling and storage of fertilizers, observing safety precautions.
04.0	Manage a pest-control program--The student will be able to:
04.01	Develop an integrated pest management program or schedule.
04.02	Train employees in the safe use of pesticides.
05.0	Prune and shape plants--The student will be able to:
05.01	Train employees in pruning techniques.
05.02	Identify and use tools for pruning.
05.03	Prune plants to achieve desired growth.
05.04	Demonstrate sanitation and safety practices when pruning.
06.0	Demonstrate employability skills--The student will be able to:
06.01	Conduct a job search.
06.02	Secure information about a job.
06.03	Identify documents that may be required when applying for a job.
06.04	Complete a job application form.
06.05	Demonstrate competency in job interview techniques.
06.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other person.
06.07	Identify acceptable work habits.
06.08	Demonstrate knowledge of how to make job changes.
06.09	Demonstrate acceptable employee health habits.
07.0	Maintain landscape plants--The student will be able to:
07.01	Determine water requirements and apply at proper rates.
07.02	Identify weeds and apply herbicides safely.

07.03 Determine fertilization requirements and apply at proper rates.

07.04 Identify plant pest problems and apply corrective measures.

07.05 Regulate the growth of landscape plants through chemical or mechanical means.

07.06 Maintain turf viability (mow at proper height and frequency, aerate, edge, clip, and remove trash).

07.07 Cultivate and mulch plants.

07.08 Brace and repair trees.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Landscape and Horticulture Technician
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0101060505
Program Type	College Credit Certificate (CCC)
Program Length	30 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Landscape and Horticulture Technology AS degree program (1101060500).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 landscape and horticulture sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction pertaining to an understanding of plant physiology and growth, plant nutrition and fertilization, plant classification and identification, pest control, pruning and shaping plants, maintenance of landscape plants, equipment maintenance, and employability and human relations skills. This program also prepares for certification and licensure as a horticulture professional and landscape technician

See additional information relevant to Career and Technical Education (CTE) program implementation.

Standards

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

- 01.0 Demonstrate an understanding of plant physiology and growth.
- 02.0 Classify plants.
- 03.0 Select, operate, and maintain tools and equipment.
- 04.0 Fertilize plants.
- 05.0 Manage a pest-control program.
- 06.0 Prune and shape plants.
- 07.0 Maintain landscape plants.
- 08.0 Demonstrate employability skills.

Landscape Specialization:

- 09.0 Plan, install, and maintain landscape irrigation systems.
- 10.0 Analyze and organize the project.
- 11.0 Lay out and install landscape and interiorscape.

Horticulture Specialization:

- 12.0 Determine drainage system needs and design a drainage system.
- 13.0 Prune and shape plants.
- 14.0 Maintain and analyze records.
- 15.0 Prepare growing media and seedbeds.
- 16.0 Propagate plants.
- 17.0 Grow plants.
- 18.0 Harvest, process, and ship plants.
- 19.0 Market plants.
- 20.0 Design, install, and service nursery irrigation systems.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Landscape and Horticulture Technician
CIP Number: 0101060505
Program Length: 30 credit hours
SOC Code(s): 37-1012

This certificate program is part of the Landscape and Horticulture Technology AS degree program (1101060500). At the completion of this program, the student will be able to:

01.0 Demonstrate an understanding of plant physiology and growth--The student will be able to:

01.01 Describe the process of photosynthesis.

01.02 Identify and describe the functions of all parts of the plant.

01.03 Describe an asexual reproduction process.

01.04 Explain the differences between angiosperms and gymnosperms.

01.05 Identify the differences between woody and herbaceous plants.

02.0 Classify plants--The student will be able to:

02.01 Identify and group shade and flowering trees.

02.02 Identify and group fruit trees and plants.

02.03 Identify and group annuals, vegetables, and herbs.

02.04 Identify and group woody ornamentals, vines, and ground covers.

02.05 Identify and group tropical foliage plants.

02.06 Identify and group turf and ornamental grasses.

03.0 Select, operate, and maintain tools and equipment--The student will be able to:

03.01 Select and operate equipment for the job.

03.02	Maintain an inventory of parts and supplies.
04.0	Fertilize plants--The student will be able to:
04.01	Evaluate influences of nutrients on plant growth.
04.02	Apply fertilizers, using appropriate methods (dry, liquid, slow-release, injection, etc.).
04.03	Demonstrate proper handling and storage of fertilizers, observing safety precautions.
05.0	Manage a pest-control program--The student will be able to:
05.01	Develop an integrated pest management program or schedule.
05.02	Train employees in the safe use of pesticides.
05.03	Obtain a pesticide license.
06.0	Prune and shape plants--The student will be able to:
06.01	Train employees in pruning techniques.
06.02	Identify and use tools for pruning.
06.03	Prune plants to achieve desired growth.
06.04	Demonstrate sanitation and safety practices when pruning.
07.0	Maintain landscape plants--The student will be able to:
07.01	Determine water requirements and apply at proper rates.
07.02	Identify weeds and apply herbicides safely.
07.03	Determine fertilization requirements and apply at proper rates.
07.04	Regulate growth of landscape plants through chemical or mechanical means.
07.05	Maintain turf viability (mow at proper height and frequency, aerate, edge, clip, and remove trash).
07.06	Identify plant pest problems and apply corrective measures.
07.07	Cultivate and mulch plants.
07.08	Brace and repair trees.

08.0	Demonstrate employability skills--The student will be able to:
08.01	Conduct a job search.
08.02	Secure information about a job.
08.03	Identify documents that may be required when applying for a job.
08.04	Complete a job application form.
08.05	Demonstrate competency in job interview techniques.
08.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other person.
08.07	Identify acceptable work habits.
08.08	Demonstrate knowledge of how to make job changes.
08.09	Demonstrate acceptable employee health habits.
Landscape Specialization:	
09.0	Plan, install, and service landscape irrigation systems--The student will be able to:
09.01	Determine irrigation requirements.
09.02	Operate and service low-volume irrigation system.
09.03	Operate and service overhead irrigation systems.
09.04	Operate and maintain automatic system.
10.0	Analyze and organize the project--The student will be able to:
10.01	Interpret plans and specifications.
10.02	Identify safety requirements.
10.03	Organize site preparation.
10.04	Locate project materials.
11.0	Lay out and install landscape.--The student will be able to:
11.01	Rough grade site.

11.02	Install large materials.
11.03	Install irrigation system.
11.04	Lay out and install plants.
11.05	Prepare final grade.
11.06	Install lawns.
11.07	Install mulch.
11.08	Perform final clean up.
Horticulture Specialization:	
12.0	Determine drainage system needs and design a drainage system--The student will be able to:
12.01	Determine the texture and percolation characteristics of the soil.
13.0	Prune and shape plants--The student will be able to:
13.01	Develop a pruning program and time schedule.
13.02	Select and use chemical growth regulators.
13.03	Root-prune plants and trees.
14.0	Maintain and analyze records--The student will be able to:
14.01	Maintain fertilizer and pesticide application records.
14.02	Use computers in the landscape and horticulture operations.
15.0	Prepare growing media and seedbeds--The student will be able to:
15.01	Identify media materials.
15.02	Mix rooting and growing media according to plant requirements.
15.03	Sterilize rooting, potting, and growing media.
15.04	Collect and test a soil sample from field and potting media.
15.05	Adjust pH and nutritional levels of media.

15.06	Prepare planting beds and sites.
15.07	Fill and level benches and pots with media.
15.08	Demonstrate sanitation practices when handling and storing plant media materials.
16.0	Propagate plants–The student will be able to:
16.01	Collect propagation materials at proper time (seeds, cuttings, scions, bulbs, etc.).
16.02	Demonstrate propagation by grafting, budding, layering, separating, dividing, cutting, and tissue culturing.
16.03	Prepare flats and a seedbed and plant seeds.
16.04	Prepare a rooting bed.
16.05	Prepare propagation materials (seeds, cuttings, scions, etc.)
16.06	Apply growth stimulants to propagation materials.
16.07	Transplant rooted propagation materials including tissue culture transplants.
16.08	Demonstrate sanitation and safety practices when propagating.
17.0	Grow plants–The student will be able to:
17.01	Prepare media for containers.
17.02	Prepare field site for transplants.
17.03	Select plant containers.
17.04	Determine plant spacing in the field and on container beds.
17.05	Transplant propagated materials to various containers and to the field.
17.06	Determine and provide light requirements of various plant types.
18.0	Harvest, process, and ship plants–The student will be able to:
18.01	Grade and harvest field-grown plants (ball, burlap, bare-root, “grow-bags”).
18.02	Select, grade, and assemble container-grown plants.
18.03	Prepare for shipment, loading, and transporting harvested plant materials.

19.0	Market plants–The student will be able to:
19.01	Identify, inventory, and label marketable plants.
20.0	Design, install, and maintain nursery irrigation systems–The student will be able to:
20.01	Determine irrigation requirements.
20.02	Assess quality of irrigation water.
20.03	Operate and service various types of irrigation systems.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Zoo Animal Technology
Career Cluster: Agriculture, Food and Natural Resources

AAS	
CIP Number	0101099900
Program Type	College Credit
Standard Length	66 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	39-2011 - Animal Trainers 19-1023 - Zoologists and Wildlife Biologists 39-2021 - Nonfarm Animal Caretakers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 zoo animal sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction that prepares individuals to supervise and coordinate the activities of workers engaged in the care and exhibition of birds and animals. Subject matter also includes safety, diseases and parasites, feeding and nutrition, maintenance and repair, animal behavior, as well as leadership, communications, employability, human and public relations skills.

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 consisting of 66 credit hours.

Standards

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

- 01.0 Prevent, treat and control diseases and parasites of animals.
- 02.0 Capture and restrain animals.
- 03.0 Manage animal housing and sanitation.
- 04.0 Manage animal nutrition and feeding.
- 05.0 Operate and maintain instruments and equipment.
- 06.0 Provide first aid for animals.
- 07.0 Collect laboratory specimens.
- 08.0 Analyze and keep records.
- 09.0 Manage animal, visitor and worker safety.
- 10.0 Identify animal species.
- 11.0 Interpret and observe laws, rules and regulations relative to operation.
- 12.0 Dispense medicine and supplies.
- 13.0 Manage, maintain and repair facilities.
- 14.0 Demonstrate leadership, employability, communication, human and public relations skills.
- 15.0 Observe and interpret animal behavior.

**Florida Department of Education
Student Performance Standards**

Program Title: Zoo Animal Technology
CIP Number: 0101099900
Program Length: 66 credit hours
SOC Code(s): 19-1023, 39-2011, 39-2021

The AAS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS. At the completion of this program, the student will be able to:

01.0 Prevent, treat and control diseases and parasites of animals--The student will be able to:

01.01 Observe animals daily for symptoms of disease and parasites.

01.02 Recognize signs of disease requiring the quarantine or isolation of animals.

01.03 Vaccinate animals.

01.04 Provide special nutritional care for animals as required.

01.05 Maintain a quarantine program for new animal populations.

01.06 Manage a pest control program.

01.07 Identify and treat trauma, nutritional disorders, infections, poisoning and genetic diseases.

01.08 Properly handle mortality cases for disposal or necropsy.

02.0 Capture and restrain animals--The student will be able to:

02.01 Identify and use techniques and equipment for the capture and restraint of animals.

02.02 Identify circumstances justifying the capture and restraint of animals.

02.03 Transport animals safely.

03.0 Manage animal housing and sanitation--The student will be able to:

03.01 Dispose of animal waste.

03.02 Identify specific sanitation procedures applicable to managing the collection.

03.03 Select and use appropriate cleaning aids and disinfectants.

03.04	Develop a sanitation schedule.
03.05	Assign animals to appropriate housing according to species requirements.
03.06	Maintain environmental conditions required by species.
04.0	Manage animal nutrition and feeding--The student will be able to:
04.01	Identify nutritional requirements of various animal species in the wild.
04.02	Provide appropriate diets to maintain various species in captivity.
04.03	Properly store and maintain animal food supplies.
04.04	Prepare and dispense food.
04.05	Manage condition under which animals are fed.
05.0	Operate and maintain instruments and equipment--The student will be able to:
05.01	Operate and maintain scales and balances.
05.02	Identify, operate and maintain clinical instruments.
05.03	Operate and maintain sterilization equipment.
05.04	Use and maintain capture and restraint equipment.
05.05	Operate communications equipment.
05.06	Identify and safely use hand and power tools.
06.0	Provide first aid for animals--The student will be able to:
06.01	Identify injuries requiring first aid and provide emergency treatment.
06.02	Prepare and maintain first aid equipment and supplies.
06.03	Identify injuries requiring services of a veterinarian.
07.0	Collect laboratory specimens--The student will be able to:
07.01	Collect blood specimens.
07.02	Collect urine specimens.

07.03	Collect fecal specimens.
07.04	Collect tissue samples.
07.05	Collect environmental samples.
07.06	Properly package and handle specimens for shipment or analysis.
08.0	Analyze and keep records--The student will be able to:
08.01	Keep and maintain equipment service and maintenance records.
08.02	Keep personnel records.
08.03	Keep and maintain animal medical records.
08.04	Keep record of animal feeding and diet.
08.05	Maintain animal behavioral records.
08.06	Keep records of chemical, pesticide and medication use.
09.0	Manage animal, visitor and worker safety--The student will be able to:
09.01	Maintain the safety of animals.
09.02	Manage and maintain safety of visitors.
09.03	Handle animals in a safe and cautious manner.
09.04	Operate tools and equipment in a safe manner.
09.05	Prepare for emergencies.
10.0	Identify animal species--The student will be able to:
10.01	Classify animals according to habitat and nutritional requirements.
10.02	Recognize morphological characteristics of major animal groups.
10.03	Use taxonomical keys to identify animals to genus and species.
10.04	Identify species of animals in specific collections.
11.0	Interpret and observe laws, rules and regulations relative to operation--the student will be able to:

11.01	Observe local, state, federal and international laws and regulations.
11.02	Maintain licenses, certificates, bonds and permits.
11.03	Interpret rules and regulations.
11.04	Identify agencies regulating the profession.
12.0	Dispense medicine and supplies--The student will be able to:
12.01	Follow verbal and written instructions when administering medications.
12.02	Interpret instructions and warnings on the labels of medicines and chemicals.
12.03	Maintain security of medicines and chemicals.
12.04	Identify medicines and chemicals commonly used in the profession.
12.05	Carefully mix, measure and dispense medications.
12.06	Maintain inventory of supplies and medications.
13.0	Manage, maintain and repair facilities--The student will be able to:
13.01	Maintain grounds, facilities and exhibits according to master plan.
13.02	Operate grounds keeping equipment.
13.03	Form and pour concrete.
13.04	Perform simple electrical repairs.
13.05	Perform simple plumbing repairs.
13.06	Paint wood, metal and masonry surfaces.
13.07	Perform repairs on wooden structures.
13.08	Observe safety precautions.
14.0	Demonstrate leadership, employability, communication, human and public relations skills--The student will be able to:
14.01	Conduct a job search.
14.02	Secure information about a job.

14.03	Identify documents that may be required when applying for a job.
14.04	Complete a job application form correctly.
14.05	Demonstrate competence in job interview techniques.
14.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
14.07	Identify acceptable work habits.
14.08	Demonstrate knowledge of how to make job changes appropriately.
14.09	Demonstrate acceptable employee health habits.
15.0	Observe and interpret animal behavior—The student will be able to:
15.01	Recognize animal breeding behavior.
15.02	Provide appropriate breeding environment for animals.
15.03	Adjust animal diet during breeding season.
15.04	Manage the breeding of various species.
15.05	Identify behavior of animals following parturition.
15.06	Provide pre-natal and post-partum care for animals.
15.07	Observe and recognize abnormal animal behavior.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation the student has chosen as a career goal.

Career and Technical Student Organization (CTSO)

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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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Program Length

The AAS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS. The standard length of this program is 66 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Biomass Cultivation Specialist
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0101110301
Program Type	College Credit Certificate (CCC)
Program Length	21 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	19-4011 Agricultural and Food Science Technicians 45-2092 Farmworkers and Laborers, Crop, Nursery, and Greenhouse 19-4099 Precision Agriculture Technicians 45-2091 Agriculture Equipment Operators
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Biomass Cultivation AS degree program (1101110302).

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 agricultural production sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction that prepares individuals to manage land, water, machinery, crops and facilities as well as keep records, analyze records and technical reports, and demonstrate leadership, employability, communication and human relations skills.

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

Standards

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

- 01.0 Distinguish varieties of energy grasses.
- 02.0 Manage crops.
- 03.0 Manage machinery and equipment.
- 04.0 Demonstrate safe chemical handling and chemical waste removal.
- 05.0 Keep and analyze production records.
- 06.0 Demonstrate leadership, communication, employability and human relations skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Biomass Cultivation Specialist
CIP Number: 0101110301
Program Length: 21 credit hours
SOC Code(s): 19-4011, 45-2092, 19-4099, 45-2091

This certificate program is part of Biomass Cultivation AS degree program (1101110302). At the completion of this program, the student will be able to:

01.0 Distinguish varieties of energy grasses--The student will be able to:

01.01 List species used as bioenergy feedstock.

01.02 Compare and contrast morphology and anatomy of energy grass species.

01.03 Explain how biological features of energy grasses are important for cellulosic bioethanol production.

02.0 Manage crops--The student will be able to:

02.01 Prepare soil for crops.

02.02 Determine seeding/planting rate and spacing.

02.03 Calibrate and adjust planting equipment.

02.04 Plant crops.

02.05 Select appropriate cultural practices including cultivation, fertilization and irrigation.

02.06 Identify and control diseases, insects and pests.

02.07 Determine maturity of crops.

02.08 Harvest crops.

02.09 Store crops.

03.0 Manage machinery and equipment--The student will be able to:

03.01 Maintain oil, fuel and hydraulic levels in equipment.

03.02 Maintain tires, batteries and coolant system on all equipment and vehicles.

03.03	Operate and service small gasoline engines.
03.04	Replace hoses, belts and lines.
03.05	Cut and weld with oxy-acetylene and arc welding equipment.
03.06	Observe safety procedures when operating farm equipment.
03.07	Follow a general maintenance schedule.
04.0	Demonstrate safe chemical handling and chemical waste removal--The student will be able to:
04.01	Maintain records per state and federal regulations.
04.02	Know and practice chemical handling according to the guidelines established by Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA).
04.03	Demonstrate safe waste disposal practices.
05.0	Keep and analyze production records--The student will be able to:
05.01	Keep fertilization and pesticide use records.
05.02	Keep equipment maintenance and service records.
05.03	Record cultural and production information.
06.0	Demonstrate leadership, communication, employability and human relations skills--The student will be able to:
06.01	Develop citizenship awareness and responsibility.
06.02	Demonstrate effective communication skills.
06.03	Complete an employment application.
06.04	Conduct a job search.
06.05	Demonstrate job interview skills.
06.06	Recognize appropriate work habits.
06.07	Identify associations and societies associated with occupation.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities must be provided through directed laboratory experience, practicum or cooperative/internship experience. Whenever the cooperative method is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student may receive compensation for work performed.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fl DOE.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Pest Control Operations
Program Type: ATD (Applied Technology Diploma)
Career Cluster: Agriculture, Food and Natural Resources

	CC	PSAV
Program Number	N/A	A020408
CIP Number	0101110502	0101110503
Grade Level	Applied Technology Diploma (ATD)	Applied Technology Diploma (ATD)
Standard Length	24 credit hours	720 clock hours
CTSO	Collegiate FFA	Collegiate FFA
SOC Codes (all applicable)	37-3012 - Pesticide Handlers, Sprayers, and Applicators, Vegetation	37-3012 - Pesticide Handlers, Sprayers, and Applicators, Vegetation
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm	
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp	
Basic Skills Level:	N/A	Mathematics: 10 Language: 10 Reading: 10

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 instruction that prepares individuals to identify pests, select the appropriate pesticide, and apply pesticides safely. Subject matter includes correct workplace practices, route planning, pest identification, safety, pesticide categories, and alternative control methods.

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

Program Structure

This program is an Applied Technology Diploma (ATD) program that is part of a technical degree program, is less than 60 credit hours, and leads to employment in a specific occupation. An ATD program may consist of either technical credit or college credit. A public school district may offer an ATD program only as technical credit, with college credit awarded to a student upon articulation to a community college.

PSAV Program

When offered at the district level, this program is a planned sequence of instruction consisting of one occupational completion points and the courses as shown below.

OCP	Course Number	Course Title	Length	SOC Code
A	ORH0867	Pesticide Handlers, Sprayers, and Applicators, Vegetation 1	360 hours	37-3012
	ORH0868	Pesticide Handlers, Sprayers, and Applicators, Vegetation 2	360 hours	

College Credit

When offered at the community college level, this ATD program is part of the Pest Control Technology AS program (1101110500) and has a program length of 24 credits.

Standards

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

- 01.0 Apply pesticides and agricultural chemicals safely and efficiently.
- 02.0 List and explain laws and regulations relative to the safe application of pest control materials.
- 03.0 Maintain equipment used to apply pest control materials.
- 04.0 Qualify for appropriate certification to apply pest control materials.
- 05.0 Assist in keeping accurate records required by law and for business purposes.
- 06.0 Identify pests and the appropriate chemicals used to control them.
- 07.0 Market and merchandise goods and services.
- 08.0 Demonstrate adequate communication, employability, human and interpersonal relations skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Pest Control Operations
PSAV Number: A020408

When this program is offered at the PSAV level, the following organization of courses, standards, and benchmarks apply.

PSAV Course Number: ORH0867 Occupational Completion Point: A Pesticide Handlers, Sprayers, and Applicators, Vegetation 1 – 360 Hours – SOC Code 37-3012	
01.0	Apply pesticides and agricultural chemicals safely and efficiently--The student will be able to:
01.01	Recognize pesticide and chemical poisoning symptoms.
01.02	Read and interpret packaging labels and guidelines for safety.
01.03	Read and interpret package labels for application rates and instructions.
01.04	Recommend kinds of pesticides and agricultural chemicals to be used in specific situations.
01.05	Use protective clothing and equipment when handling agricultural chemicals.
01.06	Recognize symptoms of pesticide, chemical, and residue damage.
01.07	Calculate coverage of chemical.
01.08	Assess compatibility of selected chemicals.
01.09	Determine rate and volume of chemical to be applied.
01.10	Select time of chemical application.
01.11	Select and match nozzles for equipment type, chemical used, and pattern of application.
01.12	Safely store chemicals.
01.13	Mix chemicals and carrying agents.
01.14	Apply granular or dry chemical materials.
01.15	Apply liquid materials.

01.16	Adjust ground speed of chemical application equipment.
01.17	Dispose of used chemical containers.
01.18	Recognize & respond to pesticide spills.
01.19	Read and interpret MSDS information.
02.0	List and explain laws and regulations relative to the safe application of pest control materials--The student will be able to:
02.01	Observe local, state, and federal pesticide and agricultural chemical regulations.
02.02	Observe EPA regulations.
02.03	List agencies responsible for the regulation of the pest control and chemical application industry.
02.04	Attend workshops and seminars to upgrade skills and knowledge.
02.05	List sources of up-to-date information and services.
02.06	List societies, organizations, and associations relative to the occupation or profession.
03.0	Maintain equipment used to apply pest control materials--The student will be able to:
03.01	Inspect safety equipment for cleanliness, effectiveness, and proper fit.
03.02	Inspect equipment for leaks, clogs, and other malfunctions, and identify improper equipment for the job.
03.03	Adjust pressure and spray patterns.
03.04	Adjust equipment height and width.
03.05	Adjust mixing apparatus.
03.06	Repair or replace hoses, nozzles, and cut-off valves.
03.07	Prepare equipment for storage.
03.08	Lubricate equipment.
03.09	Follow operator's manuals.
03.10	Repair and/or maintain dusters.
03.11	Repair and/or maintain fumigators.

03.12	Assist in keeping vehicle maintenance records.
03.13	Maintain and use shop equipment and tools.
03.14	Clean and flush chemical application equipment.
03.15	Select appropriate equipment to be used with each chemical.
04.0	Qualify for appropriate certification to apply pest control materials--The student will be able to:
04.01	Interpret certification and licensing requirements.
04.02	Identify qualifications needed for various certificates or licensures.
04.03	Apply for license or certificate.
04.04	Maintain license or certificate.

PSAV Course Number: ORH0868
Occupational Completion Point: B
Pesticide Handlers, Sprayers, and Applicators, Vegetation 2 – 360 Hours – SOC Code 37-3012

05.0	Assist in keeping accurate records required by law and for business purposes--The student will be able to:
05.01	Assist in maintaining personnel records.
05.02	Assist in maintaining health and accident records.
05.03	Assist in keeping equipment maintenance records.
05.04	Assist in keeping pesticide application records.
05.05	Assist in maintaining inventory of pesticides and chemicals.
06.0	Identify pests and the appropriate chemicals used to control them--The student will be able to:
06.01	Identify fungi and bacteria and their symptoms.
06.02	Recognize symptoms of insects and nematodes.
06.03	Classify feeding habits and life cycles of insects.
06.04	Describe life cycles of bacteria and fungi.
06.05	Consider the pest, host being attacked, and chemical when recommending chemical control measures.

06.06	Assess environmental impact when recommending chemical control measures.
06.07	Identify insect, weed, and other pests.
06.08	Assess economic and aesthetic thresholds to determine if pesticide applications are warranted.
07.0	Market and merchandise goods and services--The student will be able to:
07.01	Handle customer complaints and questions.
07.02	Take orders for goods and services by telephone.
07.03	Advise customers in the selection of goods or services.
08.0	Demonstrate adequate communication, employability, human, and interpersonal relations skills--The student will be able to:
08.01	Conduct a job search.
08.02	Secure information about a job.
08.03	Identify documents that may be required when applying for a job.
08.04	Complete a job application form correctly.
08.05	Demonstrate competence in job interview techniques.
08.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other person.
08.07	Identify acceptable work habits.
08.08	Demonstrate knowledge of how to make job changes appropriately.
08.09	Demonstrate acceptable employee health habits.

**Florida Department of Education
Student Performance Standards**

Program Title: Pest Control Operations
ATD CIP Number: 0102040802
SOC Code(s): 37-3012

When this program is offered at the college level, the following standards and benchmarks apply:

01.0	Apply pesticides and agricultural chemicals safely and efficiently--The student will be able to:
01.01	Read and interpret packaging labels and guidelines for safety.
01.02	Read and interpret package labels for application rates and instructions.
01.03	Recommend kinds of pesticides and agricultural chemicals to be used in specific situations.
01.04	Use protective clothing and equipment when handling agricultural chemicals.
01.05	Recognize symptoms of pesticide, chemical, and residue damage.
01.06	Calculate coverage of chemical.
01.07	Assess compatibility of selected chemicals.
01.08	Determine rate and volume of chemical to be applied.
01.09	Select time of chemical application.
01.10	Select and match nozzles for equipment type, chemical used, and pattern of application.
01.11	Safely store chemicals.
01.12	Mix chemicals and carrying agents.
01.13	Apply granular or dry chemical materials.
01.14	Apply liquid materials.
01.15	Adjust ground speed of chemical application equipment.
01.16	Dispose of used chemical containers.

02.0	List and explain laws and regulations relative to the safe application of pest control materials–The student will be able to:
02.01	Observe local, state, and federal pesticide and agricultural chemical regulations.
02.02	Observe EPA regulations.
02.03	List agencies responsible for the regulation of the pest control and chemical application industry.
02.04	Attend workshops and seminars to upgrade skills and knowledge.
02.05	List sources of up-to-date information and services.
02.06	List societies, organizations, and associations relative to the occupation or profession.
03.0	Maintain equipment used to apply pest control materials–The student will be able to:
03.01	Inspect safety equipment for cleanliness, effectiveness, and proper fit.
03.02	Inspect equipment for leaks, clogs, and other malfunctions, and identify improper equipment for the job.
03.03	Adjust pressure and spray patterns.
03.04	Adjust equipment height and width.
03.05	Adjust mixing apparatus.
03.06	Repair or replace hoses, nozzles, and cut-off valves.
03.07	Prepare equipment for storage.
03.08	Lubricate equipment.
03.09	Follow operator's manuals.
03.10	Repair and/or maintain dusters.
03.11	Repair and/or maintain fumigators.
03.12	Assist in keeping vehicle maintenance records.
03.13	Maintain and use shop equipment and tools.
03.14	Clean and flush chemical application equipment.
03.15	Select appropriate equipment to be used with each chemical.

04.0	Qualify for appropriate certification to apply pest control materials–The student will be able to:
04.01	Interpret certification and licensing requirements.
04.02	Identify qualifications needed for various certificates or licensures.
04.03	Apply for license or certificate.
04.04	Maintain license or certificate.
05.0	Assist in keeping accurate records required by law and for business purposes–The student will be able to:
05.01	Assist in maintaining personnel records.
05.02	Assist in maintaining health and accident records.
05.03	Assist in keeping equipment maintenance records.
05.04	Assist in keeping pesticide application records.
05.05	Assist in maintaining inventory of pesticides and chemicals.
06.0	Identify pests and the appropriate chemicals used to control them--The student will be able to:
06.01	Identify fungi and bacteria and their symptoms.
06.02	Recognize symptoms of insects and nematodes.
06.03	Classify feeding habits and life cycles of insects.
06.04	Describe life cycles of bacteria and fungi.
06.05	Consider the pest, host being attacked, and chemical when recommending chemical control measures.
06.06	Assess environmental impact when recommending chemical control measures.
06.07	Identify insect, weed, and other pests.
07.0	Market and merchandise goods and services–The student will be able to:
07.01	Handle customer complaints and questions.
07.02	Take orders for goods and services by telephone.
07.03	Advise customers in the selection of goods or services.

08.0	Demonstrate adequate communication, employability, human, and interpersonal relations skills–The student will be able to:
08.01	Conduct a job search.
08.02	Secure information about a job.
08.03	Identify documents that may be required when applying for a job.
08.04	Complete a job application form correctly.
08.05	Demonstrate competence in job interview techniques.
08.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other person.
08.07	Identify acceptable work habits.
08.08	Demonstrate knowledge of how to make job changes appropriately.
08.09	Demonstrate acceptable employee health habits.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Either a community college or school district may offer the ATD program as college credit or vocational credit (vocational technical Center may offer only as vocational credit). Students completing an ATD at a vocational technical center will be awarded the guarantee college credit upon enrollment to the community college.

This program is part of the Pest Control Technology AS degree and guarantees transfer of 24 credit hours toward the related AS degree. Minimum entrance requirements for this program include a high school diploma or GED. Students must meet the minimum basic skills levels to complete the program.

Faculty teaching this program must have a minimum of an AS degree in the discipline area or meet the "exceptional cases" criteria as established by the Southern Association for Colleges and Schools.

No fees will be charged for the transfer of credit from a vocational technical center to a community college. The established statewide fee structure will be adhered to by both delivery systems.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

Basic Skills

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C. the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10, Language 10, and Reading 10. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

The information related to the guaranteed transfer of credit between an ATD program and AS degree must be documented and maintained by the Articulation Coordinating Committee (ACC). The transfer of the ATD to an AS degree is guaranteed for a period of three (3) years following the date of the award of the ATD. For further information about ATD to AS degree articulation agreements please visit, [http://www.fldoe.org/articulation/pdf/ATD to ASandAAS ArticulationAgreemts.pdf](http://www.fldoe.org/articulation/pdf/ATD_to_ASandAAS_ArticulationAgreemts.pdf)

Program Length

In accordance with Rule 6A-10.024, F.A.C. an ATD program consists of a course of study that is part of an AS or AAS degree program, is less than 60 credit hours, is approximately 50% of the technical component (non-general education), and leads to employment in a specific occupation. An ATD program may consist of either technical credit or college credit.

Students must have a high school diploma, a GED, or a certificate of completion to be admitted to an ATD program. Within six weeks of entry, students in ATD programs of 450 or more hours must be tested pursuant to Rule 6A-10.040, F.A.C. and if below minimum standards for completion from the program, must receive remedial instruction. The minimum standards must be at least the equivalent of a score of ten (10) on all sections of basic skills test approved in Rule 6A-10.040, F.A.C. Students must successfully complete all remedial instruction before completing the ATD.

Community Colleges may offer either college or career credit toward the ATD. A Career Center in a public school district may offer an ATD program only as technical credit, with college credit awarded to a student upon articulation to a community college (Section 1004.02, F.S.)

When offered at a community college the standard length of this program is 24 credits. When offered at a technical center the standard length of this program is 720 clock hours.

In accordance with Rule 6A-10.024, F.A.C. all faculty providing instruction must have at least a baccalaureate degree or an associate degree with demonstrated competencies in the specific instructional program as defined by the Southern Association of Colleges and Schools.

**Florida Department of Education
Curriculum Framework**

Program Title: Marine Mammal Behavior and Training
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0103060101
Program Type	College Credit Certificate (CCC)
Program Length	15 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	39-2011 - Animal Trainers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Marine Environmental Technology AS degree program (1103060100).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 purpose of this program is to provide technically skilled employees for the marine mammal training, behavior, and research fields. Graduates of this program will obtain the fundamental academic skills necessary to be successful at entry level positions in the marine mammal training, behavior and research fields and demonstrate the an understanding of the fundamental concepts of marine mammal science.

Graduates will demonstrate the ability to understand and practice the fundamentals of: marine mammal husbandry; marine mammal medical care and pathology; behavior modification and training; anatomy; physiology; maternity; population management; habitat and maintenance;

environmental enrichment; cognitive and behavioral research methodology, design and implementation; dolphin acoustics; and communication; marine mammal law; and conservation.

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

Standards

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

- 01.0 Demonstrate an understanding of the fundamental principles of marine mammal anatomy and evolution.
- 02.0 Demonstrate basic knowledge of marine mammal social structure and culture.
- 03.0 Demonstrate proficiency of basic marine mammal training and husbandry techniques.
- 04.0 Demonstrate knowledge of principle marine mammal laws and regulations.
- 05.0 Describe and discuss research focused on marine mammals.
- 06.0 Demonstrate knowledge of conservation issues involving marine mammals
- 07.0 Demonstrate an understanding of the guiding principles and practices of marine mammals in human care.

**Florida Department of Education
Student Performance Standards**

Program Title: Marine Mammal Behavior and Training
CIP Number: 0103060101
Program length: 15 credit hours
SOC Code (s): 39-2011

This certificate program is part of the Marine Environmental Technology AS degree program (1103060100). At the completion of this program, the student will be able to:

01.0	Demonstrate an understanding of the fundamental principles of marine mammal anatomy and evolution. The student will be able to:
01.01	Demonstrate an understanding of the external and internal aspects of dolphin anatomy and physiology, and their role in the successful survival of a mammal in the marine environment.
01.02	Demonstrate knowledge of the anatomy and evolution of various marine mammals including other cetaceans, pinnipeds and sirenians.
01.03	Demonstrate knowledge of the evolution of marine mammals.
02.0	Demonstrate basic knowledge of marine mammal social structure and culture. The student will be able to:
02.02	Demonstrate an understanding of basic dolphin ecology as related to communication, foraging, reproduction, calf rearing and social structure.
02.03	Explain and outline marine mammal maternal characteristics, behaviorism human care and the wild, as well as prenatal care, birthing situations and maternity care of mother and neonate human care facilities.
02.04	Explain how the natural social ecology of dolphins and the importance and impact of it on how they are managed at human care facility.
02.05	Demonstrate an understanding of the basic social structure of other representative marine mammal taxa.
02.06	Demonstrate how the term “culture” has been theorized to apply to certain aspects of cetacean societies and how that impacts our understanding of their cognition.
02.07	Understand the portrayal of marine mammals in the media and how and why it has changed over time.
02.08	Understand the application of animal assistance to humans throughout history and the more recent use of marine mammals in military service and how the latter has greatly contributed to our essential knowledge base of marine mammals overall.
03.0	Demonstrate proficiency of basic marine mammal training and husbandry techniques. The student will be able to:
03.01	Understand the philosophy and techniques of operant (behavioral) conditioning, with a focus on positive reinforcement in training behavior and its application to working with dolphins.
03.02	Demonstrate operant conditioning techniques through the use of learned hand signals in communicating requests for various trained behaviors from the dolphin.

03.03	Apply skills learned in animal care, handling and reinforcement during a live animal presentation for the general public.
03.04	Construct a plan for basic marine mammal care, dietary and medical needs, and animal handling.
03.05	Understand the medical issues unique to marine mammals, methods of treatment of bacterial, viral, fungal and parasitic disease, established preventive care practices.
03.06	Demonstrate the use of operant conditioning in training a new behavior through outlining, developing, implementing and modifying a behavior chain through practical application with the animals.
03.07	To summarize the importance of voluntary medical behavior training, concepts and techniques used to desensitize animals to non-invasive medical equipment and procedures. Understand the importance of the of trainer/animal relationship with regard to properly maintaining the health and well being of the animals.
03.08	To investigate and understand the purpose and necessity of animal enrichment including cognitive, development, and social aspects. Design and implement enrichment activities to enhance the habitat and activities of the animals.
03.09	To summarize safety precautions and the social issues surrounding enrichment devices, habitat design, safety & maintenance social groupings, training and dolphin & sea lion nutrition & energetics.
03.10	To critique various career pathways and opportunities available in the field of marine mammal care and training, including necessary academics, field experience, trainer forums, further experiential education in the field, networking, etc.
04.0	Demonstrate knowledge of principle marine mammal laws and regulations. The student will be able to:
04.01	Understand and explain the laws and regulating agencies, and their evolution, designed to protect marine mammals in both the wild and human care as well as regulate facilities .
04.02	Understand the separate roles of both NOAA and the Department of Agriculture and how they impact marine mammals and marine mammal facilities.
05.0	Describe and discuss research focused on marine mammals. - The student will be able to:
05.01	Describe the historical and current research efforts relating to dolphin cognition, behavior, acoustics, communication, strandings, physiology, reproduction and conservation.
05.02	Summarize basic medical procedures and the importance and implications of husbandry techniques to marine mammal research.
05.03	Explain how research with dolphins in human care have expanded our understanding of their wild cousins and contributed to their conservation.
05.04	Summarize trends in basic dolphin ethology, past and ongoing studies related to cognition, behavior and communication and its application in research, as well as an understanding of passive observational data collection and facilitation of active cognitive research.
05.05	Evaluate theories and research on dolphin echolocation and whistle production; implication of anthropogenic noise in the marine environment and ongoing research in the area.
05.06	Conduct independent behavioral observations.
05.07	Review research design and logistics as it applies to marine mammals in human care through a project design exercise conducted collaboratively throughout the course, including an understanding of results analyses and interpretation.
05.08	Critique career pathways and requirements toward becoming a marine mammal research scientist in human care settings (ex situ) and in the field (in situ).

06.0	Demonstrate knowledge of conservation issues involving marine mammals. - The student will be able to:
06.01	Understand the current conservation issues of international/domestic . concern which affect marine mammals and their environment, cumulative impacts both natural and human induced, as well as ways in which individuals can affect the environment in a positive manner to conserve the species.
06.02	Master the skills in synthesizing new information and experiences with prior conceptions of dolphins and the marine environment to clearly refine their opinions and knowledge base.
06.03	Outline the organization of the Marine Mammal Stranding Network; procedures used in assisting and rehabilitating stranded marine mammals; international and domestic issues concerning threats to dolphins and the marine environment.
06.04	List anthropogenic impacts affecting marine mammals and their environment, and demonstrate an understanding of research needed in this area, implications of impacts and associated research.
06.05	Understand past and present state of whaling operations around the world and the processes and organizations that govern these activities
06.06	Understand status of certain endangered marine mammal species and conservation measures to sustain their populations.
07.0	Demonstrate an understanding of the guiding principles and practices of marine mammals in human care. The student will be able to:
07.01	To diagram population management, including theories, tools and strategies for maintaining a population's genetic diversity and demographic stability in order to insure its long term persistence.
07.02	Summarize specific concerns surrounding appropriate design, construction and maintenance of aquatic mammal habitats for marine mammals in human care.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Tropical Ornamental Mariculture Technician
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0103060102
Program Type	College Credit Certificate (CCC)
Program Length	30 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	45-2093 - Farmworkers, Farm, Ranch, and Aquacultural Animals
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Marine Environmental Technology AS degree program (1103060100).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 instruction in tropical marine ornamental finfish and invertebrate husbandry, disease and parasite diagnostics and prevention, nutrition of marine aquaculture organisms, aquaculture best management practices, marine aquaculture systems and design, as well as an internship at a tropical marine aquaculture facility.

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

Standards

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

- 01.0 Compose scientific and/or technical reports.
- 02.0 Demonstrate an understanding of marine ecosystems, environmental management, and resource conservation.
- 03.0 Comprehension of fundamental principles governing business and entrepreneurship.
- 04.0 Demonstrate an understanding of the fundamental principles of marine aquaculture –
- 05.0 Demonstrate a thorough knowledge of aquaculture best management practices.
- 06.0 Identify and diagnose common diseases and parasites that infect marine aquaculture organisms.
- 07.0 Demonstrate a moderate understanding of marine aquaculture systems.
- 08.0 Recognize appropriate nutritional requirements for the most common marine aquaculture organisms.
- 09.0 Demonstrate a basic understanding of marine aquaculture husbandry principles and practices

**Florida Department of Education
Student Performance Standards**

Program Title: Tropical Ornamental Mariculture Technician
CIP Number: 0103060102
Program Length: 30 credit hours
SOC Code(s): 45-2093

This certificate program is part of the Marine Environmental Technology AS degree program (1103060100). At the completion of this program, the student will be able to:

01.0 Compose scientific and/or technical reports—The student will be able to:

01.01 Explain the peer-review process of publishing a scientific article.

01.02 Explain the function of each section of a scientific paper or technical report.

01.03 Critically analyze a scientific paper describing its thesis, methods, results and conclusions.

01.04 Create at least two reports formatted according to a scientific publishing format.

02.0 Demonstrate an understanding of marine ecosystems, environmental management, and resource conservation—The student will be able to:

02.01 Explain the essential components of ecology, and how energy flows through an ecosystem.

02.02 Explain the functional role of primary producers in the marine environment, and identify common species of marine plants and algae.

02.03 Explain the essential components of intertidal ecology, and how energy flows through various types of intertidal ecosystems.

02.04 Describe the features and functional systems in the intertidal, neritic, epipelagic and deep ocean regions.

02.05 Explain the basic functional ecology and energy flow on a coral reef.

02.06 List the various resources humans derived from the sea and what problems this presents.

02.07 Explain how humankind has and continues to impact the marine environment.

02.08 Describe methods and best practices currently in use to conserve marine ecosystems including but not limited to as marine spatial planning, integrated coastal zone management and marine protected areas.

02.09 Explain the concepts of “Tragedy of the Commons” and “Precautionary Principle” as they relate to marine ecosystem and resource conservation.

03.0 Comprehension of fundamental principles governing business and entrepreneurship. —The student will be able to:

03.01	Demonstrate a familiarity of entrepreneurship by understanding the characteristics and mindset of entrepreneurs.
03.02	Identify and evaluate opportunities within the marketplace, both for new venture creation and within existing organizations.
03.03	Create the tools necessary to act on an entrepreneurial opportunity by writing a business plan, building a management team, financing the opportunity and creating an innovative marketing plan.
03.04	Describe successful strategies and common mistakes made by successful entrepreneurs.
03.05	Describe the legal requirements and obstacles in starting a business venture.
04.0	Demonstrate an understanding of the fundamental principles of marine aquaculture. – The student will be able to:
04.01	Demonstrate a basic understanding of marine aquaculture husbandry principles and practices.
04.02	Demonstrate the skills required to culture phytoplankton and zooplankton required for larval rearing.
04.03	Describe the basic types of marine aquaculture systems.
04.04	Describe the various types of common organisms and techniques currently used
04.05	Demonstrate a basic knowledge of common diseases and parasites during marine aquaculture and methods for their control.
05.0	Demonstrate a thorough knowledge of aquaculture best management practices. Students will be able to:
05.01	Describe the concept of aquaculture Best Management Practices.
05.02	Compile and analyze marine aquaculture industry management data.
05.03	Identify and demonstrate proper use of key Quality Management tools.
05.04	Develop and implement the key components and concepts of an aquaculture management plan.
06.0	Demonstrate a basic understanding of marine aquaculture husbandry principles and practices. - Students will be able to:
06.01	Identify the principles of water quality specific to marine aquaculture from a variety of marine taxa.
06.02	Demonstrate a working knowledge of variety of husbandry techniques for most of the known marine species currently being cultured, including temperature and photoperiod control conducive to spawning and species specific life styles.
06.03	Understand basic selective breeding techniques for enhanced phenotypic traits.
07.0	Identify and diagnose common diseases and parasites that infect marine aquaculture organisms. - Students will be able to:
07.01	Demonstrate an understanding of how the culture environment is associated with the occurrence and outbreak of disease and parasites in marine aquaculture systems.
07.02	Identify the differences between environmental, viral, bacterial, parasitic and fungal diseases of marine species.

07.03	Demonstrate a basic understanding of methodologies for treatment of diseases commonly encountered during marine aquaculture operations.
07.04	Demonstrate an understanding of the basic principles of marine aquatic health management and biosecurity.
08.0	Demonstrate a moderate understanding of marine aquaculture systems. - Students will be able to:
08.01	Describe the various types of marine aquaculture systems and demonstrate the ability to distinguish the primary components of specific marine aquaculture systems.
08.02	Identify which systems are best for the culture and business model of the target species.
08.03	Recognize the System requirements for Integrated Multi-Trophic Mariculture (IMTM) systems.
08.04	Demonstrate an understanding of the impacts of specific marine aquaculture systems on the environment and especially marine ecosystems.
08.05	Demonstrate basic skills for computer automated drafting.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students. Most onsite (i.e. FKCC) laboratory activities associated with the TOMT certificate are centered on marine aquaculture activities. On-site laboratory facilities include: (1) an indoor marine ornamental laboratory with a sterile seawater supply, (2) a support and disease diagnostic laboratory adjacent to the marine ornamental lab, and (3) an outdoor system with six (6) 600 gallon polyethylene tanks with filtered sea-water pumped in from the ambient waters and/or drawn from a saltwater well.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Turf Equipment Technology
Program Type: ATD (Applied Technology Diploma)
Career Cluster: Agriculture, Food and Natural Resources

	CC	PSAV
Program Number	N/A	A020608
CIP Number	0131030202	0131030203
Grade Level	Applied Technology Diploma (ATD)	Applied Technology Diploma (ATD)
Standard Length	38 credit hours	1140 clock hours
CTSO	Collegiate FFA	Collegiate FFA
SOC Codes (all applicable)	49-3053 - Outdoor Power Equipment and Other Small Engine Mechanics	49-3053 - Outdoor Power Equipment and Other Small Engine Mechanics
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm	
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp	
Basic Skills Level:	N/A	Mathematics: 10 Language: 10 Reading: 10

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 instruction that prepares individuals to manage and maintain turf care equipment and to manage a shop facility. Instruction includes: hand tools, gasoline and diesel mechanics, paints and painting, sharpening and grinding, welding, hydraulics, electrical systems, training on specialized turf care equipment, record keeping, inventory control, safety, laws and regulations, public relations, human relations, shop management, professionalism, employability skills, communications skills, and management skills

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

Program Structure

This program is an Applied Technology Diploma (ATD) program that is part of a technical degree program, is less than 60 credit hours, and leads to employment in a specific occupation. An ATD program may consist of either technical credit or college credit. A public school district may offer an ATD program only as technical credit, with college credit awarded to a student upon articulation to a community college.

PSAV Program

When offered at the district level, this program is a planned sequence of instruction consisting of one occupational completion points and the courses as shown below.

OCP	Course Number	Course Title	Length	SOC Code
A	SER0004	Outdoor Power Equipment and Other Small Engine Mechanics 1	435 hours	49-3053
	SER0005	Outdoor Power Equipment and Other Small Engine Mechanics 2	435 hours	
	SER0006	Outdoor Power Equipment and Other Small Engine Mechanics 3	270 hours	

College Credit

When offered at the community college level, this ATD program is part of the Turf Equipment Management AS program (1131030201) and has a program length of 38 credits.

Standards

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

- 01.0 Disassemble, reassemble, adjust, repair, and diagnose the problems related to two and four-cycle engines.
- 02.0 Service electrical systems, fuels and lubricating systems, cooling systems, power train/hydraulic drives, and controls on turf equipment.
- 03.0 Adjust, sharpen, grind, and rebuild reel and rotary mowing units.
- 04.0 Demonstrate understanding of governmental regulations and compliances pertaining to golf courses.
- 05.0 Use shop tools and equipment, and organize a shop following appropriate safety, management, and inventory techniques.
- 06.0 Order and stock parts and keep shop records.
- 07.0 Perform basic welding tasks using both gas and arc welding techniques.
- 08.0 Identify and safely operate turf care equipment.
- 09.0 Demonstrate employability skills.
- 10.0 Identify the various professional organizations and publications that pertain to the turf management industry.
- 11.0 Design a functional golf course maintenance facility and select appropriate maintenance equipment.
- 12.0 Develop a preventive maintenance program for turf care equipment.
- 13.0 Develop human relations skills.
- 14.0 Perform decision making activities.

**Florida Department of Education
Student Performance Standards**

Program Title: Turf Equipment Technology
PSAV Number: A020608

When this program is offered at the PSAV level, the following organization of courses, standards, and benchmarks apply.

PSAV Course Number: SER0004	
Occupational Completion Point: A	
Outdoor Power Equipment and Other Small Engine Mechanics 1 – 435 Hours – SOC Code 49-3053	
01.0	Disassemble, reassemble, adjust, repair, and diagnose the problems related to two-cycle and four-cycle engines--The student will be able to:
01.01	Evaluate horsepower and torque.
01.02	Disassemble and reassemble a two-cycle and four-cycle engine.
01.03	Identify crankcase and cylinder assembly.
01.04	Identify and be able to assemble valves, piston assembly, crankshaft, cooling system, and air filters.
01.05	Identify and assemble parts of the carburetor assembly.
01.06	Identify and assemble the ignition system, governor, alternator, and starter system.
01.07	Identify types of batteries.
01.08	Follow safety rules and precautions when dealing with engines.
02.0	Service electrical systems, fuel and lubricating systems, power train/hydraulic drives, and controls on turf equipment--The student will be able to:
02.01	Identify turf equipment electrical systems.
02.02	Service hydraulic systems on a variety of turf equipment.
02.03	Service turf equipment power train systems.
02.04	Identify and service various lubricating systems and understand types of fuels and lubricants.
02.05	Operate and repair the various mechanical and hydraulic controls on turf equipment.
02.06	Repair the governor, ignition, alternator, and starter system on various pieces of turf equipment.

03.0	Adjust, sharpen, grind, and rebuild reel and rotary mowing units--The student will be able to:
03.01	Sharpen and balance rotary mower blades.
03.02	Remove and replace rotary mower blades.
04.0	Demonstrate understanding of governmental regulations and compliances pertaining to golf courses--The student will be able to:
04.01	Control pollution
04.02	Protect water quality
04.03	Demonstrate fire prevention methods
04.04	Identify and prevent health hazards and demonstrate proper first aid
05.0	Use shop tools and equipment and organize a shop following appropriate safety, management and inventory techniques--The student will be able to:
05.01	Follow basic OSHA safety regulations and shop fire prevention techniques.
05.02	Perform basic first aid procedures.
05.03	Establish a file system for shop records.
05.04	Identify and use shop hand tools and equipment that relate to turf equipment maintenance.
05.05	Select the appropriate fasteners, bearings, seals, belts, chains, fuels, and lubricants for various turf equipment.
05.06	Establish and maintain appropriate shop space for specific shop tasks.
05.07	Establish an appropriate equipment inventory system.

PSAV Course Number: SER0005
Occupational Completion Point: A
Outdoor Power Equipment and Other Small Engine Mechanics 2 – 435 Hours – SOC Code 49-3053

06.0	Order and stock parts and keep shop records--The student will be able to:
06.01	Use the various equipment manuals to identify parts and service procedures.
06.02	Order parts properly.
06.03	Establish a system for stocking appropriate turf equipment parts.

06.04	Gather the appropriate forms for establishing a recordkeeping system.
06.05	Maintain computer-based inventory and record-keeping system.
07.0	Perform basic welding tasks using both gas and arc welding techniques--The student will be able to:
07.01	Follow welding symbols, and safety practices.
07.02	Connect and operate oxy-acetylene welding equipment.
07.03	Run beads and weld various types of joints.
07.04	Braze and solder metal.
07.05	Cut metal with and oxy-acetylene torch.
07.06	Select appropriate welding rods.
07.07	Set up an electrical arc welding machine.
07.08	Arc weld various types of joints.
08.0	Identify and safely operate turf care equipment--The student will be able to:
08.01	Identify the appropriate use for commonly used turf care equipment.
08.02	Identify the operation safety procedures for commonly used turf equipment.
08.03	Operate properly all commonly used turf care equipment.
09.0	Demonstrate employability skills--The student will be able to:
09.01	Conduct a job search.
09.02	Secure information about a job.
09.03	Identify documents which may be required when applying for a job interview.
09.04	Complete a job application correctly.
09.05	Demonstrate competence in a job interview.
09.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
09.07	Identify acceptable work habits.

09.08	Demonstrate knowledge or how to make job changes appropriately.
09.09	Demonstrate acceptable employee health habits.
09.10	Identify appropriate attire and grooming to maintain a functional and professional atmosphere in the equipment maintenance facility.
10.0	Identify the various professional organizations and publications that pertain to the turf management industry--The student will be able to:
10.01	Identify major points in the history of the golf course/turf industry.
10.02	Identify and understand various professional turf publications.
10.03	Identify and understand the basic role of professional turf organizations.
10.04	Identify the basics of the seed production and sod production industries.
10.05	Identify the various classes of golf courses and turf maintenance organizations.
11.0	Design a functional golf course maintenance facility and select appropriate maintenance equipment--The student will be able to:
11.01	Evaluate the organization and management styles utilized by various golf courses.
11.02	Classify, by use, the various equipment used on a typical 18-hole golf course.
11.03	List the equipment needed to properly maintain an 18-hole golf course.
11.04	Design and organize a golf course maintenance complex.
11.05	Develop an equipment budget for an 18-hole golf course.
11.06	Identify appropriate attire and grooming to maintain a functional and professional atmosphere in the equipment maintenance facility.

PSAV Course Number: SER0006
Occupational Completion Point: A
Outdoor Power Equipment and Other Small Engine Mechanics 3 – 270 Hours – SOC Code 49-3053

12.0	Develop preventive maintenance programs for turf care equipment--The student will be able to:
12.01	Develop a recordkeeping system to record equipment use.
12.02	Develop a recordkeeping system to record service work performed on equipment.
13.0	Develop human relations skills--The student will be able to:
13.01	Demonstrate appropriate work habits.

13.02	Identify traits that promote good human relations and increase job performance.
13.03	Develop an understanding of the role of the golf course superintendent and turf equipment service manager in the overall successful operations of the golf course.
14.0	Perform decision-making activities--The student will be able to:
14.01	Develop the ability to solve problems in a logical sequence.
14.02	Demonstrate the ability to determine proper work priorities.
14.03	Prepare a day's work schedule for the superintendent.
14.04	Choose appropriate action in situations requiring following a chain of command.
14.05	Choose appropriate action in situations requiring effective time management.
14.06	Choose appropriate action in situations requiring application of business ethics.
14.07	Identify ways to assign work to others.

**Florida Department of Education
Student Performance Standards**

Program Title: Turf Equipment Technology
ATD CIP Number: 0131030202
SOC Code(s): 49-3053

When this program is offered at the college level, the following standards and benchmarks apply:

01.0	Disassemble, reassemble, adjust, repair, and diagnose the problems related to two-cycle and four-cycle engines--The student will be able to:
01.01	Evaluate horsepower and torque.
01.02	Disassemble and reassemble a two-cycle and four-cycle engine.
01.03	Identify crankcase and cylinder assembly.
01.04	Identify and be able to assemble valves, piston assembly, crankshaft, cooling system, and air filters.
01.05	Identify and assemble parts of the carburetor assembly.
01.06	Identify and assemble the ignition system, governor, alternator, and starter system.
01.07	Identify types of batteries.
01.08	Follow safety rules and precautions when dealing with engines.
02.0	Service electrical systems, fuel and lubricating systems, power train/hydraulic drives, and controls on turf equipment--The student will be able to:
02.01	Identify turf equipment electrical systems.
02.02	Service hydraulic systems on a variety of turf equipment.
02.03	Service turf equipment power train systems.
02.04	Identify and service various lubricating systems and understand types of fuels and lubricants.
02.05	Operate and repair the various mechanical and hydraulic controls on turf equipment.
02.06	Repair the governor, ignition, alternator, and starter system on various pieces of turf equipment.
03.0	Adjust, sharpen, grind, and rebuild reel and rotary mowing units--The student will be able to:

03.01	Repair and sharpen various types of reel mowers.
03.02	Grind reel bedknives with various bedknife grinders.
03.03	Lap reel mower blades.
03.04	Follow safety procedures when using reel and bedknife grinders.
03.05	Adjust reel mowers to produce proper cutting heights.
03.06	Sharpen and balance rotary mower blades.
03.07	Remove and replace rotary mower blades.
04.0	Demonstrate understanding of governmental regulations and compliances pertaining to golf courses--The student will be able to:
04.01	Control pollution
04.02	Protect water quality
04.03	Demonstrate fire prevention methods
04.04	Identify and prevent health hazards and demonstrate proper first aid
04.05	Identify and manage hazardous waste on the golf course
04.06	Manage fertilizer storage demonstrating proper handling techniques
04.07	Demonstrate pesticide safety
05.0	Use shop tools and equipment and organize a shop following appropriate safety, management and inventory techniques--The student will be able to:
05.01	Follow basic OSHA safety regulations and shop fire prevention techniques.
05.02	Perform basic first aid procedures.
05.03	Establish a file system for shop records.
05.04	Identify and use shop hand tools and equipment that relate to turf equipment maintenance.
05.05	Select the appropriate fasteners, bearings, seals, belts, chains, fuels, and lubricants for various turf equipment.
05.06	Establish and maintain appropriate shop space for specific shop tasks.
05.07	Establish an appropriate equipment inventory system.

06.0	Order and stock parts and keep shop records--The student will be able to:
06.01	Use the various equipment manuals to identify parts and service procedures.
06.02	Order parts properly.
06.03	Establish a system for stocking appropriate turf equipment parts.
06.04	Gather the appropriate forms for establishing a recordkeeping system.
06.05	Maintain computer-based inventory and record-keeping system.
07.0	Perform basic welding tasks using both gas and arc welding techniques--The student will be able to:
07.01	Follow welding symbols, and safety practices.
07.02	Connect and operate oxy-acetylene welding equipment.
07.03	Run beads and weld various types of joints.
07.04	Braze and solder metal.
07.05	Cut metal with and oxy-acetylene torch.
07.06	Select appropriate welding rods.
07.07	Set up an electrical arc welding machine.
07.08	Arc weld various types of joints.
08.0	Identify and safely operate turf care equipment--The student will be able to:
08.01	Identify the appropriate use for commonly used turf care equipment.
08.02	Identify the operation safety procedures for commonly used turf equipment.
08.03	Operate properly all commonly used turf care equipment.
09.0	Demonstrate employability skills--The student will be able to:
09.01	Conduct a job search.
09.02	Secure information about a job.
09.03	Identify documents which may be required when applying for a job interview.

09.04	Complete a job application correctly.
09.05	Demonstrate competence in a job interview.
09.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
09.07	Identify acceptable work habits.
09.08	Demonstrate knowledge or how to make job changes appropriately.
09.09	Demonstrate acceptable employee health habits.
09.10	Identify appropriate attire and grooming to maintain a functional and professional atmosphere in the equipment maintenance facility.
10.0	Identify the various professional organizations and publications that pertain to the turf management industry--The student will be able to:
10.01	Identify major points in the history of the golf course/turf industry.
10.02	Identify and understand various professional turf publications.
10.03	Identify and understand the basic role of professional turf organizations.
10.04	Identify the basics of the seed production and sod production industries.
10.05	Identify the various classes of golf courses and turf maintenance organizations.
11.0	Design a functional golf course maintenance facility and select appropriate maintenance equipment--The student will be able to:
11.01	Evaluate the organization and management styles utilized by various golf courses.
11.02	Classify, by use, the various equipment used on a typical 18-hole golf course.
11.03	List the equipment needed to properly maintain an 18-hole golf course.
11.04	Design and organize a golf course maintenance complex.
11.05	Develop an equipment budget for an 18-hole golf course.
12.0	Develop preventive maintenance programs for turf care equipment--The student will be able to:
12.01	Use equipment manufacturers' manuals to implement proper service procedures.
12.02	Develop a recordkeeping system to record equipment use.
12.03	Develop a recordkeeping system to record service work performed on equipment.

13.0	Develop human relations skills--The student will be able to:
13.01	Demonstrate appropriate work habits.
13.02	Identify traits that promote good human relations and increase job performance.
13.03	Develop an understanding of the role of the golf course superintendent and turf equipment service manager in the overall successful operations of the golf course.
14.0	Perform decision-making activities--The student will be able to:
14.01	Develop the ability to solve problems in a logical sequence.
14.02	Demonstrate the ability to determine proper work priorities.
14.03	Prepare a day's work schedule for the superintendent.
14.04	Choose appropriate action in situations requiring following a chain of command.
14.05	Choose appropriate action in situations requiring effective time management.
14.06	Choose appropriate action in situations requiring application of business ethics.
14.07	Identify ways to assign work to others.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Either a community college or school district may offer the Applied Technology Diploma program as college credit or vocational credit (vocational technical Center may offer only as vocational credit). Students completing an ATD at a vocational technical center will be awarded the guarantee college credit upon enrollment to the community college.

Minimum entrance requirements for this program include a high school diploma or GED. Students must meet the minimum basic skills levels to complete the program.

Faculty teaching this program must have a minimum of an AS degree in the discipline area or meet the "exceptional cases" criteria as established by the Southern Association for Colleges and Schools.

No fees will be charged for the transfer of credit from a vocational technical center to a community college. The established statewide fee structure will be adhered to by both delivery systems.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

Basic Skills

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C. the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10, Language 10, and Reading 10. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement

(Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

The information related to the guaranteed transfer of credit between an ATD program and AS degree must be documented and maintained by the Articulation Coordinating Committee (ACC). The transfer of the ATD to an AS degree is guaranteed for a period of three (3) years following the date of the award of the ATD. For further information about ATD to AS degree articulation agreements please visit, http://www.fldoe.org/articulation/pdf/ATD_to_ASandAAS_ArticulationAgreemts.pdf

Program Length

In accordance with Rule 6A-10.024, F.A.C. an ATD program consists of a course of study that is part of an AS or AAS degree program, is less than 60 credit hours, is approximately 50% of the technical component (non-general education), and leads to employment in a specific occupation. An ATD program may consist of either technical credit or college credit.

Students must have a high school diploma, a GED, or a certificate of completion to be admitted to an ATD program. Within six weeks of entry, students in ATD programs of 450 or more hours must be tested pursuant to Rule 6A-10.040, F.A.C. and if below minimum standards for completion

from the program, must receive remedial instruction. The minimum standards must be at least the equivalent of a score of ten (10) on all sections of basic skills test approved in Rule 6A-10.040, F.A.C. Students must successfully complete all remedial instruction before completing the ATD.

Community Colleges may offer either college or career credit toward the ATD. A Career Center in a public school district may offer an ATD program only as technical credit, with college credit awarded to a student upon articulation to a community college (Section 1004.02, F.S.)

When offered at a community college the standard length of this program is 38 credits. When offered at a technical center the standard length of this program is 1140 clock hours.

In accordance with Rule 6A-10.024, F.A.C. all faculty providing instruction must have at least a baccalaureate degree or an associate degree with demonstrated competencies in the specific instructional program as defined by the Southern Association of Colleges and Schools.

**Florida Department of Education
Curriculum Framework**

Program Title: Assessment and Safety Compliance Specialist
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0703010402
Program Type	College Credit Certificate (CCC)
Program Length	13 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	19-4091- Environmental Science and Protection Technicians, Including Health
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Environmental Science Technology AS degree program (1703010401).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 analysis, handling, storage, and dispensing of hazardous materials in accordance with appropriate federal, state, and local laws and regulations governing proper chemical management. The certificate will cover industry standards such as those included in the Occupational Health and Safety Administration (OSHA) 29CFR1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, the Oil Pollution Act of 1990, the Clean Air Act, the Clean Water Act, and the Department of Transportation (DOT) regulations. Graduates of this certificate program should be able to research applicable local, state, and federal regulations and implement methods and strategies to ensure compliance; to maintain records as required by OSHA, the Environmental Protection Agency (EPA), and the DOT; to develop and

implement hazardous materials handling procedures; to plan for emergency response to hazardous materials incidents; and to protect employees/workers/communities from hazardous material exposures.

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

Standards

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

- 01.0 Demonstrate knowledge of the principles of managing and remediation of water pollution.
- 02.0 Demonstrate knowledge of the principles of managing and remediation of air pollution.
- 03.0 Demonstrate awareness of environmental noise sources and their monitoring.
- 04.0 Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants.
- 05.0 Sample, analyze, and calculate data related to air and water pollutants.
- 06.0 Demonstrate an awareness of radiation monitoring and radioactive contamination control.
- 07.0 Demonstrate an awareness of solid waste, the problems engendered by solid waste accumulation, and disposal and solutions to those problems.
- 08.0 Demonstrate employability skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Assessment and Safety Compliance
CIP Number: 0703010402
Program Length: 13 credit hours
SOC Code(s): 19-2041

This certificate program is part of the Environmental Science Technology AS degree program (1703010401).
 At the completion of this program, the student will be able to:

01.0 Demonstrate knowledge of the principles of managing and remediation of water pollution--The student will be able to:

01.01 Determine chemical and physical properties of water.

01.02 Describe microbial systems.

01.03 Describe surface water, groundwater systems, hydrologic cycle, and potable water treatment processes.

01.05 Identify types and sources of water contamination.

01.06 Describe legal aspects and consequences of pollution.

01.07 Collect water samples for analysis.

01.08 Identify the accepted water quality standards for effluent from wastewater treatment plants.

01.09 Identify the correct and accepted water quality standards for industrial waste effluent.

01.04 Determine chemical and physical properties of water.

02.0 Demonstrate knowledge of the principles of managing and remediation of air pollution--The student will be able to

02.01 Identify natural and manmade pollutants, their sources, effects, and control techniques.

02.02 Collect and analyze air samples.

02.03 Describe legal aspects and consequences of air pollution.

02.04 Measure the air pollutant of a specific source.

03.0 Demonstrate awareness of environmental noise sources and their monitoring--The student will be able to:

03.01 Define and discuss the physical properties of sound.

03.02	Discuss the threshold of hearing, tolerance and hearing loss.
03.03	Discuss environmental noise, its effect on humans and solutions to noise pollution.
03.04	Discuss legal aspects and consequences of noise pollution.
04.0	Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants--The student will be able to:
04.01	Demonstrate knowledge of basic laboratory operation.
04.02	Operate and calibrate selected laboratory instruments.
04.03	Operate and calibrate selected field instruments and equipment.
05.0	Sample, analyze, and calculate data related to air and water pollutants--The student will be able to:
05.01	Gather and analyze selected samples.
05.02	Manipulate data and reach firm conclusions.
05.03	Write selected formal technical reports.
05.04	Identify and perform the correct analysis for selected air pollutants listed with state and federal regulations.
05.05	Identify and perform the correct analysis for selected parameters listed with state and federal regulations for wastewater effluent.
06.0	Demonstrate an awareness of radiation monitoring and radioactive contamination control--The student will be able to:
06.01	Discuss types and sources of radiation.
06.02	Discuss the immediate and long range effects of radiation on animals and plants.
06.03	Discuss nuclear power plant design, nuclear power hazards, and safety features.
06.04	Discuss nuclear fuel reprocessing and storage.
06.05	Discuss legal aspects and consequences of radioactive pollution.
07.0	Demonstrate an awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems--The student will be able to:
07.01	Discuss the composition, sources, and quantity of solid waste.
07.02	Discuss methods of solid waste disposal.
07.03	Discuss various solutions to solid waste accumulations and disposal.

07.04	Discuss the legal aspects and consequences of solid waste pollution.
07.05	Identify the solid wastes from domestic households, municipalities, and industry.
07.06	Identify a sanitary landfill.
07.07	Discuss the construction features of a safe landfill.
07.08	Discuss the possibilities of contaminants (leachates) seeping into the groundwater.
07.09	Discuss the need to have monitoring well located around a sanitary landfill.
07.10	Discuss those wastes that are permitted by state and federal regulation to be disposed at a landfill site.
08.0	Demonstrate employability skills--The student will be able to:
08.01	Secure information about a job.
08.02	Identify documents that may be required when applying for a job.
08.03	Identify acceptable work habits.
08.04	Demonstrate competence in job interview techniques.
08.05	Demonstrate knowledge of how to make job changes appropriately.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Hazardous Materials Specialist
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0703010403
Program Type	College Credit Certificate (CCC)
Program Length	14 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	19-4091- Environmental Science and Protection Technicians, Including Health
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Environmental Science Technology AS degree program (1703010401).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 analysis, handling, storage, and dispensing of hazardous materials in accordance with appropriate federal, state, and local laws and regulations governing proper chemical management. The certificate will cover industry standards such as those included in the Occupational Health and Safety Administration (OSHA) 29CFR1910.120 [Hazardous Waste Operations and Emergency Response](#) (HAZWOPER) Standard, the Oil Pollution Act of 1990, the Clean Air Act, the Clean Water Act, and the Department of Transportation (DOT) regulations. Graduates of this certificate program should be able to research applicable local, state, and federal regulations and implement methods and strategies to ensure compliance; to maintain records as required by OSHA, the Environmental Protection Agency (EPA), and the

DOT; to develop and implement hazardous materials handling procedures; to plan for emergency response to hazardous materials incidents; and to protect employees/workers/communities from hazardous material exposures.

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

Standards

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

- 01.0 Demonstrate knowledge of the principles of managing and remediation of water pollution.
- 02.0 Demonstrate knowledge of the principles of managing and remediation of air pollution.
- 03.0 Demonstrate awareness of environmental noise sources and their monitoring.
- 04.0 Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants.
- 05.0 Sample, analyze, and calculate data related to air and water pollutants.
- 06.0 Demonstrate an awareness of radiation monitoring and radioactive contamination control.
- 07.0 Demonstrate an awareness of solid waste, the problems engendered by solid waste accumulation, and disposal and solutions to those problems.
- 08.0 Demonstrate employability skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Hazardous Materials Specialist
CIP Number: 0703010403
Program Length: 14 credit hours
SOC Code(s): 19-4091

This certificate program is part of the Environmental Science Technology AS degree program (1703010401).
 At the completion of this program, the student will be able to:

01.0	Demonstrate knowledge of the principles of managing and remediation of water pollution--The student will be able to:
01.01	Determine chemical and physical properties of water.
01.02	Describe microbial systems.
01.03	Describe surface water, groundwater systems, hydrologic cycle, and potable water treatment processes.
01.04	Identify types and sources of water contamination.
01.05	Collect water samples for analysis.
01.06	Identify the accepted water quality standards for effluent from wastewater treatment plants.
01.07	Identify the correct and accepted water quality standards for industrial waste effluent.
02.0	Demonstrate knowledge of the principles of managing and remediation of air pollution--The student will be able to
02.01	Collect and analyze air samples.
02.02	Measure the air pollutant of a specific source.
02.03	Record, interpret, and report laboratory analyses.
03.0	Demonstrate awareness of environmental noise sources and their monitoring--The student will be able to:
03.01	Define and discuss the physical properties of sound.
03.02	Discuss the threshold of hearing, tolerance, and hearing loss.
03.03	Discuss environmental noise, its effect on humans, and solutions to noise pollution.
04.0	Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants--The student will be able to:

04.01	Demonstrate knowledge of basic laboratory operation.
04.02	Operate and calibrate selected laboratory instruments.
04.03	Operate and calibrate selected field instruments and equipment.
05.0	Sample, analyze, and calculate data related to air and water pollutants--The student will be able to:
05.01	Gather and analyze selected samples.
05.02	Manipulate data and reach firm conclusions.
05.03	Write selected formal technical reports.
05.04	Identify and perform the correct analysis for selected air pollutants listed with state and federal regulations.
05.05	Identify and perform the correct analysis for selected parameters listed with state and federal regulations for wastewater effluent.
06.0	Demonstrate an awareness of radiation monitoring and radioactive contamination control--The student will be able to:
06.01	Discuss nuclear power plant design, nuclear power hazards, and safety features.
06.02	Discuss nuclear fuel reprocessing and storage.
07.0	Demonstrate an awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems--The student will be able to:
07.01	Discuss the composition, sources, and quantity of solid waste.
07.02	Discuss methods of solid waste disposal.
07.03	Discuss various solutions to solid waste accumulations and disposal.
07.04	Identify a sanitary landfill.
07.05	Discuss the construction features of a safe landfill.
07.06	Discuss the possibilities of contaminants (leachates) seeping into the groundwater.
07.07	Discuss the need to have monitoring well located around a sanitary landfill.
07.08	Discuss those wastes that are permitted by state and federal regulation to be disposed at a landfill site.
08.0	Demonstrate employability skills--The student will be able to:
08.01	Secure information about a job.

08.02 Identify documents that may be required when applying for a job.

08.03 Demonstrate competence in job interview techniques.

08.04 Demonstrate knowledge of how to make job changes appropriately.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Water Quality Technician
Career Cluster: Agriculture, Food and Natural Resources

CCC	
CIP Number	0703010404
Program Type	College Credit Certificate (CCC)
Program Length	12 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	19-4091 - Environmental Science and Protection Technicians, Including Health
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Environmental Science Technology AS degree program (1703010401).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 analysis and dispensing of water in accordance with appropriate federal, state, and local laws and regulations. The certificate will cover industry standards such as those included in the Clean Water Act. Graduates of this certificate program should be able to research applicable local, state, and federal regulations and implement methods and strategies to ensure compliance; to maintain records as required by OSHA, and the Environmental Protection Agency (EPA); and to control the process to transfer or treat water or liquid waste.

This program does not prepare individuals for the D, C, B or A level of Water or Wastewater Treatment Facility Operator Certification as those requirements are outlined in Department of Environmental Protection Rule 62-602.

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

Standards

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

- 01.0 Demonstrate knowledge of the principles of managing and remediation of water pollution.
- 02.0 Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants.
- 03.0 Sample, analyze and calculate data related to air and water pollutants.
- 04.0 Demonstrate and awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems.
- 05.0 Demonstrate employability skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Water Quality Technician
CIP Number: 0703010404
Program Length: 12 credit hours
SOC Code(s): 19-4091

This certificate program is part of the Environmental Science Technology AS degree program (1703010401).
 At the completion of this program, the student will be able to:

01.0	Demonstrate knowledge of the principles of managing and remediation of water pollution--The student will be able to:
01.01	Determine chemical and physical properties of water.
01.02	Describe microbial systems.
01.03	Describe surface water, groundwater systems, hydrologic cycle, and potable water treatment processes.
01.04	Describe the marine environment.
01.05	Identify types and sources of water contamination.
01.06	Describe legal aspects and consequences of pollution.
01.07	Collect water samples for analysis.
01.08	Identify the accepted water quality standards for effluent from wastewater treatment plants.
01.09	Identify the correct and accepted water quality standards for industrial waste effluent.
01.10	Demonstrate the technology applied to non-point source pollution control (stormwater and agriculture runoff).
02.0	Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants--The student will be able to:
02.01	Demonstrate knowledge of basic laboratory operation.
02.02	Operate and calibrate selected laboratory instruments.
02.03	Operate and calibrate selected field instruments and equipment.
03.0	Sample, analyze and calculate data related to air and water pollutants--The student will be able to:
03.01	Gather and analyze selected samples.

03.02	Manipulate data and reach firm conclusions.
03.03	Write selected formal technical reports.
03.04	Identify and perform the correct analysis for selected parameters listed with state and federal regulations for wastewater effluent.
04.0	Demonstrate an awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems--The student will be able to:
04.01	Discuss the possibilities of contaminants (leachates) seeping into the groundwater.
04.02	Discuss the need to have monitoring well located around a sanitary landfill.
05.0	Demonstrate employability skills--The student will be able to:
05.01	Conduct a job search.
05.02	Secure information about a job.
05.03	Identify documents that may be required when applying for a job.
05.04	Complete a job application.
05.05	Demonstrate competence in job interview techniques.
05.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
05.07	Identify acceptable work habits.
05.08	Demonstrate knowledge of how to make job changes appropriately.
05.09	Demonstrate acceptable employee health habits.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method is offered, the following is required for each student: (1) a training plan signed by the student, the instructor and the employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and (2) a work station which reflects equipment, skills, and tasks relevant to the student's career goal. Students must receive compensation for work performed.

In accordance with State Board of Education Rule 6A-10.0315, minimum basic skill levels have been established for admittance into a college associate degree program.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fl DOE.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Environmental Science Technician
Career Cluster: Agriculture, Food & Natural Resources Career Cluster

CCC	
CIP Number	0703010407
Program Type	College Credit Certificate (CCC)
Program Length	30 Credit Hours
CTSO	SkillsUSA
SOC Codes (all applicable)	29-9012 -Occupational Health and Safety Technicians 13-1041 - Compliance Officers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This certificate program is part of the Environmental Science Technology AS degree program (1703010401).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

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 & 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 & Natural Resources career cluster.

The content includes but is not limited to instruction in worker health and safety, transportation of hazardous materials, and a focus on federal regulations for environmental protection. Instruction includes the analysis, handling, storage, transportation, and dispensing of hazardous materials in accordance with appropriate regulations and the planning for the protection of employees/workers/communities from hazardous material exposures.

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

Standards

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

- 01.0 Demonstrate knowledge of the principles of managing and remediation of water pollution.
- 02.0 Demonstrate knowledge of the principles of managing and remediation of air pollution.
- 03.0 Demonstrate awareness of environmental noise sources and their monitoring.
- 04.0 Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants.
- 05.0 Sample, analyze and calculate data related to air and water pollutants.
- 06.0 Demonstrate an awareness of radiation monitoring and radioactive contamination control.
- 07.0 Demonstrate and awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems.
- 08.0 Demonstrate employability skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Environmental Science Technician
CIP Numbers: 0703010407
Program Length: 30 credit hours
SOC Code(s): 29-9012, 13-1041

**This certificate program is part of Environmental Science Technology AS degree program (1703010401).
 At the completion of this program, the student will be able to:**

01.0	Demonstrate knowledge of the principles of managing and remediation of water pollution--The student will be able to:
01.01	Determine chemical and physical properties of water.
01.02	Describe legal aspects and consequences of pollution.
02.0	Demonstrate knowledge of the principles of managing and remediation of air pollution--The student will be able to:
02.01	Identify natural and manmade pollutants; their sources, effects, and control techniques.
02.02	Collect and analyze air samples.
02.03	List the regulated parameters of emission for selected industrial sources.
02.04	Record, interpret and report laboratory analyses.
03.0	Demonstrate awareness of environmental noise sources and their monitoring--The student will be able to:
03.01	Define and discuss the physical properties of sound.
03.02	Discuss the threshold of hearing, tolerance, and hearing loss.
03.03	Discuss environmental noise, its effect on humans, and solutions to noise pollution.
03.04	Select the regulatory agency that controls noise sources.
04.0	Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants--The student will be able to:
04.01	Demonstrate knowledge of basic laboratory operation.
04.02	Operate and calibrate selected laboratory instruments.

04.03	Operate and calibrate selected field instruments and equipment.
05.0	Sample, analyze and calculate data related to air and water pollutants--The student will be able to:
05.01	Manipulate data and reach firm conclusions.
05.02	Write selected formal technical reports.
05.03	Identify and perform the correct analysis for selected air pollutants listed with state and federal regulations.
06.0	Demonstrate an awareness of radiation monitoring and radioactive contamination control--The student will be able to:
06.01	Discuss types and sources of radiation.
06.02	Discuss the immediate and long range effects of radiation on animals and plants.
06.03	Discuss nuclear power plant design, nuclear power hazards, and safety features.
07.0	Demonstrate an awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems--The student will be able to:
07.01	Discuss the composition, sources and quantity of solid waste.
07.02	Discuss methods of solid waste disposal.
07.03	Identify the solid wastes from domestic households, municipalities and industry.
07.04	Discuss those wastes that are permitted by state and federal regulation to be disposed at a landfill site.
08.0	Demonstrate employability skills--The student will be able to:
08.01	Secure information about a job.
08.02	Identify documents that may be required when applying for a job.
08.03	Complete a job application.
08.04	Demonstrate competence in job interview techniques.
08.05	Identify acceptable work habits.
08.06	Demonstrate knowledge of how to make job changes appropriately.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Career and Technical Student Organization (CTSO)

SkillsUSA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Agricultural Production Technology
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1101000000
Program Type	College Credit
Standard Length	60 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	11-9013 - Farmers, Ranchers, and Other Agricultural Managers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction that prepares individuals to manage land, water, machinery, financing, crops and/or livestock, labor and facilities as well as make contracts, manage taxes, keep records, analyze records and technical reports, and demonstrate leadership, employability, communication and human relations skills.

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 consisting of 60 credit hours.

Standards

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

- 01.0 Obtain and dispose of an agricultural enterprise.
- 02.0 Manage and supervise labor.
- 03.0 Manage crops.
- 04.0 Manage livestock.
- 05.0 Manage machinery and equipment.
- 06.0 Manage facilities.
- 07.0 Select sources and methods of financing the operation.
- 08.0 Keep and analyze financial, production and personnel records.
- 09.0 Market crops/livestock.
- 10.0 Interpret technical information and incorporate it into managerial practices.
- 11.0 Integrate state and federal regulations into the operation.
- 12.0 Demonstrate leadership, communication, employability and human relations skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Agricultural Production Technology
CIP Number: 1101000000
Program Length: 60 credit hours
SOC Code(s): 11-9013

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Obtain and dispose of agricultural enterprise--The student will be able to:

01.01 Determine land capability classes of farm or ranch.

01.02 List steps in obtaining title to real estate.

01.03 Determine advantage of using services of Soil Conservation Service (SCS).

01.04 Develop a farm or ranch rental/lease agreement.

01.05 Determine value of property.

01.06 Develop a will for transfer or disposal of property.

02.0 Manage and supervise labor--The student will be able to:

02.01 Train and supervise workers.

02.02 Obtain information from workers necessary for employment.

02.03 List responsibilities and liability of employer regarding workers rights, safety and welfare.

02.04 List local, state and federal regulations regarding employment of workers.

02.05 Develop an employee work schedule.

03.0 Manage crops--The student will be able to:

03.01 Prepare a land use plan.

03.02 Determine long-range conservation practices.

03.03 Prepare soil for crops.

03.04	Select crop varieties best suited for land, market and type of farm operation.
03.05	Determine seeding/planting rate and spacing.
03.06	Calibrate and adjust planting equipment.
03.07	Plant crops.
03.08	Select appropriate cultural practices including cultivation, fertilization and irrigation.
03.09	Identify and control diseases, insects and pests.
03.10	Determine maturity of crops.
03.11	Harvest crops.
03.12	Store crops.
03.13	Determine the most advantageous method of marketing crops.
04.0	Manage livestock--The student will be able to:
04.01	Select and/or breed livestock.
04.02	Determine nutritional requirements and balance livestock rations.
04.03	Prepare a feeding schedule.
04.04	Determine quality of pasture range or forage.
04.05	Provide for winter rations and supplements.
04.06	Maintain pasture fertility and quality.
04.07	Develop a breeding/marketing plan for operation.
04.08	Cull unproductive animals.
04.09	Provide aid for animals with parturition problems.
04.10	Care for newborn livestock.
04.11	List causes of livestock infertility.
04.12	Provide mineral supplement for animals.

04.13	Determine most advantageous method of marketing livestock.
04.14	Transport livestock.
04.15	Identify and treat disorders, diseases and pests of livestock.
05.0	Manage machinery and equipment--The student will be able to:
05.01	Assess needs for the purchases of new or replacement equipment.
05.02	Maintain oil, fuel and hydraulic levels in equipment.
05.03	Maintain tires, batteries and coolant system on all equipment and vehicles.
05.04	Operate and service small gasoline engines.
05.05	Replace hoses, belts and lines.
05.06	Cut and weld with oxy-acetylene and arc welding equipment.
05.07	Observe safety procedures when operating farm equipment.
05.08	Develop a general maintenance schedule.
06.0	Manage facilities--The student will be able to:
06.01	Safely operate and maintain general farm shop tools and equipment.
06.02	Install and maintain electrical wiring and equipment.
06.03	Square and build a farm structure.
06.04	Determine a bill of materials for a farm construction project.
06.05	Form and pour concrete.
06.06	Build and repair fences, gates and pens.
06.07	Develop a general maintenance schedule for facilities and equipment.
07.0	Select sources and methods of financing the operation--The student will be able to:
07.01	List major sources of production credit.
07.02	List sources of credit for capital items and real estate.

07.03	Prepare a case using accepted forms for obtaining credit from farm lending institutions.
08.0	Keep and analyze financial, production and personnel records--The student will be able to:
08.01	Keep fertilization and pesticide use records.
08.02	Keep equipment maintenance and service records.
08.03	Record cultural and production information.
08.04	Determine cost efficiency of operations.
08.05	Maintain labor and personnel records.
08.06	Prepare a farm tax return.
08.07	Prepare an annual budget
08.08	Determine credit, cash flow and investment returns.
08.09	Review sources and kinds of farm insurance.
09.0	Market crops/livestock--The student will be able to:
09.01	Secure and interpret market information.
09.02	Select marketing channels for greatest profit.
09.03	Interpret elements of marketing agreements.
09.04	Market crops/livestock.
09.05	Provide for transportation of product to market.
10.0	Interpret technical information and incorporate it into managerial practices--The student will be able to:
10.01	Keep and maintain a file of current technical information from universities, governmental and commercial agencies.
10.02	Maintain a reference file for periodicals and other publications.
10.03	Attend seminars and workshops to update skills and knowledge.
10.04	Determine sources and advantages of using computer networking.
11.0	Integrate state and federal regulations into operation--The student will be able to:

11.01	List agencies responsible for inspecting and regulating operation of product.
11.02	Secure necessary inspection certificates and registrations.
11.03	List reasons for the necessity of inspections, certifications and registrations.
12.0	Demonstrate leadership, communication, employability and human relations skills--The student will be able to:
12.01	Develop citizenship awareness and responsibility.
12.02	Demonstrate knowledge in organizing and conducting meetings.
12.03	Demonstrate effective communication skills.
12.04	Complete an employment application
12.05	Conduct a job search.
12.06	Demonstrate job interview skills.
12.07	Recognize appropriate work habits.
12.08	Identify associations and societies associated with occupation or profession.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp .

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 60 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Agribusiness Management
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1101010100
Program Type	College Credit
Standard Length	60 credit hours (primary)-63 credit hours (secondary)
CTSO	Collegiate FFA
SOC Codes (all applicable)	11-9013 - Farmers, Ranchers, and Other Agricultural Managers 45-4011 - Forest and Conservation Workers 37-3011 – Landscaping and Groundskeeping Workers 37-1012 -- First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction that prepares individuals to apply the economic and business principles involved in the organization, operation and management of farms and agricultural business. Subject matter includes finance, laws, labor, machinery, facilities, and marketing, as well as leadership, communication, employability and human relations skills.

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 consisting of 60-63 credit hours.

Standards

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

- 01.0 Obtain and dispose of an agricultural enterprise.
- 02.0 Prepare and administer an agricultural oriented plan (manage the crop/livestock plan).
- 03.0 Supervise and manage the operation, maintenance and repair of equipment.
- 04.0 Manage facilities and structures.
- 05.0 Select sources and methods of financing operation.
- 06.0 Interpret and apply state and federal rules and regulations.
- 07.0 Perform accounting activities.
- 08.0 Perform communication activities.
- 09.0 Develop human relations skills.
- 10.0 Demonstrate employability skills.
- 11.0 Develop leadership skills.
- 12.0 Identify, classify, and demonstrate management activities.
- 13.0 Demonstrate a basic understanding of legal and ethical issues in a business environment.
- 14.0 Demonstrate basic computer skills.

In addition, students will complete the objectives in one of the following specializations:

Forest Operations

- Forest Operations – SOC Code: 45-4011 – Forest and Conservation Workers

- 15.0 Prepare and administer forest management plans.
- 16.0 Plan and administer forest inventories.
- 17.0 Assist registered land surveyor in location of property corners and boundary lines, road construction and drainage projects.
- 18.0 Prepare and administer forest fire and smoke management plans and assist in forest fire suppression and control.
- 19.0 Identify major southeastern forest tree species.
- 20.0 Identify and control major southeastern forest insects and diseases.
- 21.0 Evaluate forest ecosystems.
- 22.0 Evaluate forest soils with respect to chemical and fertilizer applications and hydrology.
- 23.0 Collect, maintain and/or analyze data and records.
- 24.0 Prepare, analyze and enforce contracts and other legal documents.
- 25.0 Administer the purchase, sale and/or marketing of forest products.

Irrigation Technology

- Irrigation Technology -- SOC Code: 37-3011 – Landscaping and Groundskeeping Workers

- 26.0 Demonstrate an understanding of the use of communications in an irrigation business environment.
- 27.0 Demonstrate an understanding of the types of pipe installation common to irrigation systems.
- 28.0 Demonstrate an understanding of irrigation system components.
- 29.0 Demonstrate an understanding of basic design principles used in irrigation systems.
- 30.0 Demonstrate an understanding of basic irrigation system maintenance and operation.
- 31.0 Demonstrate an understanding of distribution systems used in the irrigation industry.
- 32.0 Demonstrate an understanding of control systems used in irrigation installation and repair.
- 33.0 Demonstrate an understanding of water supply.
- 34.0 Demonstrate an understanding of sprinkler performance.
- 35.0 Demonstrate an understanding of site analysis in residential and commercial irrigation systems.
- 36.0 Demonstrate an understanding of and practice in design principles used in residential and commercial irrigation systems.
- 37.0 Demonstrate an understanding of job preparation necessary in residential and commercial irrigation systems.
- 38.0 Demonstrate an understanding of installation techniques used in residential and commercial irrigation systems.
- 39.0 Demonstrate an understanding of how to obtain site information necessary in the residential irrigation system design process.
- 40.0 Demonstrate an understanding of selection and safe use of equipment for residential irrigation system installation.
- 41.0 Demonstrate an understanding of how to select pipe sizes and valves appropriate for specific residential irrigation system installations.
- 42.0 Demonstrate an understanding of microcomputer applications used to design residential irrigation systems.
- 43.0 Demonstrate an understanding of the role of "the green industry."
- 44.0 Demonstrate an understanding of the basic principles of plant growth.
- 45.0 Demonstrate an understanding of the role of plant nutrients and fertilizers.
- 46.0 Demonstrate an understanding of pest management practices.
- 47.0 Demonstrate an understanding of the role of irrigation.
- 48.0 Demonstrate an understanding of the role of soil science.
- 49.0 Demonstrate an understanding of plants used in urban and suburban landscapes.
- 50.0 Demonstrate an understanding of the basic safety issues involved in the "green industry."
- 51.0 Demonstrate an understanding of the water cycle.
- 52.0 Demonstrate an understanding of the uses of water resources.
- 53.0 Demonstrate an understanding of water resource policies in Florida.
- 54.0 Demonstrate an understanding of surface water supplies.
- 55.0 Demonstrate an understanding of groundwater supplies.
- 56.0 Demonstrate an understanding of drip system components.
- 57.0 Demonstrate an understanding of the characteristics of water emission devices.
- 58.0 Demonstrate an understanding of basic design principles for low volume irrigation systems.
- 59.0 Demonstrate an understanding of procedures involved in installation of low volume irrigation systems.
- 60.0 Demonstrate an understanding of irrigation system computer software currently used in industry.
- 61.0 Demonstrate an understanding of materials selection and costing needed for sales presentations.
- 62.0 Develop an understanding of the breadth of the irrigation industry.
- 63.0 Demonstrate an understanding of irrigation water requirements.
- 64.0 Demonstrate an understanding of economic analysis as applied to irrigation investment decisions.
- 65.0 Demonstrate an understanding of methods of develop overall operating and maintenance procedures.

- 66.0 Demonstrate an understanding of analysis of irrigation systems.
- 67.0 Demonstrate an understanding of how to obtain site information necessary in the commercial irrigation system design process.
- 68.0 Demonstrate an understanding of selection and safe use of equipment for a commercial irrigation system installation.
- 69.0 Demonstrate an understanding of how to select pipe sizes and valves appropriate for specific commercial irrigation system installations.
- 70.0 Demonstrate an understanding of writing irrigation specifications.
- 71.0 Demonstrate an understanding of advanced hydraulic and head lay out concepts.

Horticulture Technician

- Horticulture Technician – SOC Code: 37-1012 -- First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers

- 72.0 Demonstrate an understanding of plant physiology and growth.
- 73.0 Classify plants.
- 74.0 Select, operate, and maintain tools and equipment.
- 75.0 Fertilize plants.
- 76.0 Manage a pest-control program.
- 77.0 Prune and shape plants.
- 78.0 Maintain landscape plants.
- 79.0 Demonstrate employability skills.
- 80.0 Determine drainage system needs and design a drainage system.
- 81.0 Maintain and analyze records.
- 82.0 Prepare growing media and seedbeds.
- 83.0 Propagate plants.
- 84.0 Grow plants.
- 85.0 Harvest, process, and ship plants.
- 86.0 Market plants.
- 87.0 Design, install, and maintain nursery irrigation systems.

Golf Course Technician

- Golf Course Technician – SOC Code: 37-1012.00 -- First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers

- 88.0 Supervise and manage the operation, maintenance and repair of golf course equipment.
- 89.0 Schedule irrigation and manage the design, installation and maintenance of golf course irrigation systems.
- 90.0 Prescribe, supervise and manage the application of agricultural chemicals for the prevention and control of pests.
- 91.0 Prescribe, supervise and manage the fertilization of the turf and landscape.
- 92.0 Train and supervise employees in grooming and maintaining greens, tees, fairways, roughs and other areas.
- 93.0 Provide a safe environment for workers and patrons.
- 94.0 Keep and analyze maintenance, employee, equipment and inventory records.

- 95.0 Observe local, state and federal laws and regulations.
- 96.0 Demonstrate leadership, communication, public relations, employability and human relations skills.
- 97.0 Demonstrate an understanding of the types of pipe installation common to irrigation system.
- 98.0 Demonstrate an understanding of irrigation system components.
- 99.0 Demonstrate an understanding of basic design principles used in irrigation systems.
- 100.0 Demonstrate an understanding of basic irrigation system maintenance and operation.
- 101.0 Demonstrate an understanding of sprinkler performance.
- 102.0 Demonstrate an understanding of the basic principles of plant growth.
- 103.0 Demonstrate an understanding of the role of plant nutrients and fertilizers.
- 104.0 Demonstrate an understanding of pest management practice.
- 105.0 Demonstrate an understanding of the role of irrigation.
- 106.0 Demonstrate an understanding of the basic safety issues involved in the "green industry".
- 107.0 Demonstrate an understanding of the drip system components.
- 108.0 Demonstrate an understanding of basic design principles for low volume irrigation systems.
- 109.0 Demonstrate an understanding of procedures involved in installation of low volume irrigation systems.
- 110.0 Demonstrate an understanding of plant physiology and growth.
- 111.0 Classify plants.
- 112.0 Select, operate and maintain tools and equipment.
- 113.0 Fertilize plants.
- 114.0 Manage a pest-control program.

**Florida Department of Education
Student Performance Standards**

Program Title: Agribusiness Management
CIP Number: 1101010100
Program Length: 60 credit hours (primary)-63 credit hours (secondary)
SOC Code(s): 11-9011

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Obtain and dispose of an agricultural enterprise--The student will be able to:

01.01 Develop plan for type and size of agricultural enterprise.

01.02 Obtain title to real estate.

01.03 Complete farm rental/lease Agreement.

01.04 Purchase building insurance.

01.05 Purchase liability insurance.

01.06 Transfer agribusiness ownership.

02.0 Prepare and administer an agricultural oriented plan--The student will be able to:

02.01 Prepare land development plan.

02.02 Prepare agricultural plan in one of the following: crop or product program, irrigation, fertilization, pesticide, plant.

02.03 Enroll in Agricultural Stabilization Conservation Service Program if applicable.

02.04 Enroll in and review Soil Conservation Service Practices if applicable.

02.05 Contract for custom services.

02.06 Develop plan for purchase and operation of irrigation system.

02.07 Develop fertilization plan.

02.08 Develop pesticide plan.

02.09 Develop plan to meet seed/plant needs.

02.10	Develop marketing plan.
02.11	Market livestock/livestock products.
02.12	Purchase insurance.
03.0	Supervise and manage the operation, maintenance and repair of equipment--The student will be able to:
03.01	Develop budgets for changing the machinery and equipment program.
03.02	Prepare inventory of farm machinery and equipment; harvest, fuel, and lubricants.
03.03	Obtain machinery and equipment by purchase, rent, lease or trade.
03.04	Develop plan for machinery and equipment maintenance program.
04.0	Manage facilities and structures--The student will be able to:
04.01	Plan for the expansion of existing facilities or construction of new facilities.
04.02	Develop plan for repairing, remodeling, improving facilities.
04.03	Acquire buildings by purchase, rental or lease.
04.04	Purchase building supplies.
05.0	Select sources and methods of financing operation--The student will be able to:
05.01	Analyze major sources of agricultural production credit.
05.02	Analyze and select sources of credit for capital items and real estate.
05.03	Prepare a case using accepted forms for obtaining credit from an agricultural lending institution.
05.04	Analyze contracts, leases and other legal documents.
05.05	Analyze and interpret land use maps.
05.06	Interpret a real estate legal description.
05.07	Identify major elements in lease agreements.
05.08	Identify major elements in contracts.
05.09	Secure legal services.

06.0	Interpret and apply state and federal rules and regulations to enterprise--The student will be able to:
06.01	List agencies responsible for inspecting and regulating operation or product.
06.02	Secure necessary inspections, certifications and registrations.
06.03	Maintain a file of current rules and regulations relative to operation.
06.04	List reasons for the necessity of inspections, certification and regulations.
07.0	Perform accounting activities--The student will be able to:
07.01	Record and post transactions in a general journal.
07.02	Prepare an income statement and payroll records.
07.03	Prepare a balance sheet.
07.04	Prepare a cash flow statement.
07.05	Journalize and post closing entries.
07.06	Demonstrate knowledge of petty case records.
07.07	Demonstrate knowledge of checking account records and bank reconciliation.
07.08	Interpret financial statements.
07.09	Demonstrate knowledge of the accounting cycle.
07.10	Demonstrate knowledge of budget principles and interpret budgets.
07.11	Demonstrate accounting operations on a computer.
07.12	Calculate and record depreciation, net worth, and income.
07.13	Complete a comparative trend analysis table.
07.14	Complete a profit and loss statement.
07.15	Calculate and record capital gains and losses, monthly/yearly receipts, operating expenses.
07.16	Balance bank statement.
07.17	Develop plan for bestowing the estate.

07.18	Complete IRS income or loss schedule, Capital gains and losses schedule, Investment credit schedule, 1040 schedule.
08.0	Perform communication activities--The student will be able to:
08.01	Demonstrate effective telephone usage and courtesy.
08.02	Demonstrate effective listening skills.
08.03	Give, follow, and Interpret oral and written communication.
08.04	Demonstrate knowledge of e-mail etiquette and ethics.
08.05	Compose business correspondence and related documents and demonstrate correct spelling, grammar, punctuation, and work choice.
08.06	Prepare, outline, and deliver an effective short oral presentation.
08.07	Participate in a group discussion as a member and as a leader.
08.08	Obtain appropriate information from graphics and other visual media.
08.09	Research and interpret information retrieved from print and electronic resources.
08.10	Annotate letters, reports, and news articles.
08.11	Proofread and edit documents.
08.12	Research and compose a document containing statistical information.
08.13	Prepare visual material, including electronic media, to support an oral presentation.
08.14	Demonstrate ability to communicate effectively with diverse populations.
09.0	Develop human relation skills--The student will be able to:
09.01	Analyze and develop written solutions to behavior problems affecting job performance.
09.02	Demonstrate ability to work effectively as part of a team.
09.03	Demonstrate conflict resolution skills.
09.04	Demonstrate punctuality, initiative, courtesy, dependability, flexibility, and honesty.
09.05	Develop and demonstrate the unique human relations skills needed for success in the business sector.
09.06	Recognize different personality styles and how to interact effectively with them in the workplace.

09.07	Differentiate between an acceptable and unacceptable code of ethical conduct in business.
09.08	Discuss how values and attitudes influence behavior.
09.09	Explain how understanding of self-concept and self-esteem impacts human relations skills.
09.10	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
10.0	Demonstrate employability skills--The student will be able to:
10.01	Demonstrate understanding of acceptable hygiene and grooming habits.
10.02	Identify sources of employment opportunities.
10.03	Identify appropriate attire and grooming for a business office.
10.04	Identify documents that may be required when applying for a job.
10.05	Complete a resume and cover letter.
10.06	Complete a job application form correctly.
10.07	Prepare a plain-text resume for electronic distribution.
10.08	Demonstrate effective job interview techniques.
10.09	Demonstrate understanding of different types of interviews.
10.10	Prepare a thank you letter for an interview.
10.11	Identify and demonstrate appropriate responses to feedback from supervisors.
10.12	Identify and demonstrate acceptable work habits.
10.13	Demonstrate knowledge of how to make job and career changes appropriately.
10.14	Demonstrate basic knowledge of employment law.
10.15	Demonstrate ability to adapt to change.
10.16	Demonstrate effective time management skills.
10.17	Prepare a letter of resignation.
10.18	Identify methods for securing an employment reference.

10.19	Conduct a job search.
10.20	Secure information about a job.
10.21	Demonstrate competence in job interview techniques.
11.0	Develop leadership skills--The student will be able to:
11.01	Demonstrate an understanding of how to plan and lead an effective meeting.
11.02	Define effective leadership.
11.03	Identify and explain key leadership behaviors.
11.04	Compare different styles of leadership.
11.05	Relate leadership to other management and communication skills.
11.06	Examine ways effective leaders develop, coach, and motivate.
11.07	Define organization vision and mission.
11.08	Identify characteristics of effective goals.
11.09	Describe personal leadership style.
11.10	Explain how effective leaders identify problems and make decisions.
11.11	Compare different styles of managing conflict.
11.12	Identify acceptable work habits.
11.13	Demonstrate knowledge of how to make job changes appropriately.
12.0	Identify, classify and demonstrate management activities--The student will be able to:
12.01	Compare management styles.
12.02	Identify the major functions of management.
12.03	Demonstrate understanding of basic management concepts such as authority, responsibility, delegation, empowerment, and hiring and firing.
12.04	Demonstrate knowledge of the relationship between authority and responsibility to task accomplishment.
12.05	Select the most effective communication systems.

12.06	Identify problems and make appropriate decisions.
12.07	Demonstrate understanding of organizational culture and its impact on communication.
12.08	Identify and discuss current management issues in business and other organizations.
12.09	Describe activities associated with the management functions of planning, organizing, staffing, leading and controlling.
12.10	Manage and supervise labor
12.11	Develop labor supply plan.
12.12	Hire and dismiss employees.
12.13	Establish and record pay scale and benefits.
12.14	Train workers using demonstration performance method.
12.15	Develop employee work schedules
12.16	Prepare payroll records.
13.0	Demonstrate a basic understanding of legal and ethical issues in a business environment--The student will be able to:
13.01	Demonstrate basic understanding of contracts.
13.02	Demonstrate basic understanding of human resource issues.
13.03	Demonstrate basic understanding of negotiable instruments.
13.04	Demonstrate basic understanding of intellectual property rights.
13.05	Demonstrate basic understanding of appropriate use of employer property.
13.06	Demonstrate basic understanding of confidentiality.
13.07	Demonstrate basic understanding of role of ethical decision making in dealing with stakeholders.
13.08	Demonstrate knowledge of social responsibilities.
13.09	Demonstrate knowledge of legal and privacy issues regarding e-mail, voice mail, internet, telephone, and other communication methods.
14.0	Demonstrate basic computer skills--The student will be able to:
14.01	Demonstrate Keyboarding Techniques.

14.02	Demonstrate basic proficiency in spreadsheet, word processing, database, and presentation software and e-mail communication.
14.03	Perform research using the internet and intranet.
Forest Operations	
15.0	Prepare and administer forest management plans--The student will be able to:
15.01	Prepare and conduct a statistically based forest inventory.
15.02	Calculate, analyze and evaluate forest inventory data.
15.03	Write an approximate management plan for tract based on landowner objectives including timber volumes, harvesting schedules, regeneration schedules, stand maps, stand and stock tables and recommendations for multiple-use and for future management.
15.04	Select and execute appropriate silvicultural system for tract.
15.05	Conduct a prescribed burn including pre-planning, permitting, firing systems, smoke management and suppression techniques.
15.06	Plan and execute timber stand improvement when needed.
15.07	Plan and execute appropriate site preparation, tree planting and harvesting.
15.08	Demonstrate knowledge of ordinances related to harvesting and regeneration activities.
16.0	Plan and administer forest inventories--The student will be able to:
16.01	Prepare and conduct a statistically based forest inventory using area samples, i.e. fixed-radius plot inventory.
16.02	Prepare and conduct a statistically based forest inventory using point sample, i.e. prism inventory.
16.03	Operate dendrometers such as tree calipers and diameter tape.
16.04	Operate hypsometers such as altimeter, clinometers and relaskop.
16.05	Operate hand-held magnetic compass and demonstrate proper pacing procedure in forested situations.
16.06	Locate forest tracts using legal description, maps, aerial photos and atlases.
16.07	Select and use appropriate volume tables.
16.08	Calculate timber volumes by forest products.
16.09	Calculate and prepare valuation of forest tract based on product and current market prices.
16.10	Prepare "lump sum" timber bid.

16.11	Prepare "per unit" timber bid.
16.12	Calculate and prepare stand and stock tables.
16.13	Calculate and prepare growth projections and regeneration stocking.
16.14	Calculate tract averages using maps, aerial photos and/or pacing.
17.0	Assist registered land surveyor in location of property corners and boundary lines, road construction and drainage projects--The student will be able to:
17.01	Identify forest tracts based on legal description and write proper legal description for given forest tract.
17.02	Locate and mark forest tract corners and boundary lines.
17.03	Determine forest road location and identify on the ground.
17.04	Determine drainage patterns for watershed and locate proper stream crossing points.
17.05	Obtain proper permits for stream crossings, i.e. culverts, bridges.
18.0	Prepare and administer forest fire and smoke management plans and assist in forest fire suppression and control--The student will be able to:
18.01	Demonstrate knowledge of various firing techniques.
18.02	Demonstrate knowledge of weather conditions as related to forest fire-prescribed and wildfire - and smoke management.
18.03	Select proper firing techniques based on landowner objectives and weather conditions.
18.04	Demonstrate knowledge of fire suppression tools and equipment, both hand tools and mechanical.
18.05	Demonstrate knowledge of pre-suppression forest fire activities.
18.06	Evaluate acreage and damages of wildfire and recommend future forest management activities to renew resource.
18.07	Plan and administer a fire and smoke management plan including proper burning authorizations.
18.08	Complete U.S. Forest Service S-190, Introduction to Fire Behavior, and S-130, Basic Fire Fighter course with passing scores and, when possible, receive Incident Qualification Card ("Red Card").
19.0	Identify major southeastern forest tree species--The student will be able to:
19.01	Identify major commercial forest species of the southeast United States by scientific name, common name, habitat and commercial products derived from species.
19.02	Identify major commercial forest species of Florida, with or without foliage, by personal observation using the five senses.
19.03	Use dichotomous key to identify unfamiliar species.

20.0	Identify and control major southeastern forest insects and diseases--The student will be able to:
20.01	Identify major forest insects and diseases of the southeastern United States by scientific name, common name and damage inflicted.
20.02	Identify major forest insects and diseases of the southeastern United States by scientific name, common name, symptoms, and damage inflicted and recommendations for control.
20.03	Identify major forest insects and diseases of Florida in the forest by personal observation and recommend appropriate controls.
20.04	Demonstrate knowledge of chemical and biological control of forest pests.
20.05	Evaluate damages by forest insects and diseases and make recommendations for future forest management.
21.0	Evaluate forest ecosystems--The student will be able to:
21.01	Demonstrate knowledge of the major forest ecosystems of the United States.
21.02	Identify the major forest ecosystems of Florida.
21.03	Identify the relationship between human activities and forest flora and fauna.
21.04	Identify endangered species of Florida and associated regulations and/or recommended forest practices.
21.05	Demonstrate knowledge of threatened species of Florida and associated regulations and/or recommended forest practices.
21.06	Demonstrate knowledge of forest ecosystem practices on both private and public lands.
22.0	Evaluate forest soils with respect to chemical and fertilizer applications and hydrology--The student will be able to:
22.01	Demonstrate knowledge of the major forest soil types in the southeastern United States.
22.02	Identify and classify the major forest soil types of Florida.
22.03	Identify types, uses and application rates of approved forest herbicides.
22.04	Prepare and execute a herbicide plan.
22.05	Identify fertilizer formulations applicable to Florida forest soils.
22.06	Identify proper fertilizer formulations rates with proper soil type on Florida forest soils.
22.07	Define major watersheds and hydrology of a given forest area.
22.08	Demonstrate knowledge of Best Management Practices (BMP), especially special management zones (SMZ).
22.09	Identify and locate SMZ on the ground.

22.10	Obtain proper permits relating to stream crossings, ditching, cut and fill and wetland harvesting.
23.0	Collect, maintain and/or analyze data and records--The student will be able to:
23.01	Collect field data from forest inventory
23.02	Setup and maintain files of technical forestry information.
23.03	Demonstrate knowledge of federal, state and local regulations related to forestry practices.
24.0	Prepare, analyze and enforce contracts and other legal document--The student will be able to:
24.01	Demonstrate knowledge of types of contracts and legal documents related to forestry practices.
24.02	Select proper timber sale contract for given situation and prepare and execute same under supervision of forester and/or legal counsel.
24.03	Obtain and maintain proper licensure, certifications and registrations.
25.0	Administer the purchase, sale and/or marketing of forest products--The student will be able to:
25.01	Demonstrate knowledge of various forest products and markets.
25.02	Identify Florida forest products and current market valuations.
25.03	Identify timber harvesting systems used in southeastern United States.
25.04	Prepare and execute a timber sale, either lump sum or per unit.
25.05	Supervise timber harvesting activities.
25.06	Scale forest products.
Irrigation Technology	
26.0	Demonstrate an understanding of the use of communications in an irrigation business environment--The student will be able to:
26.01	Explain the communications patterns used in the irrigation industry, including connected network and chain of command.
26.02	Define common irrigation vocabulary terms.
26.03	Locate specific engineering information from print and on-line sources.
27.0	Demonstrate an understanding of the types of pipe installation common to irrigation systems--The student will be able to:
27.01	List the different types and schedules of available Polyvinyl Chloride (PVC) pipes.

27.02	Describe the different types of available fittings including solvent weld, o-rings, and mechanical joint (MJ) joints.
27.03	Describe the basic chemical reactions that occur in the manufacture of PVC pipe.
27.04	Explain the process of connecting PVC pipe by using solvent weld chemicals.
27.05	Explain the process of connecting o-ring pipe by using push-on fittings.
28.0	Demonstrate an understanding of irrigation system components--The student will be able to:
28.01	Identify various irrigation system types such as rotors, sprays, and drip.
28.02	Explain the process of time clock selection.
28.03	Explain the process of valve selection.
28.04	Explain the process of sprinkler head selection.
28.05	Explain the process of low-voltage wire selection.
29.0	Demonstrate an understanding of basic design principles used in irrigation systems--The student will be able to:
29.01	Calculate the static or working water pressure at a given point in the system.
29.02	Determine the velocity for certain type and size pipe at a given flow.
29.03	Select appropriate sprinkler heads for specific applications.
29.04	Group irrigation heads to form irrigation zones complying with proper design criteria.
29.05	Calculate specific friction loss through piping.
29.06	Compute the precipitation rate for various sprinkler types and spacing patterns.
30.0	Demonstrate an understanding of basic irrigation system maintenance and operation--The student will be able to:
30.01	Determine the watering time needed per week per station.
30.02	Develop a water schedule based on proper design principles.
30.03	Read and explain an as-built drawing.
30.04	Explain the process of remove and install sprinkler heads.
30.05	Describe introductory the process of automatic control valve repair.

30.06	Describe the process of automatic controller repair.
30.07	Diagnose and correcting wiring problems.
31.0	Demonstrate an understanding of distribution systems used in the irrigation industry--The student will be able to:
31.01	Diagnose low and high pressure conditions that result from damaged piping, faulty installation, and clogged piping.
31.02	Repair zone lines using solvent weld fittings.
31.03	Repair main lines using mechanical joint (MJ) couplings.
32.0	Demonstrate an understanding of control systems used in irrigation installation and repair--The student will be able to:
32.01	Develop watering schedules and setting control timers.
32.02	Diagnose control system using test meters and wire tracking equipment.
32.03	Isolate problems into one of three areas for repair: control timer, field wiring, and control valve.
32.04	Repair or replacing an automatic control timer.
32.05	Repair/splicing field wiring.
32.06	Repair/replacing faulty parts on the irrigation control valve.
33.0	Demonstrate an understanding of water supply--The student will be able to:
33.01	Diagnose problems of water supply interruption.
33.02	Diagnose problems with water quality.
33.03	Repair or adjusting pump control systems.
33.04	Repair adjusting backflow prevention devices.
33.05	Clean filter media or screens.
34.0	Demonstrate an understanding of sprinkler performance--The student will be able to:
34.01	Diagnose sprinkler distribution problems.
34.02	Measure and analyze precipitation rates.
34.03	Remove, clean, and reinstall heads.

34.04	Repair and adjust heads.
34.05	Adjust sprinkler head spacing if required.
35.0	Demonstrate an understanding of site analysis in residential and commercial irrigation systems--The student will be able to:
35.01	Complete an accurate site drawing.
35.02	Determine the watering requirements in view of the site plan.
35.03	Identify unique site conditions that might affect installation.
35.04	Identify the appropriate water source.
36.0	Demonstrate an understanding of and practice in design principles used in residential and commercial irrigation systems--The student will be able to:
36.01	Lay out heads on a print utilizing graphic symbol.
36.02	Select/sizing control valve.
36.03	Select/sizing zone lines.
36.04	Select/sizing main line.
37.0	Demonstrate an understanding of job preparation necessary in residential and commercial irrigation systems--The student will be able to:
37.01	List the different types of underground utilities and how to locate them.
37.02	Prepare a list of materials necessary to install the class designed irrigation system.
37.03	Identify the tools and equipment needed to install the class designed irrigation system.
38.0	Demonstrate an understanding of installation techniques used in residential and commercial irrigation systems--The student will be able to:
38.01	Use a walk behind trencher to excavate trenches.
38.02	Hand digs a trench.
38.03	Backfill and compact a trench.
38.04	Measure, cut, clean, prime, and glue solvent weld PVC pipe.
38.05	Cut and install o-ring pipe and fittings.
38.06	Install spray heads and/or rotor heads.

38.07	Install control valves.
38.08	Install nozzles, adjusting flow rates, and setting pattern.
38.09	Identify and Install low voltage direct burial wire.
38.10	Produce an "as-built" drawing.
39.0	Demonstrate an understanding of how to obtain site information necessary in the residential irrigation system design process--The student will be able to:
39.01	Develop an accurate plot plan or site drawing.
39.02	Determine the type of landscaping and water requirement for a specific site.
39.03	Identify environmental traits such as soil type and weather for a specific site.
39.04	Identify unique site conditions that might affect design or installation.
39.05	Identify possible water sources and select appropriate source.
40.0	Demonstrate an understanding of selection and safe use of equipment for residential irrigation system installation--The student will be able to:
40.01	Select appropriate sprinkler heads for each area.
40.02	Lay out heads on print utilizing graphic symbols in an irrigation design.
40.03	Group irrigation heads to form irrigation zones.
41.0	Demonstrate an understanding of how to select pipe sizes and valves appropriate for specific residential irrigation system installations--The student will be able to:
41.01	Determine the water volume and pressure available from the water supply.
41.02	Select and sizing a control valve for each zone.
41.03	Select and sizing pipe main line.
41.04	Select and sizing pipe for zone lines.
42.0	Demonstrate an understanding of microcomputer applications used to design residential irrigation systems--The student will be able to:
42.01	Enter the elements of a site plan into the computer.
42.02	Use a scanner to enter a site plan into a microcomputer application.
42.03	Lay out heads using a microcomputer application.

42.04	Use a microcomputer application to group heads together to form irrigation zones.
42.05	Use a microcomputer application to select pipe size.
43.0	Demonstrate an understanding of the role of “the green industry”--The student will be able to:
43.01	Describe the importance of the “green industry” to local, state, and national economies.
43.02	Explain the importance and impact of local, state and federal regulations.
43.03	Describe the relationship of the “green industry” to the environment.
44.0	Demonstrate an understanding of the principles of plant growth--The student will be able to:
44.01	Describe the functions of plant parts including roots, stems, leaves, flowers and fruits.
44.02	Describe the processes of plant growth including photosynthesis, respiration, nutrient uptake and respiration.
44.03	Describe the growth characteristics, and use of subtropical and tropical landscape plants.
44.04	Identify various landscape designs, natural systems and the plants associated with them.
44.05	Describe the process of effective establishment of plants in the landscape.
44.06	Describe the influences of the environment on the landscape including pollutants.
45.0	The student will demonstrate an understanding of the role of plant nutrients and fertilizers--The student will be able to:
45.01	Identify the nutrients required for plant growth and the role of each.
45.02	Identify the types and kinds of fertilizers.
45.03	Read and interpreting fertilizer labels.
45.04	Describe the application of various fertilizer formulations.
45.05	Identify symptoms of nutritional deficiencies and toxicities of plants.
46.0	The student will demonstrate an understanding of pest management practices--The student will be able to:
46.01	Describe the principles and benefits of integrated pest management.
46.02	Explain the nature of physical and chemical damage to plants.
46.03	Describe the selection process involved in the use of horticultural chemicals for arthropod pest control and subsequent implications of their usage.

46.04	Explain the role of efficient irrigation in pest control.
46.05	Explain the role of plant health in pest control.
47.0	Demonstrate an understanding of the role of irrigation--The student will be able to:
47.01	List the components of Florida's fresh water systems.
47.02	Explain evaporation transpiration rate.
47.03	Explain hydro zoning/precipitation rate.
47.04	Identify the water needs of plants.
47.05	Explain the role of mulches in the landscape.
47.06	Describe soil moisture retention and movement for various soil types.
48.0	Demonstrate an understanding of the role of soil science--The student will be able to:
48.01	Identify soil types and textures.
48.02	Explain the role of soil pH and soluble salts on plant growth.
48.03	Explain the physical properties of fill soil.
48.04	Explain the role of soil type as it affects water retention.
48.05	Interpret soil test information.
48.06	Read and understanding soil survey maps.
49.0	Demonstrate an understanding of plants used in urban and suburban landscapes--The student will be able to:
49.01	Describe the process of binomial nomenclature.
49.02	Describe the use of bedding plants and other herbaceous perennials.
49.03	Describe the use of ground covers, shrubs, trees, and vines including angiosperms and gymnosperms.
49.04	Describe the use of palms, grasses, and other monocots.
50.0	Demonstrate an understanding of the basic safety issues involved in the "green industry"--The student will be able to:
50.01	List the most common causes of accidents in the "green industry."

50.02	Discuss the importance of following proper safety precautions.
50.03	Describe the symptoms of pesticide poisoning.
50.04	Extract pertinent information from material safety data sheets.
51.0	Demonstrate an understanding of the water cycle--The student will be able to:
51.01	Describe the role of precipitation.
51.02	Explain the effects of evaporation and transpiration.
51.03	Describe the effects of runoff on water supply and quality.
51.04	Explain the process of ground water infiltration.
51.05	Describe how different ecosystems affect the water supply.
52.0	Demonstrate an understanding of the uses of water resources--The student will be able to:
52.01	List the uses and quantity of water used on a global scale.
52.02	List the uses and quantity of water used in the United States.
52.03	List the uses and quantity of water used in Florida.
53.0	Demonstrate an understanding of water resource policies in Florida--The student will be able to:
53.01	Explain the role that planning agencies have on water supply and quality.
53.02	Explain the effect the current legislation has on water supply and quality.
53.03	List the pending legislation that may affect the water supply and quality.
54.0	Demonstrate an understanding of surface water supplies--The student will be able to:
54.01	Explain the role of rivers, lakes and reservoirs.
54.02	Explain the importance of flood damage reduction planning.
54.03	Explain the issues involved in ensuring that surface water supplies are properly managed.
55.0	Demonstrate an understanding of groundwater supplies--The student will be able to:
55.01	Describe groundwater's role as a water source.

55.02	Describe the effect of pollutants on groundwater.
55.03	Describe the role of the aquifer and the regional aquifer characteristics.
55.04	Describe the effect that water pumped from the ground has on the water table.
56.0	Demonstrate an understanding of drip system components--The student will be able to:
56.01	Identify the various types of water emitters.
56.02	Identify and explain the use of drip lateral materials.
56.03	Identify and explain the use of pressure regulators.
56.04	Identify and explain the use of valves including flush valves, control valves and air vents.
57.0	Demonstrate an understanding of the characteristics of water emission devices--The student will be able to:
57.01	Identify and explain the operation of orifice emitters.
57.02	Identify and explain the operation of laminar flow emitters.
57.03	Identify and explain the operation of turbulent flow emitters.
57.04	Identify and explain the operation of vortex emitters.
57.05	Identify and explain the operation of pressure compensating emitters.
57.06	Explain emission uniformity and quality.
58.0	Demonstrate an understanding of basic design principles for low volume irrigation systems--The student will be able to:
58.01	Analyze the irrigation site and gathering appropriate site data.
58.02	Identify point or line source area.
58.03	Determine the appropriate irrigation method for each area.
58.04	Determine the number of water emitters required per plant per area.
58.05	Adapt irrigation requirements to available water supply.
59.0	Demonstrate an understanding of procedures involved in installation of low volume irrigation systems--The student will be able to:
59.01	Connect the main water line to a point of connection.

59.02	Run lateral lines.
59.03	Run distribution tubing.
59.04	Install emitters.
59.05	Develop an irrigation schedule.
60.0	Demonstrate an understanding of irrigation system computer software currently used in industry--The student will be able to:
60.01	Participate in seminars presented by industry professionals.
60.02	Identify the basic concepts of computerized control systems.
61.0	Demonstrate an understanding of materials selection and costing needed for sales presentations--The student will be able to:
61.01	Research materials costs for an irrigation project.
61.02	Visit wholesale supply houses.
62.0	Develop an understanding of the breadth of the irrigation industry--The student will be able to:
62.01	Describe an irrigation company.
62.02	Describe an irrigation supply wholesale business.
62.03	Describe the use of irrigation in a greenhouse.
62.04	Describe the use of irrigation in a golf course.
62.05	Describe the use of irrigation in a park.
62.06	Describe the use of irrigation in a commercial irrigation installation.
62.07	Describe the use of irrigation in a residential irrigation installation.
63.0	Demonstrate an understanding of irrigation water requirements--The student will be able to:
63.01	Explain common system components and their effective water use.
63.02	Explain basic concepts such as application rates, sprinkler spacing, and distribution uniformity.
63.03	Explain matched precipitation rates.
63.04	List the different types of soils and their infiltration rates.

64.0	Demonstrate an understanding of economic analysis as applied to irrigation investment decisions--The student will be able to:
64.01	Describe the procedure for determining equipment and installation cost.
64.02	Explain the process of computing ownership costs.
64.03	Explain the process of determining total system cost.
65.0	Demonstrate an understanding of methods of develop overall operating and maintenance procedures--The student will be able to:
65.01	Develop an efficient site watering schedule.
65.02	Obtain product maintenance information.
65.03	Explain how to develop an "as-built" drawing.
66.0	Demonstrate an understanding of analysis of irrigation systems--The student will be able to:
66.01	List the different levels of evaluation.
66.02	Describe and performing a visual inspection of an irrigation system.
66.03	Describe and performing a flow inspection.
66.04	Describe and performing a catch can test.
67.0	Demonstrate an understanding of how to obtain site information necessary in the commercial irrigation system design process--The student will be able to:
67.01	Develop an accurate site drawing.
67.02	Determine the type of landscaping and water requirement for a specific site.
67.03	Identify environmental traits such as soil type and weather for a specific site.
67.04	Identify unique site conditions that might affect design or installation.
67.05	Identify possible water sources and select appropriate source.
68.0	Demonstrate an understanding of selection and safe use of equipment for a commercial irrigation system installation--The student will be able to:
68.01	Select appropriate sprinkler heads for each area.
68.02	Lay out heads on print utilizing graphic symbols in an irrigation design.
68.03	Group irrigation heads to form irrigation zones.

69.0	Demonstrate an understanding of how to select pipe sizes and valves appropriate for specific commercial irrigation system installations-- The student will be able to:
69.01	Determine the water volume and pressure available from the water supply.
69.02	Select and sizing a control valve for each zone.
69.03	Select and sizing pipe main line.
69.04	Select and sizing pipe for zone lines.
70.0	Demonstrate an understanding of writing irrigation specifications--The student will be able to:
70.01	Review manufacturing and engineering data sheets and downloading from websites detailed drawings in preparation for an irrigation project.
70.02	Conform to the Florida Irrigation Society Guidelines for landscape irrigation systems.
70.03	Write specifications for a commercial irrigation project.
71.0	Demonstrate an understanding of advanced hydraulic and head layout concepts--The student will be able to:
71.01	Describe the factors that determine system flow requirements.
71.02	Explain the concepts of uniformity and efficiency.
71.03	Explain the concepts of uniformity indicators.
71.04	Demonstrate the ability to read sprinkler profiles.
71.05	Demonstrate the ability to read sprinkler dens grams.
Horticulture Technician	
72.0	Demonstrate an understanding of plant physiology and growth--The student will be able to:
72.01	Describe the process of photosynthesis.
72.02	Identify and describe the functions of all parts of the plant.
72.03	Describe an asexual reproduction process.
72.04	Explain the differences between angiosperms and gymnosperms.
72.05	Identify the differences between woody and herbaceous plants.
73.0	Classify plants--The student will be able to:

73.01	Identify and group shade and flowering trees.
73.02	Identify and group fruit trees and plants.
73.03	Identify and group annuals, vegetables, and herbs.
73.04	Identify and group woody ornamentals, vines, and ground covers.
73.05	Identify and group tropical foliage plants.
73.06	Identify and group turf and ornamental grasses.
74.0	Select, operate, and maintain tools and equipment--The student will be able to:
74.01	Select and operate equipment for the job.
74.02	Maintain an inventory of parts and supplies.
75.0	Fertilize plants--The student will be able to:
75.01	Evaluate influences of nutrients on plant growth.
75.02	Apply fertilizers, using appropriate methods (dry, liquid, slow-release, injection, etc.).
75.03	Demonstrate proper handling and storage of fertilizers, observing safety precautions.
76.0	Manage a pest-control program--The student will be able to:
76.01	Develop an integrated pest management program or schedule.
76.02	Train employees in the safe use of pesticides.
76.03	Obtain a pesticide license.
77.0	Prune and shape plants--The student will be able to:
77.01	Train employees in pruning techniques.
77.02	Identify and use tools for pruning.
77.03	Prune plants to achieve desired growth.
77.04	Demonstrate sanitation and safety practices when pruning.
77.05	Develop a pruning program and time schedule.

77.06	Select and use chemical growth regulators.
77.07	Root and prune ornamental plants and trees.
78.0	Maintain landscape plants--The student will be able to:
78.01	Determine water requirements and apply at proper rates.
78.02	Identify weeds and apply herbicides safely.
78.03	Determine fertilization requirements and apply at proper rates.
78.04	Regulate growth of landscape plants through chemical or mechanical needs.
78.05	Maintain turf viability (mow at proper height and frequency, aerate, edge, clip, and remove trash).
78.06	Identify plant pest problems and apply corrective measures.
78.07	Cultivate and mulch plants.
78.08	Brace and repair trees.
79.0	Demonstrate employability skills--The student will be able to:
79.01	Conduct a job search.
79.02	Secure information about a job.
79.03	Identify documents that may be required when applying for a job.
79.04	Complete a job application form.
79.05	Demonstrate competency in job interview techniques.
79.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other person.
79.07	Identify acceptable work habits.
79.08	Demonstrate knowledge of how to make job changes.
79.09	Demonstrate acceptable employee health habits.
80.0	Determine drainage system needs and design a drainage system--The student will be able to:
80.01	Determine the texture and percolation characteristics of the soil.

81.0	Maintain and analyze records--The student will be able to:
81.01	Maintain fertilizer and pesticide application records.
81.02	Use computers in the landscape and horticulture operations.
82.0	Prepare growing media and seedbeds--The student will be able to:
82.01	Identify media materials.
82.02	Mix rooting and growing media according to plant requirements.
82.03	Sterilize rooting, potting, and growing media.
82.04	Collect and test a soil sample from field and potting media.
82.05	Adjust pH and nutritional levels of media.
82.06	Prepare planting beds and sites.
82.07	Fill and level benches and pots with media.
82.08	Demonstrate sanitation practices when handling and storing plant media materials.
83.0	Propagate plants--The student will be able to:
83.01	Collect propagation materials at proper time (seeds, cuttings, scions, bulbs, etc.).
83.02	Demonstrate propagation by grafting, budding, layering, separating, dividing, cutting, and tissue culturing.
83.03	Prepare flats and a seedbed and plant seeds.
83.04	Prepare a rooting bed.
83.05	Prepare propagation materials (seeds, cuttings, scions, etc.)
83.06	Apply growth stimulants to propagation materials.
83.07	Transplant rooted propagation materials including tissue culture transplants.
83.08	Demonstrate sanitation and safety practices when propagating.
84.0	Grow plants--The student will be able to:
84.01	Prepare media for containers.

84.02	Prepare field site for transplants.
84.03	Select plant containers.
84.04	Determine plant spacing in the field and on container beds.
84.05	Transplant propagated materials to various containers and to the field.
84.06	Determine and provide light requirements of various plant types.
85.0	Harvest, process, and ship plants--The student will be able to:
85.01	Grade and harvest field-grown plants (ball, burlap, bare-root, "grow-bags").
85.02	Select, grade, and assemble container-grown plants.
85.03	Prepare for shipment, loading, and transporting harvested plant materials.
86.0	Market plants--The student will be able to:
86.01	Identify, inventory, and label marketable plants.
87.0	Design, install, and maintain nursery irrigation systems--The student will be able to:
87.01	Determine irrigation requirements.
87.02	Assess quality of irrigation water.
87.03	Operate and service various types of irrigation systems.
Golf Course Technician	
88.0	Supervise and manage the operation, maintenance and repair of golf course equipment--The student will be able to:
88.01	Define the role of the golf course equipment mechanic in relation to the organization.
88.02	Determine the essential power, shop and hand tools required in a golf course mechanics shop.
88.03	Design a shop layout.
88.04	Compile a list of equipment required in the operation of an 18-hole golf course.
88.05	Demonstrate knowledge and use of golf course equipment.
88.06	Develop and supervise a system of preventive maintenance.

88.07	Sharpen and grind blades and cutting surfaces on all mowing equipment.
88.08	Monitor and record the use of fuel, lubricants and consumable shop supplies.
88.09	Maintain a safe clean shop.
88.10	Maintain current catalogs for supplies and equipment.
88.11	Maintain tires and tire pressure on golf course equipment.
88.12	Train and supervise employees in the safe use of tools and equipment.
89.0	Schedule irrigation and manage the design, installation and maintenance of golf course irrigation systems--The student will be able to:
89.01	Determine water requirements for a particular turf.
89.02	Illustrate the design, computations, pumping capacity and pipe sizing needed to irrigate a given operation.
89.03	Schedule irrigation as required.
89.04	Store and handle chemicals safely.
89.05	Recognize symptoms of agricultural chemical poisoning and apply first aid.
89.06	Dispose of chemical containers.
89.07	Read and interpret safety precautions provided on equipment and pesticide containers.
90.0	Prescribe, supervise and manage the application of agricultural chemicals for the prevention and control of pests--The student will be able to:
90.01	Instruct employees in the safe use of agricultural chemicals.
90.02	Prepare proper proportions of chemicals and carrying agents.
90.03	Compute amounts of active ingredients of chemicals to be used.
90.04	Calibrate volume, pressure and output of equipment.
90.05	Weigh and measure chemicals.
90.06	Adjust height and width of equipment to achieve desired spray pattern.
90.07	Recognize symptoms of pesticide damage.
90.08	Identify fungi and bacteria.

90.09	Recognize symptoms of insects and nematodes.
90.10	Identify common insects, weeds, diseases and other pests common to golf courses.
90.11	Clean and store sprayers.
91.0	Prescribe, supervise and manage the fertilization of the turf and landscape--The student will be able to:
91.01	Take soil and leaf samples for chemical analysis.
91.02	Adjust pH level of soil.
91.03	Interpret soil and tissue chemical analysis results.
91.04	Apply fertilizer in liquid form.
91.05	Interpret labels on fertilizer containers.
91.06	Apply dry fertilizers.
91.07	Identify nutrient deficiency symptoms in turf and landscape plants.
91.08	Determine kind and type of fertilizer to apply to a given area.
91.09	Determine the nutrient requirements of various plants.
91.10	Determine amount of fertilizer to apply to a given area.
91.11	Analyze cost of various formulations and methods of application.
91.12	Recognize fertilizer injury to plant materials.
92.0	Train and supervise employees in grooming and maintaining greens, tees, fairways, roughs and other areas--The student will be able to:
92.01	Supervise the mowing of greens, collars, roughs, aprons, and fairways.
92.02	Determine the placement and location of cups and tees.
92.03	Supervise the repair of divots.
92.04	Determine conditions necessary for verticutting and aerifying turf.
92.05	Supervise the care and maintenance of sand traps.
92.06	Prune trees and shrubs.

92.07	Develop maintenance schedule for grooming golf courses.
92.08	Train and supervise employees in the care of golf courses.
92.09	Follow written and verbal instructions.
93.0	Provide a safe environment for workers and patrons--The student will be able to:
93.01	Provide instruction for the safe use of chemicals, tools and equipment.
93.02	Inspect tools and equipment for safe operation.
93.03	Apply emergency first aid.
93.04	Monitor employees work habits.
93.05	Maintain safety awareness.
94.0	Keep and analyze maintenance, employee, equipment and inventory records--The student will be able to:
94.01	Maintain equipment use and maintenance records.
94.02	Maintain pesticide use information.
94.03	Keep inventory records.
94.04	Prepare a written report or summary based on records.
94.05	Observe and make recommendations based on records.
94.06	Evaluate employees, equipment and practices based on records.
95.0	Observe local, state and federal laws and regulations--The student will be able to:
95.01	Observe OSHA rules and regulations.
95.02	Observe EPA rules and regulations.
95.03	Maintain a list of agencies responsible for regulating the industry.
96.0	Demonstrate leadership, communication, public relations, employability and human relations skills--The student will be able to:
96.01	Conduct a job search.
96.02	Secure information about a job.

96.03	Identify documents that may be required when applying for a job.
96.04	Complete a job application form correctly.
96.05	Demonstrate competence in job interview techniques.
96.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
96.07	Demonstrate acceptable employee health habits.
97.0	Demonstrate an understanding of the types of pipe installation common to irrigation systems--The student will be able to:
97.01	List the different types and schedules of available Polyvinyl Chloride (PVC) pipes.
97.02	Describe the different types of available fittings including solvent weld, o-rings, and mechanical joint (MJ) joints.
97.03	Describe the basic chemical reactions that occur in the manufacture of PVC pipe.
97.04	Explain the process of connecting PVC pipe by using solvent weld chemicals.
97.05	Explain the process of connecting o-ring pipe by using push-on fittings.
98.0	Demonstrate an understanding of irrigation system components--The student will be able to:
98.01	Identify various irrigation system types such as rotors, sprays, and drip.
98.02	Explain the process of time clock selection.
98.03	Explain the process of valve selection.
98.04	Explain the process of sprinkler head selection.
98.05	Explain the process of low-voltage wire selection.
99.0	Demonstrate an understanding of basic design principles used in irrigation systems--The student will be able to:
99.01	Calculate the static or working water pressure at a given point in the system.
99.02	Determine the velocity for certain type and size pipe at a given flow.
99.03	Select appropriate sprinkler heads for specific applications.
99.04	Group irrigation heads to form irrigation zones complying with proper design criteria.
99.05	Calculate specific friction loss through piping.

99.06	Compute the precipitation rate for various sprinkler types and spacing patterns.
100.0	Demonstrate an understanding of basic irrigation system maintenance and operation--The student will be able to:
100.01	Determine the watering time needed per week per station.
100.02	Develop a water schedule based on proper design principles.
100.03	Read and explain an as-built drawing.
100.04	Explain the process of remove and install sprinkler heads.
100.05	Describe introductory the process of automatic control valve repair.
100.06	Describe the process of automatic controller repair.
100.07	Diagnose and correcting wiring problems.
101.0	Demonstrate an understanding of sprinkler performance--The student will be able to:
101.01	Diagnose sprinkler distribution problems.
101.02	Measure and analyze precipitation rates.
101.03	Remove, clean, and reinstall heads.
101.04	Repair and adjust heads.
101.05	Adjust sprinkler head spacing if require
102.0	Demonstrate an understanding of the principles of plant growth--The student will be able to:
102.01	Describe the functions of plant parts including roots, stems, leaves, flowers and fruits.
102.02	Describe the processes of plant growth including photosynthesis, respiration, nutrient uptake and respiration.
102.03	Describe the growth characteristics, and use of subtropical and tropical landscape plants.
102.04	Identify various landscape designs, natural systems and the plants associated with them.
102.05	Describe the process of effective establishment of plants in the landscape.
102.06	Describe the influences of the environment on the landscape including pollutants.
103.0	The student will demonstrate an understanding of the role of plant nutrients and fertilizers--The student will be able to:

103.01	Identify the nutrients required for plant growth and the role of each.
103.02	Identify the types and kinds of fertilizers.
103.03	Read and interpreting fertilizer labels.
103.04	Describe the application of various fertilizer formulations.
103.05	Identify symptoms of nutritional deficiencies and toxicities of plants.
104.0	The student will demonstrate an understanding of pest management practices--The student will be able to:
104.01	Describe the principles and benefits of integrated pest management.
104.02	Explain the nature of physical and chemical damage to plants.
104.03	Describe the selection process involved in the use of horticultural chemicals for arthropod pest control and subsequent implications of their usage.
104.04	Explain the role of efficient irrigation in pest control.
104.05	Explain the role of plant health in pest control.
105.0	Demonstrate an understanding of the role of irrigation--The student will be able to:
105.01	List the components of Florida's fresh water systems.
105.02	Explain evaporation transpiration rate.
105.03	Explain hydro zoning/precipitation rate.
105.04	Identify the water needs of plants.
105.05	Explain the role of mulches in the landscape.
105.06	Describe soil moisture retention and movement for various soil types.
106.0	Demonstrate an understanding of the basic safety issues involved in the "green industry"--The student will be able to:
106.01	List the most common causes of accidents in the "green industry."
106.02	Discuss the importance of following proper safety precautions.
106.03	Describe the symptoms of pesticide poisoning.
106.04	Extract pertinent information from material safety data sheets.

107.0	Demonstrate an understanding of drip system components--The student will be able to:
107.01	Identify the various types of water emitters.
107.02	Identify and explain the use of drip lateral materials.
107.03	Identify and explain the use of pressure regulators.
107.04	Identify and explain the use of valves including flush valves, control valves and air vents.
108.0	Demonstrate an understanding of basic design principles for low volume irrigation systems--The student will be able to:
108.01	Analyze the irrigation site and gathering appropriate site data.
108.02	Identify point or line source area.
108.03	Determine the appropriate irrigation method for each area.
108.04	Determine the number of water emitters required per plant per area.
108.05	Adapt irrigation requirements to available water supply.
109.0	Demonstrate an understanding of procedures involved in installation of low volume irrigation systems--The student will be able to:
109.01	Connect the main water line to a point of connection.
109.02	Run lateral lines.
109.03	Run distribution tubing.
109.04	Install emitters.
109.05	Develop an irrigation schedule.
110.0	Demonstrate an understanding of plant physiology and growth--The student will be able to:
110.01	Describe the process of photosynthesis.
110.02	Identify and describe the functions of all parts of the plant.
110.03	Describe an asexual reproduction process.
110.04	Explain the differences between angiosperms and gymnosperms.
110.05	Identify the differences between woody and herbaceous plants.

111.0 Classify plants--The student will be able to:
111.01 Identify and group shade and flowering trees.
111.02 Identify and group fruit trees and plants.
111.03 Identify and group annuals, vegetables, and herbs.
111.04 Identify and group woody ornamentals, vines, and ground covers.
111.05 Identify and group tropical foliage plants.
111.06 Identify and group turf and ornamental grasses.
112.0 Select, operate, and maintain tools and equipment--The student will be able to:
112.01 Select and operate equipment for the job.
112.02 Maintain an inventory of parts and supplies.
113.0 Fertilize plants--The student will be able to:
113.01 Evaluate influences of nutrients on plant growth.
113.02 Apply fertilizers, using appropriate methods (dry, liquid, slow-release, injection, etc.).
113.03 Demonstrate proper handling and storage of fertilizers, observing safety precautions.
114.0 Manage a pest-control program--The student will be able to:
114.01 Develop an integrated pest management program or schedule.
114.02 Train employees in the safe use of pesticides.
114.03 Obtain a pesticide license.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The AS degree in Agribusiness Management is a degree into which various agricultural certificates or ATDs can articulate. Up to 30 credits of an approved college credit certificate can be articulated into the 60 credit AS giving the student a “specialty” in various agricultural areas such as: irrigation, forestry, horticulture or golf course operations.

It is also recommended that students be members of professional organizations associated with the selected agricultural specialty (example: Florida Nursery, Growers and Landscape Association, Florida Forestry Association, Florida Irrigation Society, Florida Turfgrass Association)

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a “transfer value” assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 60-63 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Aquaculture Management
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1101030301
Program Type	College Credit
Standard Length	63 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	11-9013 - Farmers, Ranchers, and Other Agricultural Managers 45-1011 - First-Line Supervisors of Farming, Fishing, and Forestry Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction that prepares individuals to apply the economic and business principles involved in the organization, operation and management of aquaculture farms and businesses. Content includes, but is not limited to, instruction in ichthyology, fish breeding, fish nutrition, pond maintenance, diagnosis and treatment of diseases in fish, economic and marketing principles for the production of an aquatic crop, business management of a fish farm, and field experience necessary to operate an aquaculture operation.

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 consisting of 63 credit hours.

Standards

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

- 01.0 Identify important aquaculture plants and animals and describe their culture in various production units.
- 02.0 Perform general aquaculture production unit operations.
- 03.0 Determine methods of fish identification.
- 04.0 Demonstrate an understanding of water quality and aquaculture.
- 05.0 Maintain optimal nutrition for aquaculture organisms.
- 06.0 Diagnose and control common aquaculture maladies.
- 07.0 Operate and maintain aquaculture equipment.
- 08.0 Assist in the maturation, spawning, larval and juvenile rearing of aquaculture organisms.
- 09.0 Perform general aquaculture nursery systems operations.
- 10.0 Demonstrate an ability to manage aquatic species in multiple production units over time.
- 11.0 Apply business, economic and marketing principles to the production of an aquatic crop.
- 12.0 Demonstrate management skills required to operate an aquaculture farm.
- 13.0 Manage a pond operation.

**Florida Department of Education
Student Performance Standards**

Program Title: Aquaculture Management
CIP Number: 1101030301
Program Length: 63 credit hours
SOC Code(s): 11-9013, 45-1011

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0	Identify important aquaculture plants and animals and describe their culture in various production units--The student will be able to:
01.01	Define aquaculture and describe the historical important of aquaculture to local, state, national and international economies.
01.02	List occupations in aquaculture production, processing, distribution, marketing, and service.
01.03	Identify important aquatic species and products produced by aquatic farmers in Florida, U. S., and foreign countries.
01.04	List the types of production units and systems employed by aquaculturist in Florida, U. S. and foreign countries.
01.05	Outline basic techniques for constructing ponds, tanks, raceways, net pens and cages.
01.06	Describe basic production techniques for the culture of plants, mollusks, crustaceans, and finfish.
01.07	List and describe the major factors in growth of aquaculture species.
01.08	List important criteria in selecting a site for an aquaculture farm.
01.09	Describe natural fisheries and aquaculture production trends.
02.0	Perform general aquaculture production unit operations--The student will be able to:
02.01	Identify and describe the general anatomy, biology and life cycles for aquaculture species studied in this program.
02.02	Identify and describe the general morphology of aquatic macro and microalgae.
02.03	List methods to help determine aquatic animal health and behavior for various aquaculture production units.
02.04	List techniques for routine maintenance of aquaculture ponds, cage culture systems, and submerged lands.
02.05	Identify common aquaculture predators and list predator control techniques
02.06	Record production data such as water quality parameters, feed amounts, mortality and other routine information required for a

specific operation on data sheets and enter into a computer.

03.0 Determine methods of fish identification--The student will be able to:

03.01 Identify the major families of fish.

03.02 Describe the complexities of fish anatomy for the following systems:

- Skeletal systems
- Musculature
- Nervous system
- Vascular system
- Respiratory system
- Urogenital system
- Digestive system
- Reproductive system

03.03 Identify the major anatomical fish structures.

03.04 Describe the physiological characteristics of fish for the following:

- Color
- Bioluminescence
- Sound production
- Sensory systems
- Osmoregulation

03.05 Classify fish.

03.06 Describe the aquatic environment.

03.07 Discuss the basics of fish behavior.

03.08 Identify the muscles of a fish.

03.09 Measure the physical characteristics of fish.

03.10 Use a taxonomic key to identify fish.

03.11 Identify the major taxa of fish.

04.0 Demonstrate an understanding of water quality and aquaculture--The student will be able to:

04.01 Define environmental variables and list ranges important for survival and growth of important aquaculture species.

04.02 Demonstrate an understanding of aquifers, water quantity and management, and agricultural water use in Florida.

04.03 Identify water quality measurements necessary for accurately culturing aquaculture organisms.

04.04	Measure water quality parameters in aquaculture production units, record data in logs and computers, and interpret results.
04.05	Describe the nitrogen cycle and identify system equipment and/or processes which reduce nitrogenous wastes.
04.06	Discuss the importance of oxygen to the maintenance of production units and aquatic animal health and the effect of temperature on oxygen concentration.
04.07	Describe processes in aquaculture production units that effect pH, alkalinity, carbon dioxide, oxygen, ammonia, and other environmental parameters.
04.08	Measure primary productivity and discuss its importance in various aquaculture production units.
04.09	Calculate water volumes for various sizes of aquaculture production units.
04.10	List potential sources of aquaculture pollution and describe methods of preventing or abating these problems.
04.11	Identify Best Management Practices for treating waste water from various aquaculture production units.
05.0	Maintain optimal nutrition for aquaculture organisms--The student will be able to:
05.01	Explain the digestive anatomy of fish.
05.02	Explain fish metabolic rates.
05.03	Identify fish food additives
05.04	Outline the basic concepts of nutrition for plants, mollusks, crustaceans, and fish.
05.05	Discuss the importance of nutrition to growth and survival of various aquaculture species.
05.06	Identify feeding habits and practices of a variety of aquaculture species.
05.07	List common ingredients and additives of aquatic feeds and identify practices in feeds formulation and manufacturing.
05.08	Demonstrate an ability to culture live feeds including microalgae, rotifers and artemia and discuss their importance.
05.09	Calculate feeding rates, growth and feed conversion ratios for various aquaculture species stocked at different densities and rates.
05.10	List different feeding methods, measure feed and maintain feed records in logs and computers.
05.11	Discuss and differentiate feeding practices for hatchery, nursery and grow out of mollusks.
05.12	Discuss nutrition practices for culturing aquatic plants.
05.13	Discuss the principles of bioenergetics to growth.
06.0	Diagnose and control common aquaculture maladies--The student will be able to:

06.01	Identify the common diseases that infect aquaculture organisms.
06.02	Understand the basic mechanisms for control of disease.
06.03	Identify common bacterial diseases and treatment options.
06.04	Identify common mycotic diseases and treatment options.
06.05	Identify common viral diseases and treatment options.
06.06	Identify common parasitic diseases and treatment options.
06.07	Discuss the relationship of nutrition, water quality and stress how they may cause disease in aquaculture organisms.
06.08	Prepare an aquatic organism for diagnostic examination or shipment.
06.09	Observe various diseases of aquatic organisms and demonstrate use of a microscope.
06.10	List approved drugs available for use in aquaculture.
06.11	Describe approved chemicals and their use in treating diseases.
06.12	Identify common aquatic parasites found in Florida waters.
06.13	Identify toxic environmental diseases in fish.
07.0	Operate and maintain aquaculture equipment--The student will be able to:
07.01	List equipment used in various production units necessary to raise plants, mollusks, crustaceans, and fish.
07.02	Set up and maintain standard aquaria.
07.03	Set up field aquaculture ponds.
07.04	Measure field parameters such as temperature, salinity, and hardness.
07.05	Set up a system to culture aquatic plants.
07.06	Demonstrate an ability to correctly use aquaculture equipment including, but not limited to, a thermometer, oxygen meter, refractometer, pH meter, pump, graduated cylinder, beaker, nets, siphon, scales, sieves, calipers, secchi disk, and a microscope.
07.07	Set up aquaculture filtration systems.
07.08	List equipment options of a recirculating system including solids removal, biofiltration, sterilization and aeration, and explain their basic functions.
07.09	Operate and perform system maintenance on a recirculating system.

07.10	Estimate pumping requirements and select an appropriately sized pump for a given system and water volume.
07.11	Layout a PVC plumbing scheme for a given aquaculture system with a sufficient number of valves to allow for bypass and isolation and then measure, cut and assemble that water system.
07.12	Layout and put together an aeration system operated on airlift technology.
07.13	Replace and install a pump.
07.14	Perform simple calculations related to water volume, water flow and system loading.
07.15	Use and operate tools and equipment safely.
07.16	Measure productivity in aquaculture systems.
08.0	Assist in the maturation, spawning, larval and juvenile rearing of aquaculture organisms--The student will be able to:
08.01	Describe the reproductive anatomy, function of reproductive organs, and reproductive cycles of selected aquaculture organisms.
08.02	Differentiate between males and females of the same species.
08.03	Relate environmental factors to successful reproduction of various aquaculture species.
08.04	Explain the use of hormones, anesthetics, chemicals, antibiotics, and other techniques to manage broodstock and accelerate reproductive cycles and contrast the difference between environmental conditioning and induced spawning techniques.
08.05	Maintain and care for broodstock and prepare spawning tanks and/or systems.
08.06	Describe maturation, spawning, hatching, and larval rearing techniques for selected aquaculture species.
08.07	Discuss the importance of nutrition at various stages of the larval rearing cycle for selected aquaculture species.
08.08	Use a microscope to examine the stages and condition of eggs and larvae.
08.09	Prepare, stock, feed and maintain larval rearing tanks.
08.10	Culture live feeds and calculate feeding rates.
08.11	Outline a maturation system design for selected aquatic species.
08.12	List important practices and tasks in hatchery management.
08.13	Estimate production numbers from a given spawn of a given species.
08.14	Record hatching date in logs and computers and interpret results.
09.0	Perform general aquaculture nursery systems operations--The student will be able to:

09.01	Maintain, clean and operate a broodstock tank and list important practices in managing broodstock.
09.02	Start, maintain, count and harvest live feeds.
09.03	Maintain a nursery system by demonstrating an ability to clean tanks and filtration equipment, adjust water flow and volume, set aeration, and monitor water quality and feeding levels.
09.04	Describe and differentiate between land-based and field-based nursery systems, equipment and operations.
09.05	Monitor and record routine data such as feed amounts and times, temperature, oxygen, salinity, and ammonia and enter data into a computer or log book.
09.06	List and describe nursery production systems and larval husbandry techniques for fish, crustaceans, and mollusks.
09.07	Demonstrate practical hands-on experience in handling a variety of juvenile aquaculture organisms and operating nursery production units.
10.0	Demonstrate an ability to manage aquatic species in multiple production units over time--The student will be able to:
10.01	Identify routine management techniques involved in aquaculture.
10.02	Calculate system volume and stocking strategies for given aquaculture production units.
10.03	Develop a written protocol and design data sheets for daily feeding, water quality measuring, system maintenance, and other factors for various aquaculture production units culturing a given species.
10.04	Periodically sample or otherwise determine growth and production unit biomass/density and adjust feeding rates accordingly.
10.05	List methods of harvesting aquatic crops from various aquaculture production units and preparing them for shipment to market.
10.06	Acclimate and transfer aquatic animals from one water source to another.
10.07	Design, layout, build, and plumb a simple aquaculture recirculating or other aquaculture production unit system.
10.08	Calculate production area or volume, stocking rates, densities, feeding rates, conversion and growth of a given species for a given aquaculture production unit system being supervised.
10.09	Demonstrate an understanding of management principles and use of management decision-making tools, including a computer.
10.10	List communication skills and identify work habits necessary for supervising employees.
11.0	Apply business, economic and marketing principles to the production of an aquatic crop--The student will be able to:
11.01	Describe aquaculture production and value of selected species in Florida, domestically, and internationally.
11.02	List and access sources of market information and statistics for selected aquaculture species.
11.03	Identify sources of competition both locally and globally.
11.04	Identify critical risk factors which may limit success of a farm.

11.05	Itemize fixed and variable costs of an aquaculture venture.
11.06	Explain the principles of production economics to include costs, taxes, interest, depreciation, record keeping, cash flow and financial statements.
11.07	Write a hypothetical business plan and a production plan for an aquaculture venture.
11.08	Describe factors and variables in selecting a site for an aquaculture facility, including land, water, proximity of markets, labor and community acceptance.
11.09	Link culture system options to a given site and water resources.
11.10	Predict hypothetical production numbers for a given facility with given variables.
11.11	Outline a simple operating budget for an aquaculture facility including cash flow and financial statement.
11.12	Describe characteristics of a well-planned aquaculture facility.
11.13	Demonstrate use of a computer for record keeping, production and decision-making.
11.14	Evaluate techniques for aquaculture marketing.
12.0	Demonstrate management skills required to operate an aquaculture farm--The student will be able to:
12.01	List rules, state statutes and federal regulations important to aquaculture.
12.02	Explain the regulations that govern aquaculture on the local, state and national levels.
12.03	Describe permitting procedures for various species, sites and aquaculture production units.
12.04	List Best Management Practices necessary to operate and permit selected aquaculture facilities.
12.05	Develop a production plan and budget for a given aquaculture facility, design a record keeping system, establish operating procedures, harvest schedules and determine potential profitability.
12.06	Demonstrate an ability to maintain farm records including property, insurance, personnel, payroll, permits and licenses, equipment and tangible property, aquatic animal inventory, accounts receivable, accounts payable, and others.
12.07	Define HACCP and discuss its importance to both processing and aquaculture.
12.08	List management skills necessary for effective supervision of employees.
13.0	Manage a pond operation--The student will be able to:
13.01	Explain the basic techniques for building aquaculture ponds.
13.02	Explain the aquifer water quality in Florida.
13.03	Perform water chemistry quality measurements and explain their importance.

13.04	Produce aquatic plants in an aquaculture environment.
13.05	Identify filtration systems for aquaculture.
13.06	Manage water quality.
13.07	Explain water treatments.
13.08	Perform plankton analysis.
13.09	Describe the value of aeration systems.
13.10	Set up a closed system.
13.11	Set up cage systems.
13.12	Measure primary productivity.
13.13	Explain the importance of pond fertilization.
13.14	Explain the feeding techniques for large pond operations.
13.15	Measure density of organisms per acre.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method of instruction is offered, the following is 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; and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp .

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 63 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This AS degree program includes the following College Credit Certificates:

Aquaculture Technology (0101030302) – 26 credit hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

**Florida Department of Education
Curriculum Framework**

Program Title: Equine Studies
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1101050700
Program Type	College Credit
Standard Length	60 credit hours (primary)-64 credit hours (secondary)- no new enrollments
CTSO	Collegiate FFA
SOC Codes (all applicable)	45-1011 - First-Line Supervisors of Farming, Fishing, and Forestry Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 prepare students for employment in equine industry occupations under one of two different specializations. **Equine Farm Management** includes careers such as entry level equine farm supervisory and management positions, assistant farm manager, broodmare/foal manager, yearling manager in a variety of equine enterprises, or First-Line Supervisors/Managers of Animal Husbandry and Animal Care Workers (45-1011.08). Additional positions include entry level managerial positions in equine retail sales, managerial positions in service based sectors of the equine industry or entrepreneurial opportunities in the equine industry. **Equine Exercise Physiology** trains students in the emerging field of equine athletic management, providing students with expertise in conditioning techniques, management of the equine athlete and rehabilitation techniques. Graduates will be employed as assistant trainers, rehabilitation technicians, grooms for high performance horses or independent contractors in horse care.

The content for both specializations includes instruction to individuals in the areas of planning, organizing, directing and controlling of an equine operation with dual emphasis on:

- The science and care of equine species and the knowledge and understanding necessary for managing equine operations and husbandry and disease.
- Business skills such as financial management, marketing, employee relations, computer applications and business plan development.

The Equine Studies Associate in Science degree program should include the requirements specified in the statewide Articulation Manual.

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 consisting of 60-64 credit hours.

Standards

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

A. Equine Science Core Learning Outcomes:

- 01.0 Identify veterinary terminology and illustrate equine health practices.
- 02.0 Analyze equine nutrient requirements and evaluate equine diets.
- 03.0 Identify, analyze and apply basic concepts related to normal and abnormal equine behaviors.
- 04.0 Perform safe horse handling techniques.
- 05.0 Evaluate equine management systems for appropriate animal welfare, including housing, care and regulations.
- 06.0 Demonstrate employability skills including interpersonal skills, ethics, communication and responsibility through work based learning activities and a portfolio.

B. Business Management Specialization Learning Outcomes:

- 07.0 Identify equine industry sectors and business opportunities in a business plan.
- 08.0 Demonstrate techniques in evaluation, selection and breeding of horses.
- 09.0 Demonstrate ability to plan, schedule and maintain records and contracts, using appropriate technical information systems.
- 10.0 Perform equine marketing and sales management functions.
- 11.0 Demonstrate leadership and effective communication in employee management.

C. Exercise Physiology Learning Outcomes:

- 12.0 Design and manage physiological conditioning programs for the equine athlete.
- 13.0 Apply manual therapies for maintenance and therapeutic applications.
- 14.0 Identify and apply rehabilitation techniques using state-of-the-art equipment.
- 15.0 Evaluate hoof care, tack and equipment for different equine athletic endeavors.

**Florida Department of Education
Student Performance Standards**

Program Title: Equine Studies
CIP Number: 1101050700
Program Length: 60-64 credit hours
SOC Code(s): 45-1011

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

Equine Science Core Learning Outcomes:

01.0 Identify veterinary terminology and illustrate equine health practices—The student will be able to:

01.01 Understand equine diseases and establish appropriate wellness programs for equine populations.

01.02 Comprehend equine anatomy and form to function concepts.

01.03 Anticipate typical problems of performance and reproductive horses to prevent injury or poor health; effectively follow veterinarian orders to restore health and productivity.

01.04 Identify and describe equine anatomy, with special emphasis on physiology and function.

01.05 Provide first aid for horses.

01.06 Identify equine medications and demonstrate ability to administer as per veterinarian instructions.

02.0 Analyze equine nutrient requirements and evaluate equine diets—The student will be able to:

02.01 Evaluate equine diets according to nutrient requirements for different classes of horses (working, growing, lactating).

02.02 Determine economic impact of feedstuff purchasing decisions.

02.03 Maintain safe feeding management programs for enhanced equine health.

02.04 Prepare a typical diet for horses of different classes.

02.05 Understand feed manufacturing techniques and feed analysis systems.

03.0 Identify, analyze and apply basic concepts related to normal and abnormal equine behaviors—The student will be able to:

03.01 Understand and recognize natural horse behaviors.

03.02	Identify and resolve abnormal equine behaviors.
03.03	Utilize horse learning behaviors to improve management and safe handling of horses.
04.0	Perform safe horse handling techniques--The student will be able to:
04.01	Safely catch, lead, tie, groom, restrain and work around horses of various levels of training.
04.02	Safely administer health and medical practices, such as leg wraps, vital signs, injections and restraint for such treatments.
04.03	Evaluate safe transportation techniques and equipment for transportation.
04.04	Evaluate training equipment and demonstrate application of training equipment.
05.0	Evaluate equine management systems for appropriate animal welfare, including housing, care and regulations--The student will be able to:
05.01	Describe housing designs for different equine management systems.
05.02	Identify appropriate levels of care and welfare for equines.
05.03	Develop a health care program for an equine farm including vaccination protocols, deworming schedules/programs, biosecurity and first aid.
06.0	Demonstrate employability skills including interpersonal skills, ethics, communication and responsibility through work based learning activities and a portfolio--The student will be able to:
06.01	Demonstrate punctuality, initiative, courtesy, dependability, flexibility and honesty.
06.02	Demonstrate ability to work as part of a team.
06.03	Conduct a job search, write a resume and practice interview techniques.
06.04	Understand legal requirements for employees including hiring, firing, and documentation.
06.05	Develop managerial skills such as mentoring, management by objectives, balanced feedback, critical appraisal and promotion.
Business Management Specialization Learning Outcomes:	
07.0	Identify equine industry sectors and business opportunities in a business plan--The student will be able to:
07.01	Identify breeds of horses and describe typical uses.
07.02	Understand evolution and the role horses have played in history and cultural development.
07.03	Develop awareness of critical issues to the horse industry such as legislative, regulatory, ethical and environmental responsiveness.

07.04	Identify business opportunities in various equine sectors by evaluating market opportunity and profit potential.
07.05	Develop a business plan for a typical equine business specifically aimed at a financial institution for funding.
08.0	Demonstrate techniques in evaluation, selection and breeding of horses–The student will be able to:
08.01	Evaluate equine conformation according to use and purpose.
08.02	Understand basic genetics and selection techniques for effective animal breeding.
08.03	Show ability to manage reproductive health and efficiency.
08.04	Develop appropriate management techniques for equine breeding farm, including stallion management, estrus detection, breeding, foaling and foal management.
09.0	Demonstrate ability to plan, schedule and maintain records and contracts, using appropriate technical information systems–The student will be able to:
09.01	Maintain and analyze equine records and basic business records (health, breeding, inventory, equipment, purchases, and depreciation).
09.02	Understand contract language and different types of contracts.
09.03	Maintain machinery, equipment and facility inventory records.
09.04	Understand legal requirements, rules and regulations concerning horses and agribusiness.
09.05	Manage farm inventory (horses, feed, equipment) for optimum efficiency and profitability.
10.0	Perform equine marketing and sales management functions–The student will be able to:
10.01	Perform market analysis and collect market information.
10.02	Develop a marketing plan, including advertising, communications, promotional goals and budget.
10.03	Actively participate in marketing activities, such as public speaking, demonstrations, clinics, shows, group activities and community service.
11.0	Demonstrate leadership and effective communication in employee management–The student will be able to:
11.01	Demonstrate punctuality, initiative, courtesy, dependability, flexibility and honesty.
11.02	Select and hire farm managers who will work with various levels of farm workers, work well in a team environment and care about equine.
11.03	Develop effective oral and written communication skills.
Exercise Physiology Learning Outcomes:	

12.0	Design and manage physiological conditioning programs for the equine athlete–The student will be able to:
12.01	Understand and apply different training/conditioning techniques for various equine athletics.
12.02	Understand equine biomechanics and how they influence equine performance.
12.03	Develop optimum conditioning programs to minimize risk of injury to the horse.
13.0	Apply manual therapies for maintenance and therapeutic applications–The student will be able to:
13.01	Understand different manual therapies that can be applied by non-veterinarians for the health and well-being of the horse.
13.02	Develop expertise in the application of different manual therapies for the horse.
14.0	Identify and apply rehabilitation techniques using state-of-the-art equipment–The student will be able to:
14.01	Understand concepts of rehabilitation for horses, including different therapeutic modalities and equipment.
14.02	Work in a rehabilitation center to gain familiarity with different equipment and rehabilitation strategies.
15.0	Evaluate hoof care, tack and equipment for different equine athletic endeavors--The student will be able to:
15.01	Understand different farrier techniques for various equine athletic endeavors.
15.02	Understand action of bits and hackamores in the control and training of horses.
15.03	Evaluate saddle fit.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is 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 and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student may receive compensation for work performed.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 64 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This AS degree program includes the following College Credit Certificates:

Equine Assistant Management (0101050701) – 24 hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

**Florida Department of Education
Curriculum Framework**

Program Title: Landscape and Horticulture Technology
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1101060500
Program Type	College Credit
Standard Length	64 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction pertaining to an understanding of plant physiology and growth, plant nutrition and fertilization, plant classification and identification, propagation, pest control, pruning and shaping plants, maintenance of landscape plants, drainage and irrigation systems, equipment management, marketing, cultural and environmental management, business management, design, and employability and human relations skills. This program also prepares for certification and licensure as a horticulture professional, landscape technician, or landscape contractor & designer.

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 consisting of 64 credit hours.

Standards

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

- 01.0 Demonstrate an understanding of plant physiology and growth.
- 02.0 Classify plants.
- 03.0 Determine drainage system needs and design a drainage system.
- 04.0 Select, operate, and maintain tools and equipment.
- 05.0 Fertilize plants.
- 06.0 Manage a pest-control program.
- 07.0 Prune and shape plants.
- 08.0 Plan and install a drainage system.
- 09.0 Protect plants and equipment from adverse weather.
- 10.0 Maintain and analyze records.
- 11.0 Demonstrate employability skills.
- 12.0 Demonstrate managerial and supervisory skills.

A. Horticulture Specialization:

- 13.0 Prepare growing media and seedbeds.
- 14.0 Propagate plants.
- 15.0 Grow plants.
- 16.0 Protect plants and equipment from adverse weather.
- 17.0 Harvest, process, and ship plants.
- 18.0 Market plants.
- 19.0 Design horticulture facilities.
- 20.0 Design, install, and service nursery irrigation systems.

B. Landscape Specialization:

- 21.0 Analyze and design the project (landscape and interiorscape).
- 22.0 Prepare, estimate, and establish contracts.
- 23.0 Analyze and organize the project.
- 24.0 Lay out and install landscape.
- 25.0 Plan and install a drainage system.
- 26.0 Maintain customer relations and observe follow-up procedures.
- 27.0 Maintain landscape plants.
- 28.0 Select, operate, and maintain landscape tools and equipment.
- 29.0 Plan, install, and service landscape irrigation systems.

**Florida Department of Education
Student Performance Standards**

Program Title: Landscape and Horticulture Technology
CIP Number: 1101060500
Program Length: 64 credit hours
SOC Code(s): 37-1012

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Demonstrate an understanding of plant physiology and growth--The student will be able to:

01.01 Describe the process of photosynthesis.

01.02 Identify and describe the functions of all parts of the plant.

01.03 Describe an asexual reproduction process.

01.04 Explain the differences between angiosperms and gymnosperms.

01.05 Identify the differences between woody and herbaceous plants.

02.0 Classify plants--The student will be able to:

02.01 Identify and group shade and flowering trees.

02.02 Identify and group fruit trees and plants.

02.03 Identify and group annuals, vegetables, and herbs.

02.04 Identify and group woody ornamentals, vines, and ground covers.

02.05 Identify and group tropical foliage plants.

02.06 Identify and group turf and ornamental grasses.

03.0 Determine drainage system needs and design a drainage system--The student will be able to:

03.01 Determine the natural slope/grade of an area.

03.02 Determine the texture and percolation characteristics of the soil.

03.03 Identify techniques for constructing ditches and culverts.

03.04	Direct the movement of water away from structures and installations.
03.05	Design and underground drainage system.
04.0	Select, operate, and maintain tools and equipment--The student will be able to:
04.01	Determine equipment needs for the company.
04.02	Select and operate equipment for the job.
04.03	Supervise the service and maintenance of power equipment.
04.04	Supervise the repair and maintenance of facilities.
04.05	Instruct and supervise employees in the safe use of tools and equipment.
04.06	Maintain an inventory of parts and supplies.
05.0	Fertilize plants--The student will be able to:
05.01	Evaluate influences of nutrients on plant growth.
05.02	Collect soil and leaf tissue samples for analysis.
05.03	Interpret and evaluate the results of soil and leaf tissue analysis.
05.04	Apply fertilizers, using appropriate methods (dry, liquid, slow-release, injection, etc.).
05.05	Demonstrate proper handling and storage of fertilizers, observing safety precautions.
06.0	Manage a pest-control program--The student will be able to:
06.01	Develop an integrated pest management program or schedule.
06.02	Train employees in the safe use of pesticides.
06.03	Obtain a restricted-use pesticide license.
07.0	Prune and shape plants--The student will be able to:
07.01	Train employees in pruning techniques.
07.02	Develop a pruning program and time schedule.
07.03	Identify and use tools for pruning.

07.04	Prune plants to achieve desired growth.
07.05	Prune plans with unique cultural requirements (roses, fruit trees, etc.).
07.06	Prune specialty items (topiary, espalier, bonsai, etc.).
07.07	Select and use chemical growth regulators.
07.08	Root-prune plants and trees.
07.09	Demonstrate sanitation and safety practices when pruning.
08.0	Plan and install a drainage system–The student will be able to:
08.01	Determine the natural slope/grade of an area.
08.02	Determine the texture and percolation characteristics of the soil.
08.03	Identify techniques for constructing ditches and culverts.
08.04	Direct the movement of water away from installations.
09.0	Protect plants and equipment from adverse weather–The student will be able to:
09.01	Monitor and interpret weather forecasts.
09.02	Supervise procedures for protecting plants and equipment from adverse weather.
09.03	Compare cost and efficiency of various methods of protecting plants and equipment from adverse weather.
10.0	Maintain and analyze records–The student will be able to:
10.01	Maintain fertilizer and pesticide application records.
10.02	Keep equipment maintenance and service records.
10.03	Maintain sales and production records.
10.04	Record labor and personnel information.
10.05	Keep inventory records.
10.06	Analyze cost and effectiveness of management practices.
10.07	Determine plant production cost.

10.08	Determine insurance needs.
10.09	Prepare an annual budget.
10.10	Prepare a five-year projection plan.
10.11	Maintain accounts-receivable and accounts-payable records.
10.12	Use computers in the landscape and horticulture operations.
11.0	Demonstrate employability skills--The student will be able to:
11.01	Conduct a job search.
11.02	Secure information about a job.
11.03	Identify documents that may be required when applying for a job.
11.04	Complete a job application form.
11.05	Demonstrate competency in job interview techniques.
11.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other person.
11.07	Identify acceptable work habits.
11.08	Demonstrate knowledge of how to make job changes.
11.09	Demonstrate acceptable employee health habits.
12.0	Demonstrate managerial and supervisory skills--The student will be able to:
12.01	Instruct employees in their tasks.
12.02	Prepare daily work plans.
12.03	Enforce safety regulations.
12.04	Develop an outline for a policy manual.
12.05	Organize and conduct employee training.
12.06	Conduct employee grievance procedures.
12.07	Evaluate performance of employees.

12.08	Prepare job descriptions.
12.09	Conduct job interviews.
12.10	Demonstrate effective communication skills.
12.11	Demonstrate computer literacy as related to landscape and horticulture operations.
A.	Horticulture Specialization:
13.0	Prepare growing media and seedbeds–The student will be able to:
13.01	Identify media materials.
13.02	Mix rooting and growing media according to plant requirements.
13.03	Sterilize rooting, potting, and growing media.
13.04	Collect and test a soil sample from field and potting media.
13.05	Adjust pH and nutritional levels of media.
13.06	Prepare planting beds and sites.
13.07	Fill and level benches and pots with media.
13.08	Demonstrate sanitation practices when handling and storing plant media materials.
14.0	Propagate plants–The student will be able to:
14.01	Collect propagation materials at proper time (seeds, cuttings, scions, bulbs, etc.).
14.02	Demonstrate propagation by grafting, budding, layering, separating, dividing, cutting, and tissue culturing.
14.03	Prepare flats and a seedbed and plant seeds.
14.04	Prepare a rooting bed.
14.05	Prepare propagation materials (seeds, cuttings, scions, etc.)
14.06	Apply growth stimulants to propagation materials.
14.07	Control propagation facility environment (moisture, temperature, light).
14.08	Transplant rooted propagation materials including tissue culture transplants.

14.09	Describe advanced propagation techniques (tissue, culture, pre-germination, see irradiation, tree cuttings).
14.10	Demonstrate sanitation and safety practices when propagating.
15.0	Grow plants–The student will be able to:
15.01	Prepare media for containers.
15.02	Prepare field site for transplants.
15.03	Select plant containers.
15.04	Determine plant spacing in the field and on container beds.
15.05	Transplant propagated materials to various containers and to the field.
15.06	Determine and provide light requirements of various plant types.
15.07	Determine water requirements and apply water at proper rates.
15.08	Identify weeds and apply herbicides.
15.09	Determine fertilization requirements.
15.10	Identify insect and insect-like disease problems and apply pesticides.
15.11	Demonstrate safety practices when applying pesticides.
16.0	Protect plants and equipment from adverse weather–The student will be able to:
16.01	Monitor and interpret weather forecasts.
16.02	Supervise procedures for protecting plants and equipment from adverse weather.
16.03	Compare cost and efficiency of various methods of protecting plants and equipment from adverse weather.
16.04	List plants according to environmental tolerances (light, temperature, moisture, wind, salt, etc.).
17.0	Harvest, process, and ship plants–The student will be able to:
17.01	Grade and harvest field-grown plants (ball, burlap, bare-root, “grow-bags”).
17.02	Identify mechanical techniques for harvesting field-grown plants (tree spade and mechanical digger).
17.03	Select, grade, and assemble container-grown plants.

17.04	Prepare for shipment, loading, and transporting harvested plant materials.
17.05	Use proper methods for preserving plant viability.
17.06	Comply with regulation regarding the inspection and movement of plant materials.
17.07	Demonstrate safety practices when harvesting, processing, and shipping nursery stock.
18.0	Market plants–The student will be able to:
18.01	Identify, inventory, and label marketable plants.
18.02	Identify market segments (commercial, residential, wholesale, retail, etc.)
18.03	Identify methods of marketing (advertising, public relations, sales personnel, trade shows, etc.).
18.04	Develop a marketing program (budget, displays, sales aids, price lists, etc.).
18.05	Develop sales training program (product knowledge, customer relations, sales techniques, resource materials, etc.)
18.06	Develop an annual sales calendar (seasonal sales, special promotion, etc.).
19.0	Design horticulture facilities–The student will be able to:
19.01	Design a facility for propagating plants.
19.02	Design a bedding-plants growing facility.
19.03	Design a container growing facility.
19.04	Design a field growing facility.
19.05	Design a tropical foliage growing facility.
19.06	Design a retail facility.
20.0	Design, install, and service nursery irrigation systems–The student will be able to:
20.01	Determine irrigation requirements.
20.02	Assess quality of irrigation water.
20.03	Design and set up an irrigation system for propagation area, greenhouse or enclosed structure, shade house, retail display area, and field-growing area.
20.04	Maintain electric and engine-driven pumps.

20.05	Operate and service various types of irrigation systems.
20.06	Calculate cost efficiency of irrigation system.
B.	Landscape Specialization:
21.0	Analyze and design the project (landscape and interiorscape)–The student will be able to:
21.01	Determine the purpose, problems, or desired effect of the project.
21.02	Analyze the environmental conditions of the landscape or interiorscape.
21.03	Determine site analysis problems.
21.04	Demonstrate working knowledge of Computer-Assisted Drafting (CAD) system.
21.05	Design hardscape plan.
21.06	Design and select appropriate plant materials for desired effect and function.
21.07	Determine the method and form of presentation of the project.
22.0	Prepare, estimate, and establish contracts–The student will be able to:
22.01	Develop a list of materials required for the project.
22.02	Determine equipment needs.
22.03	Estimate time and man hours.
22.04	Determine cost of materials, equipment, and labor.
22.05	Prepare a price for customer, based on specifications.
22.06	Establish terms of a contract.
23.0	Analyze and organize the project–The student will be able to:
23.01	Interpret plans and specifications.
23.02	Identify safety requirements.
23.03	Organize site preparation.
23.04	Locate project materials.

23.05	Determine personnel needs.
23.06	Determine equipment needs.
23.07	Establish project schedule.
24.0	Lay out and install landscape—The student will be able to:
24.01	Locate existing utilities.
24.02	Rough grade site.
24.03	Install large materials.
24.04	Install irrigation system.
24.05	Construct hardscape (walls, walks, patio, drives, etc.)
24.06	Lay out and install plants.
24.07	Prepare interiorscape.
24.08	Prepare final grade.
24.09	Install lawns.
24.10	Install mulch.
24.11	Perform final clean up.
25.0	Plan and install a drainage system—The student will be able to:
25.01	Plan the construction of an underground drainage system.
25.02	Estimate and order appropriate fill materials.
25.03	Establish proper elevations and grade a landscape site.
25.04	Read soil and contour maps.
26.0	Maintain customer relations and observe follow-up procedures—The student will be able to:
26.01	Conduct walk-through of project with client to ensure satisfaction.
26.02	Identify current and future maintenance requirements.

26.03	Analyze project records for profitability and employee performance.
27.0	Maintain landscape plants–The student will be able to:
27.01	Determine water requirements and apply at proper rates.
27.02	Identify weeds and apply herbicides safely.
27.03	Determine fertilization requirements and apply at proper rates.
27.04	Regulate growth of landscape plants through chemical or mechanical needs.
27.05	Maintain turf viability (mow at proper height and frequency, aerate, edge, clip, and remove trash).
27.06	Identify plant pest problems and apply corrective measures.
27.07	Cultivate and mulch plants.
27.08	Brace and repair trees.
28.0	Select, operate, and maintain landscape tools and equipment–The student will be able to:
28.01	Determine equipment needs for the company.
28.02	Select and operate equipment for the job.
28.03	Supervise the service and maintenance of service equipment.
28.04	Supervise the repair and maintenance of facilities.
28.05	Instruct and supervise employees in the safe use of tools and equipment.
28.06	Maintain an inventory of parts and supplies.
29.0	Plan, install, and service landscape irrigation systems–The student will be able to:
29.01	Determine irrigation requirements.
29.02	Assess quality of irrigation water.
29.03	Plan an irrigation system.
29.04	Supervise the installation of irrigation equipment.
29.05	Service and maintain electric engine-driven pumps.

29.06 Operate and service low-volume irrigation system.
29.07 Operate and service overhead irrigation system.
29.08 Operate and maintain automatic system.
29.09 Calculate cost efficiency of an irrigation system.
29.10 Design and underground drainage system.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities must be provided through directed laboratory experience, practicum or cooperative/internship experience. Whenever the cooperative method is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student may receive compensation for work performed.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

The following industry certifications have been approved by the Florida State Board of Education for statewide articulation credit into this degree program.

Certified Horticulture Professional (FNGLA001) – 6 credit hours

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp .

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 64 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This AS degree program includes the following College Credit Certificates:

- Landscape and Horticulture Professional (0101060504) – 18 credit hours
- Landscape and Horticulture Specialist (0101060503) – 12 credit hours
- Landscape and Horticulture Technician (0101060505) – 30 credit hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

**Florida Department of Education
Curriculum Framework**

Program Title: Golf Course Operations
Career Cluster: Agriculture, Food & Natural Resources

AS	
CIP Number	1101060701
Program Type	College Credit
Standard Length	69 credit hours
CTSO	N/A
SOC Codes (all applicable)	37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction that prepares individuals to supervise and manage the operations of a golf course. Instruction includes equipment management, pest control, fertilization, care, irrigation, record keeping, safety, laws and regulations, as well as leadership, public relations, human relations, employability and communication skills.

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 consisting of 69 credit hours.

Standards

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

- 01.0 Supervise and manage the operation, maintenance and repair of golf course equipment.
- 02.0 Schedule irrigation and manage the design, installation and maintenance of golf course irrigation systems.
- 03.0 Prescribe, supervise and manage the application of agricultural chemicals for the prevention and control of pests.
- 04.0 Prescribe, supervise and manage the fertilization of turf and landscape.
- 05.0 Train and supervise employees in grooming and maintaining greens, tees, fairways, roughs and other areas.
- 06.0 Provide a safe environment for workers and patrons.
- 07.0 Keep and analyze maintenance, employee, equipment and inventory records.
- 08.0 Analyze and incorporate technical information into management practices
- 09.0 Observe local, state and federal laws and regulations.
- 10.0 Demonstrate leadership, communication, public relations, employability and human relations skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Golf Course Operations
CIP Number: 1101060701
Program Length: 69 credit hours
SOC Code(s): 37-1012

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0	Supervise and manage the operation, maintenance and repair of golf course equipment--The student will be able to:
01.01	Define the role of the golf course equipment mechanic in relation to the organization.
01.02	Determine the essential power, shop and hand tools required in a golf course mechanics shop.
01.03	Design a shop layout.
01.04	Compile a list of equipment required in the operation of an 18-hole golf course.
01.05	Demonstrate knowledge and use of golf course equipment.
01.06	Develop and supervise a system of preventive maintenance.
01.07	Sharpen and grind blades and cutting surfaces on all mowing equipment.
01.08	Trouble-shoot and repair golf course equipment.
01.09	Demonstrate gas and electric arc welding techniques on golf course equipment.
01.10	Compile, stock and manage a parts inventory.
01.11	Monitor and record the use of fuel, lubricants and consumable shop supplies.
01.12	Maintain a safe clean shop.
01.13	Maintain current catalogs and online resources for supplies and equipment.
01.14	Maintain tires and tire pressure on golf course equipment.
01.15	Train and supervise employees in the safe use of tools and equipment.
02.0	Schedule irrigation and manage the design, installation and maintenance of golf course irrigation systems--The student will be able to:

02.01	Determine water requirements for a particular turf.
02.02	Analyze soil textures regarding their moisture holding capacities.
02.03	Analyze yearly, monthly and weekly rainfall amounts and distribution in various areas of Florida.
02.04	List the major water sources for irrigation purposes.
02.05	Operate and maintain hydraulically controlled, electrically controlled and thermo-hydraulically controlled irrigation valves.
02.06	Select and operate pumps used in sprinkler irrigation systems.
02.07	Illustrate the design, computations, pumping capacity and pipe sizing needed to irrigate a given operation.
02.08	Prepare a schedule for maintaining an irrigation system.
02.09	Schedule irrigation as required.
02.10	Manage drainage and run-off of excess rainfall.
03.0	Prescribe, supervise and manage the application of agricultural chemicals for the prevention and control of pests--The student will be able to:
03.01	Store and handle chemicals safely.
03.02	Recognize symptoms of agricultural chemical poisoning and apply first aid.
03.03	Dispose of chemical containers.
03.04	Read and interpret safety precautions provided on equipment and pesticide containers.
03.05	Instruct employees in the safe use of agricultural chemicals.
03.06	Select and check personal safety equipment.
03.07	Prepare proper proportions of chemicals and carrying agents.
03.08	Check application equipment for malfunction and wear.
03.09	Compute amounts of active ingredients of chemicals to be used.
03.10	Calibrate volume, pressure and output of equipment.
03.11	Weigh and measure chemicals.
03.12	Adjust height and width of equipment to achieve desired spray pattern.

03.13	Recognize symptoms of pesticide damage.
03.14	Identify fungi and bacteria.
03.15	Recognize symptoms of insects and nematodes.
03.16	Identify common insects, weeds, diseases and other pests common to golf courses.
03.17	Clean and store sprayers.
03.18	Develop a pest control management program following best management practices.
04.0	Prescribe, supervise and manage the fertilization of turf and landscape--The student will be able to:
04.01	Take soil and leaf samples for chemical analysis.
04.02	Adjust pH level of soil.
04.03	Interpret soil and tissue chemical analysis results.
04.04	Apply fertilizer in liquid form.
04.05	Interpret labels on fertilizer containers.
04.06	Apply dry fertilizers.
04.07	Identify nutrient deficiency symptoms in turf and landscape plants.
04.08	Determine kind and type of fertilizer to apply to a given area.
04.09	Determine the nutrient requirements of various plants.
04.10	Determine amount of fertilizer to apply to a given area.
04.11	Analyze cost of various formulations and methods of application.
04.12	Recognize fertilizer injury to plant materials.
05.0	Train and supervise employees in grooming and maintaining greens, tees, fairways, roughs and other areas--The student will be able to:
05.01	Supervise the mowing of greens, collars, roughs, aprons, and fairways.
05.02	Determine the placement and location of cups and tees.
05.03	Supervise the repair of divots.

05.04	Determine conditions necessary for verticutting and aerifying turf.
05.05	Supervise the care and maintenance of sand traps.
05.06	Prune trees and shrubs.
05.07	Supervise the maintenance of water hazards.
05.08	Develop maintenance schedule for grooming golf courses.
05.09	Train and supervise employees in the care of golf courses.
05.10	Follow written and verbal instructions.
06.0	Provide a safe environment for workers and patrons--The student will be able to:
06.01	Provide instruction for the safe use of chemicals, tools and equipment.
06.02	Inspect tools and equipment for safe operation.
06.03	Apply emergency first aid.
06.04	Post safety hazards.
06.05	Monitor employees work habits.
06.06	Maintain safety awareness.
07.0	Keep and analyze maintenance, employee, equipment and inventory records--The student will be able to:
07.01	Maintain equipment use and maintenance records.
07.02	Keep and file personnel records and information.
07.03	Record and analyze time-on-task information.
07.04	Maintain pesticide use information.
07.05	Keep inventory records.
07.06	Prepare a written report or summary based on records.
07.07	Observe and make recommendations based on records.
07.08	Evaluate employees, equipment and practices based on records.

07.09	Develop annual budget for complete operation.
07.10	Keep and file guarantees, warranties, service contracts and operators manuals.
08.0	Analyze and incorporate technical information into management practices--The student will be able to:
08.01	Maintain a current file of technical information.
08.02	Update skills and knowledge through workshops and seminars.
08.03	Analyze data relative to operation.
08.04	Assess new materials, chemicals and procedures based on research or technical information.
08.05	Interpret technical information relative to operation.
09.0	Observe local, state and federal laws and regulations--The student will be able to:
09.01	Observe OSHA rules and regulations.
09.02	Observe EPA rules and regulations.
09.03	Secure and maintain permits, certificates and licenses appropriate to operation.
09.04	Observe stream and groundwater regulations.
09.05	Recognize responsibilities and liabilities of occupation or position.
09.06	Maintain a list of agencies responsible for regulating the industry.
10.0	Demonstrate leadership, communication, public relations, employability and human relations skills--The student will be able to:
10.01	Conduct a job search.
10.02	Secure information about a job.
10.03	Identify documents that may be required when applying for a job.
10.04	Complete a job application form correctly.
10.05	Demonstrate competence in job interview techniques.
10.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
10.07	Identify acceptable work habits.

10.08 Demonstrate knowledge of how to make job changes appropriately.

10.09 Demonstrate acceptable employee health habits.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The Florida Nursery Growers and Landscape Association (FNGLA) is the appropriate professional organization.

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 69 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Zoo Animal Technology
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1101099900
Program Type	College Credit
Standard Length	66 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	39-2011 - Animal Trainers 19-1023 - Zoologists and Wildlife Biologists 39-2021 - Nonfarm Animal Caretakers 45-2021 – Animal Breeders 33-9011 – Animal Control Officers 45-2093 - Farmworkers, Farm, Ranch, and Aquacultural Animals
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 zoo animal sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction that prepares individuals to supervise and coordinate the activities of workers engaged in the care and exhibition of birds and animals. Subject matter also includes safety, diseases and parasites, feeding and nutrition, maintenance and repair, animal behavior, as well as leadership, communications, employability, human and public relations skills.

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 consisting of 66 credit hours.

Standards

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

- 01.0 Prevent, treat and control diseases and parasites of animals.
- 02.0 Demonstrate interpretation and guest service skills
- 03.0 Develop and maintain Animal Management Techniques
- 04.0 Manage animal nutrition and feeding.
- 05.0 Operate and maintain instruments and equipment.
- 06.0 Provide first aid for animals.
- 07.0 Collect laboratory specimens.
- 08.0 Analyze and keep records.
- 09.0 Manage animal, visitor and worker safety.
- 10.0 Identify animal species.
- 11.0 Interpret and observe laws, rules and regulations relative to operation.
- 12.0 Dispense medicine and supplies.
- 13.0 Manage, maintain and repair facilities.
- 14.0 Demonstrate leadership, employability, communication, human and public relations skills.
- 15.0 Observe and interpret animal behavior.

**Florida Department of Education
Student Performance Standards**

Program Title: Zoo Animal Technology
CIP Number: 1101099900
Program Length: 66 credit hours
SOC Code(s): 19-1023, 39-2011, 39-2021

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Prevent, treat and control diseases and parasites of animals--The student will be able to:

01.01 Observe animals daily for symptoms of disease and parasites.

01.02 Recognize signs of disease requiring the quarantine or isolation of animals.

01.03 Vaccinate animals.

01.04 Provide special nutritional care for animals as required.**

01.05 Maintain a quarantine program for new animal populations.**

01.06 Perform pest control program.

01.07 Identify and treat trauma, nutritional disorders, infections, poisoning and genetic diseases.

01.08 Properly handle mortality cases for disposal or necropsy.

01.09 Practice basic cleanliness and orderliness in and around animal enclosures

01.10 Identify specific sanitation procedures applicable to managing the collection and the various situations they would be used: quarantine, medical building, kitchen, public areas, storage buildings.

01.11 Properly dispose of animal waste, used food items and plant material

01.12 Maintain a quarantine program for new animal populations

01.13 Understand injury, nutritional disorders, infections, poisoning, genetic, and zoonotic diseases

02.0 Demonstrate interpretation and guest service skills --The student will be able to:

02.01 Handle guest questions and situations

02.02	Interact with zoo guests in a positive and enthusiastic manner
02.03	Understand their audience based on age, interest level and learning style
02.04	Communicate appropriately to all audiences
02.05	Uses and understands interpretative techniques
02.06	Demonstrate passion and professionalism
02.07	Create and deliver oral presentations
02.08	Interpret zoo policies to non-zoo staff
03.0	Develop and maintain Animal Management Techniques--The student will be able to:
03.01	Maintain environmental conditions required by species.
03.02	Provide pre-natal and post-partum care for animals
03.03	Facilitate the breeding of various species
03.04	Identify and use techniques and equipment for the capture and restraint of animals.
03.05	Identify circumstances justifying the capture and restraint of animals.
03.06	Transport animals safely
03.07	Accurately collect and record various animal measurements
04.0	Manage animal nutrition and feeding--The student will be able to:
04.01	Identify and feed appropriate plant material
04.02	Prepare and dispense appropriate diets to maintain various species in captivity.
04.03	Properly store, inventory and maintain animal food supplies.
04.04	Recognize the need to adjust animal diets based on various factors such as breeding season, environmental changes, census changes and life stage.
04.05	Present food to animals in the appropriate manner
04.06	Understand basic nutritional requirements of various animal species in the wild and in captivity
05.0	Operate and maintain instruments and equipment--The student will be able to:

05.01	Operate and maintain scales and balances.
05.02	Identify, operate and maintain clinical instruments.
05.03	Use and maintain capture and restraint equipment.
05.04	Operate communications equipment.
05.05	Identify and safely use hand and power tools.
06.0	Provide first aid for animals--The student will be able to:
06.01	Identify injuries requiring first aid and provide emergency treatment.
06.02	Prepare and maintain first aid equipment and supplies.
06.03	Identify injuries requiring services of a veterinarian.
07.0	Collect laboratory specimens--The student will be able to:
07.01	Collect urine specimens.
07.02	Collect fecal specimens.
07.03	Collect environmental samples.
07.04	Properly package and handle specimens for shipment or analysis.
08.0	Analyze and keep records--The student will be able to:
08.01	Keep exhibit maintenance records.
08.02	Keep personnel records.
08.03	Keep and maintain animal medical records.
08.04	Keep record of animal feeding and diet.
08.05	Maintain animal behavioral records.
08.06	Keep records of chemical, pesticide and medication use.
09.0	Manage animal, visitor and worker safety--The student will be able to:
09.01	Maintain the safety of animals.

09.02	Manage and maintain safety of visitors.
09.03	Handle animals in a safe and cautious manner.
09.04	Operate tools and equipment in a safe manner.
09.05	Prepare for and respond to emergencies.
10.0	Identify animal species--The student will be able to:
10.01	Classify animals according to habitat and nutritional requirements.
10.02	Recognize morphological characteristics of major animal groups.
10.03	Identify animals to genus and species.
10.04	Identify species of animals in specific collections.
11.0	Interpret and observe laws, rules and regulations relative to operation--the student will be able to:
11.01	Observe local, state, federal and international laws and regulations.
11.02	Maintain facilities up to standards of licenses, certificates, bonds and permits.
11.03	Describe the regulation process
11.04	Identify agencies regulating the profession.
11.05	Identify agencies accrediting the facility
12.0	Dispense medicine and supplies--The student will be able to:
12.01	Follow verbal and written instructions when administering medications
12.02	Interpret instructions and warnings on the labels of medicines and chemicals.
12.03	Maintain security of medicines and chemicals.
12.04	Identify medicines and chemicals commonly used in the profession
12.05	Carefully mix, measure and dispense medications.
12.06	Maintain inventory of supplies and medications.
13.0	Manage, maintain and repair facilities--The student will be able to:

13.01	Maintain grounds, facilities and exhibits according to master plan.
13.02	Operate grounds keeping equipment.
13.03	Paint wood, metal and masonry surfaces.
13.04	Perform repairs on wooden structures.
13.05	Observe safety precautions.
14.0	Demonstrate leadership, employability, communication, human and public relations skills--The student will be able to:
14.01	Conduct a job search.
14.02	Secure information about a job.
14.03	Identify documents that may be required when applying for a job.
14.04	Complete a job application form correctly.
14.05	Demonstrate competence in job interview techniques.
14.06	Respond positively to criticism from employer, supervisor, or other persons.
14.07	Establish acceptable work habits.
14.08	Practice acceptable employee health habits.
15.0	Observe and interpret animal behavior—The student will be able to:
15.01	Recognize animal breeding behavior.
15.02	Provide appropriate breeding environment for animals.
15.03	Adjust animal diet during breeding season.
15.04	Distinguish between instinctive and learned behavior.
15.05	Identify behavior of pre and post parturition animals.
15.06	Describe behavioral changes due to aging.
15.07	Recognize normal behavioral characteristics of animals through observations.
15.08	Identify behavioral problems.

15.09 Describe training of animals and correction of behavior problems

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation the student has chosen as a career goal.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 66 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Citrus Production Technology
Career Cluster: Agriculture, Food & Natural Resources

AS	
CIP Number	1101110300
Program Type	College Credit
Standard Length	62 credit hours
CTSO	N/A
SOC Codes (all applicable)	45-2092 - Farmworkers and Laborers, Crop, Nursery, and Greenhouse
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction that prepares individuals to produce citrus trees and fruit and manage services associated with citrus production. Subject matter includes pest control, propagation, nutrition, irrigation, equipment management and marketing, as well as leadership, communication, employability and human relations skills.

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 consisting of 62 credit hours.

Standards

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

- 01.0 Classify and select citrus rootstocks and scions.
- 02.0 Identify varieties of citrus.
- 03.0 Manage the propagation of citrus.
- 04.0 Analyze nutritional disorders and develop a fertilization program.
- 05.0 Identify insects, diseases and other pathogens of citrus and develop a pest control management program.
- 06.0 Identify and control citrus weed problems.
- 07.0 Protect citrus from frost and freeze damage.
- 08.0 Calculate the irrigation requirements of citrus and manage an irrigation program.
- 09.0 Select, manage and maintain citrus production equipment.
- 10.0 Determine maturity and quality of citrus fruits.
- 11.0 Keep production, financial, personnel and maintenance records.
- 12.0 Market citrus nursery and grove products.
- 13.0 Manage the growth and culture of citrus.
- 14.0 Harvest citrus.
- 15.0 Interpret and incorporate technical information into management practices.
- 16.0 Demonstrate leadership, employability, communications and human relations skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Citrus Production Technology
CIP Number: 1101110300
Program Length: 62 credit hours
SOC Code(s): 45-2092

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Classify and select citrus rootstocks and scions--The student will be able to:

01.01 Classify citrus rootstocks and scions according to taxonomy.

01.02 Select scion varieties best suited for specific soil types, rootstock compatibility, disease resistance, insect resistance, cold resistance and specific marketing purposes.

01.03 Select rootstocks best suited for specific soil types, scion compatibility, nematode resistance, insect resistance, cold resistance, disease and virus resistance and specific marketing purposes.

02.0 Identify varieties of citrus--The student will be able to:

02.01 Identify citrus fruit varieties by color, shape, texture, maturity, seeds and leaves.

02.02 Identify rootstock varieties by characteristic of fruit, leaves and stems.

03.0 Manage the propagation of citrus--The student will be able to:

03.01 Select a site for seedbeds and apply for site approval.

03.02 Supervise the preparation of site and plant certified seed.

03.03 Manage the culture and care of seedlings.

03.04 Select and cut certified budwood.

03.05 Manage the budding and wrapping of seedlings.

03.06 Train and supervise workers to maintain accurate records and counts in tagging and labeling rootstocks and scion varieties.

03.07 Supervise the culture and care of young budded nursery stock.

03.08 Supervise the digging and handling of nursery stock for potting or bareroot shipment.

03.09	Maintain strict nursery sanitation practices.
04.0	Analyze nutritional disorders and develop a fertilization program–The student will be able to:
04.01	Collect soil and plant tissue samples for analysis.
04.02	Interpret results of soil and tissue analysis.
04.03	Develop a fertilization program or schedule for grove and nursery.
04.04	Identify nutritional disorders and deficiencies in grove and nursery.
04.05	Calculate fertilization rates for citrus.
04.06	Compare advantages and disadvantages of different sources and forms of plant nutrients.
04.07	Calibrate fertilization equipment.
04.08	Supervise application of fertilizer.
04.09	Supervise cleaning and storage of fertilizer application equipment.
05.0	Identify insects, diseases and other pathogens of citrus and develop a pest control management program–The student will be able to:
05.01	Identify insects, diseases and other pathogens of citrus.
05.02	Determine extent and severity of pest infestation.
05.03	Select and supervise the application of pesticides.
05.04	Calibrate and adjust pesticide applications.
05.05	Determine effectiveness of application or spray program.
05.06	Develop a pest management program or schedule.
05.07	Train workers in the safe use of pesticides.
05.08	Recognize symptoms of pesticide poisoning and provide first aid.
05.09	Safely dispose of pesticide containers.
05.10	Observe and maintain grove and nursery sanitation practices.
05.11	Supervise the cleaning and maintenance of pesticide application equipment.

06.0	Identify and control citrus weed problems–The student will be able to:
06.01	Identify noxious weeds and vines of citrus.
06.02	Select appropriate herbicide and supervise the application.
06.03	Calibrate and adjust herbicide applicators.
06.04	Develop a weed/vine control program or schedule.
06.05	Determine appropriate conditions for effective and safe application of herbicides.
06.06	Supervise mechanical weed and vine control.
07.0	Protect citrus from frost and freeze damage–The student will be able to:
07.01	Monitor and interpret weather forecasts.
07.02	Supervise the preparation and maintenance of grove, nursery and equipment for frost and freeze.
07.03	Supervise procedures for protecting citrus from cold damage.
07.04	Protect young trees from cold damage.
07.05	Compare cost and efficiency of various methods of cold protection.
08.0	Calculate the irrigation requirements of citrus and manage an irrigation program–The student will be able to:
08.01	Determine irrigation requirements.
08.02	Plan an irrigation system.
08.03	Supervise the installation of irrigation equipment.
08.04	Service and maintain electric and engine driven pumps.
08.05	Operate and service low volume irrigation system.
08.06	Operate and service overhead irrigation system.
08.07	Calculate cost efficiency of irrigation system.
09.0	Select, manage and maintain citrus production equipment–The student will be able to:
09.01	Determine the equipment requirements for the citrus operation.

09.02	Compare cost, efficiency and maintenance requirements of various models and makes of equipment.
09.03	Determine equipment replacement schedule.
09.04	Develop a schedule for servicing of equipment.
09.05	Instruct workers in the safe and efficient use of equipment.
09.06	Supervise the maintenance and repair of citrus equipment.
09.07	Keep maintenance records.
10.0	Determine maturity and quality of citrus fruit--The student will be able to:
10.01	Determine solids using refractometer.
10.02	Interpret results of citrus juice analysis.
10.03	Estimate quality grade of product.
10.04	Estimate date of maturity of fruit.
11.0	Keep production, financial, personnel and maintenance records--The student will be able to:
11.01	Maintain fertilizer and pesticide application records.
11.02	Make grove plats.
11.03	Keep equipment maintenance and service records.
11.04	Keep inventory records.
11.05	Record production information.
11.06	Record labor and personnel information.
11.07	Analyze cost and effectiveness of management practices.
11.08	Prepare written reports.
11.09	Determine insurance needs.
12.0	Market citrus nursery and grove products--The student will be able to:
12.01	Determine market for product.

12.02	Maintain customer service relations.
12.03	Arrange for transportation of product.
12.04	Evaluate market.
12.05	Interpret and analyze marketing contracts.
12.06	Locate sources of marketing information services.
13.0	Manage the growth and culture of citrus–The student will be able to:
13.01	Supervise daily operations.
13.02	Determine work schedules.
13.03	Inspect grove/nursery properties.
13.04	Hire, train and dismiss employees.
13.05	Determine cultural practices.
13.06	Implement instructions and requests.
14.0	Harvest citrus–The student will be able to:
14.01	Make arrangements for harvesting crop.
14.02	Interpret and analyze harvesting contract.
14.03	Monitor harvesting operation.
14.04	Prepare contingency plans for harvesting citrus.
15.0	Interpret and incorporate technical information into management practices–The student will be able to:
15.01	Observe local, state and federal pesticide regulations.
15.02	Observe grove and nursery site regulations.
15.03	Observe and interpret marketing restrictions and agreements.
15.04	Interpret and observe certification, licensing and inspection requirements.
15.05	List agencies responsible for the regulation of the citrus industry.

15.06	Attend workshops and seminars to upgrade skills and knowledge.
15.07	Maintain a file for technical information, periodicals and other publications.
15.08	Determine sources of up-to-date information and services.
15.09	List societies, organizations and associations related to occupation or profession.
16.0	Demonstrate leadership, employability, communications and human relations skills–The student will be able to:
16.01	Conduct a job search.
16.02	Secure information about a job.
16.03	Identify documents that may be required when applying for a job.
16.04	Complete a job application form correctly.
16.05	Demonstrate competence in job interview techniques.
16.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
16.07	Identify acceptable work habits.
16.08	Demonstrate knowledge of how to make job changes appropriately.
16.09	Demonstrate acceptable employee health habits.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 62 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Biomass Cultivation
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1101110302
Program Type	College Credit
Standard Length	60 credit hours
CTSO	Collegiate FFA
SOC Codes (all applicable)	19-4011 Agricultural and Food Science Technicians 45-2092 Farmworkers and Laborers, Crop, Nursery, and Greenhouse 19-4099 Precision Agriculture Technicians 45-2091 Agricultural Equipment Operators 11-9013 Farmers, Ranchers, and Other Agricultural Managers
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 agricultural production sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction that prepares individuals to manage land, water, machinery, financing, crops and facilities as well as make contracts, manage taxes, keep records, analyze records and technical reports, and demonstrate leadership, employability, communication and human relations skills.

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 consisting of 60 credit hours.

Standards

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

- 01.0 Distinguish varieties of energy grasses.
- 02.0 Manage crops.
- 03.0 Manage machinery and equipment.
- 04.0 Demonstrate safe chemical handling and chemical waste removal.
- 05.0 Manage facilities.
- 06.0 Select sources and methods of financing the operation.
- 07.0 Keep and analyze production and financial records.
- 08.0 Market crops.
- 09.0 Interpret technical information and incorporate it into managerial practices.
- 10.0 Integrate state and federal regulations into operation.
- 11.0 Demonstrate leadership, communication, employability and human relations skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Biomass Cultivation
CIP Number: 1101110302
Program Length: 60 credit hours
SOC Code(s): 19-4011, 45-2092, 19-4099, 45-2091, 11-9013

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Distinguish varieties of energy grasses--The student will be able to:

01.01 List species used as bioenergy feedstock.

01.02 Compare and contrast morphology and anatomy of energy grass species.

01.03 Explain how biological features of energy grasses are important for cellulosic bioethanol production.

02.0 Manage crops--The student will be able to:

02.01 Prepare a land use plan.

02.02 Determine long-range conservation practices.

02.03 Prepare soil for crops.

02.04 Select crop varieties best suited for land, market and type of farm operation.

02.05 Determine seeding/planting rate and spacing.

02.06 Calibrate and adjust planting equipment.

02.07 Plant crops.

02.08 Select appropriate cultural practices including cultivation, fertilization and irrigation.

02.09 Identify and control diseases, insects and pests.

02.10 Determine maturity of crops.

02.11 Harvest crops.

02.12 Store crops.

02.13	Determine the most advantageous method of marketing crops.
03.0	Manage machinery and equipment--The student will be able to:
03.01	Assess needs for the purchases of new or replacement equipment.
03.02	Maintain oil, fuel and hydraulic levels in equipment.
03.03	Maintain tires, batteries and coolant system on all equipment and vehicles.
03.04	Operate and service small gasoline engines.
03.05	Replace hoses, belts and lines.
03.06	Cut and weld with oxy-acetylene and arc welding equipment.
03.07	Observe safety procedures when operating farm equipment.
03.08	Develop a general maintenance schedule.
04.0	Demonstrate safe chemical handling and chemical waste removal--The student will be able to:
04.01	Maintain records per state and federal regulations.
04.02	Know and practice chemical handling according to the guidelines established by Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA).
04.03	Demonstrate safe waste disposal practices.
05.0	Manage facilities--The student will be able to:
05.01	Safely operate and maintain general farm shop tools and equipment.
05.02	Install and maintain electrical wiring and equipment.
05.03	Determine a bill of materials for a farm construction project.
05.04	Build and repair fences.
05.05	Develop a general maintenance schedule for facilities and equipment.
06.0	Select sources and methods of financing the operation--The student will be able to:
06.01	List major sources of production credit.
06.02	List sources of credit for capital items and real estate.

06.03	Prepare a case using accepted forms for obtaining credit from farm lending institutions.
07.0	Keep and analyze financial and production records--The student will be able to:
07.01	Keep fertilization and pesticide use records.
07.02	Keep equipment maintenance and service records.
07.03	Record cultural and production information.
07.04	Determine cost efficiency of operations.
07.05	Prepare a farm tax return.
07.06	Prepare an annual budget.
07.07	Determine credit, cash flow and investment returns.
07.08	Review sources and kinds of farm insurance.
08.0	Market crops--The student will be able to:
08.01	Secure and interpret market information.
08.02	Select marketing channels for greatest profit.
08.03	Interpret elements of marketing agreements.
08.04	Sell crops.
08.05	Provide for transportation of product to market.
09.0	Interpret technical information and incorporate it into managerial practices--The student will be able to:
09.01	Keep and maintain a file of current technical information from universities, governmental and commercial agencies.
09.02	Maintain a reference file for periodicals and other publications.
09.03	Attend seminars and workshops to update skills and knowledge.
09.04	Determine sources and advantages of using computer networking.
10.0	Integrate state and federal regulations into operation--The student will be able to:
10.01	List agencies responsible for inspecting and regulating crop farming.

10.02	Secure necessary inspection certificates and registrations.
10.03	Identify reasons for the necessity of inspections, certifications and registrations.
11.0	Demonstrate leadership, communication, employability and human relations skills--The student will be able to:
11.01	Develop citizenship awareness and responsibility.
11.02	Demonstrate knowledge in organizing and conducting meetings.
11.03	Demonstrate effective communication skills.
11.04	Complete an employment application.
11.05	Conduct a job search.
11.06	Demonstrate job interview skills.
11.07	Recognize appropriate work habits.
11.08	Identify associations and societies associated with occupation.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

Career and Technical Student Organization (CTSO)

Collegiate FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 60 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This AS degree program includes the following College Credit Certificates:

Biomass Cultivation Specialist (0101110301) – 21 credit hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

**Florida Department of Education
Curriculum Framework**

Program Title: Pest Control Technology
Career Cluster: Agriculture, Food & Natural Resources

AS	
CIP Number	1101110500
Program Type	College Credit
Standard Length	62 credit hours
CTSO	N/A
SOC Codes (all applicable)	37-3012 - Pesticide Handlers, Sprayers, and Applicators, Vegetation
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction that prepares individuals to supervise and manage the sales and application of agricultural chemicals and pesticides. Subject matter includes business management sales, equipment use management, safety, pest identification, recordkeeping, leadership, employability skills, communications and human and public relations.

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 consisting of 62 credit hours.

Standards

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

- 01.0 Manage and supervise the application of pesticides and agricultural chemicals.
- 02.0 Supervise and train personnel in the safe and efficient use of pesticides and agricultural chemicals.
- 03.0 List and interpret laws and regulations relative to the safe application of pest control materials.
- 04.0 Manage the maintenance of equipment used to apply pest control materials.
- 05.0 Qualify for appropriate certification to apply pest control materials.
- 06.0 Keep accurate records required by law and for business management purposes.
- 07.0 Classify and identify pests and the appropriate chemicals used to control them.
- 08.0 Apply business practices.
- 09.0 Market and merchandise goods and services.
- 10.0 Demonstrate leadership, communication, employability, and human and public relations skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Pest Control Technology
CIP Number: 1101110500
Program Length: 62 credit hours
SOC Code(s): 37-3012

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Manage and supervise the application of pesticides and agricultural chemicals--The student will be able to:

01.01 Recognize pesticide and chemical poisoning symptoms.

01.02 Read and interpret packaging labels and guidelines for safety.

01.03 Read and interpret packaging labels for application rates and instructions.

01.04 Recommend kinds of pesticides and agricultural chemicals to be used in specific situations.

01.05 Use protective clothing and equipment when handling agricultural chemicals.

01.06 Recognize symptoms of pesticide, chemical and residue damage.

01.07 Calculate coverage of chemical.

01.08 Assess compatibility of selected chemicals.

01.09 Determine rate and volume of chemical to be applied.

01.10 Select time of chemical application.

01.11 Select and match nozzles for equipment type, chemical used and pattern of application.

01.12 Safely store chemicals.

01.13 Mix chemicals and carrying agents.

01.14 Apply granular or dry chemical materials.

01.15 Apply liquid materials.

01.16 Adjust ground speed of chemical application equipment.

01.17	Dispose of used chemical containers.
01.18	Recognize & respond to pesticide spills.
01.19	Read and interpret MSDS information.
02.0	Supervise and train personnel in the safe and efficient use of pesticides and agricultural chemicals--The student will be able to:
02.01	Develop a labor supply plan.
02.02	Hire and dismiss employees.
02.03	Establish and record pay scale and benefits for workers.
02.04	Instruct employees in the safe and efficient use of chemicals and equipment.
02.05	Observe and evaluate employees.
02.06	Maintain safety standards in the application of agricultural chemicals.
02.07	Observe rights and needs of employees.
02.08	Post appropriate health and safety announcements.
02.09	Give and take verbal and written instructions.
02.10	Maintain a safe working environment.
03.0	List and interpret laws and regulations relative to the safe application of pest control materials--The student will be able to:
03.01	Observe local, state and federal pesticide and agricultural chemical regulations.
03.02	Observe EPA regulations.
03.03	List agencies responsible for the regulation of the pest control and chemical application industry.
03.04	Attend workshops and seminars to upgrade skills and knowledge.
03.05	Maintain a file for technical information, periodicals and other information.
03.06	Determine sources of up-to-date information and services.
03.07	List societies, organizations and associations relative to the occupation or profession.
04.0	Manage the maintenance of equipment used to apply pest control materials--The student will be able to:

04.01	Inspect safety equipment for cleanliness, effectiveness and proper fit.
04.02	Inspect equipment for leaks, clogs, and other malfunctions, and determine appropriateness of equipment for a specific job.
04.03	Adjust pressure and spray patterns.
04.04	Adjust equipment height and width.
04.05	Adjust mixing apparatus.
04.06	Repair or replace hoses, nozzles and cut-off valves.
04.07	Prepare equipment for storage.
04.08	Order replacement parts and supplies.
04.09	Supervise and/or perform maintenance and repairs.
04.10	Lubricate equipment.
04.11	Follow operators manual.
04.12	Repair and/or maintain dusters.
04.13	Repair and/or maintain fumigators.
04.14	Supervise and/or maintain vehicle maintenance records.
04.15	Maintain and use shop equipment and tools.
04.16	Clean and flush chemical application equipment.
04.17	Describe compatibility of equipment with chemicals used.
05.0	Qualify for appropriate certification to apply pest control materials--The student will be able to:
05.01	Interpret certification and licensing requirements.
05.02	Identify qualification needed for various certificates or licensure.
05.03	Apply for license or certificate.
05.04	Maintain license or certificate.
06.0	Keep accurate records required by law and for business management purposes--The student will be able to:

06.01	Maintain personnel records.
06.02	Maintain health and accident records.
06.03	Maintain equipment maintenance records.
06.04	Keep and maintain complete pesticide application records.
06.05	Keep records of employee training and licensure.
06.06	File required local, state and federal reports.
06.07	Maintain inventory control of pesticides and chemicals.
07.0	Classify and identify pests and appropriate chemicals used to control them--The student will be able to:
07.01	Identify fungi and bacteria and their symptoms.
07.02	Recognize symptoms of insects and nematodes.
07.03	Classify feeding habits and life cycles of insects.
07.04	Describe life cycles of bacteria and fungi.
07.05	Consider the pest, host being attacked and chemical when recommending chemical control measures.
07.06	Assess environmental impact when recommending chemical control measures.
07.07	Identify insect, weed and other pests.
07.08	Assess economic and aesthetic thresholds to determine if pesticide applications are warranted.
08.0	Apply business practices--The student will be able to:
08.01	Maintain ledger of accounts.
08.02	Determine cost efficiency of operation.
08.03	Prepare a tax return.
08.04	Prepare a budget.
08.05	Determine credit, cash flow and investment returns.
08.06	Review sources and kinds of insurance required.

08.07	Review bonding needs and procedures.
08.08	List major sources of business credit and loans.
09.0	Market and merchandise goods and services--The student will be able to:
09.01	Display goods.
09.02	Manage sales.
09.03	Open and close office daily.
09.04	Update price list for goods and services.
09.05	Prepare advertising.
09.06	Handle customer complaints and questions.
09.07	Take order for goods and services by telephone.
09.08	Inspect and follow-up quality of services performed for customer.
09.09	Advise customer in the selection of goods or services.
10.0	Demonstrate leadership, communication, employability, human and public relations skills--The student will be able to:
10.01	Conduct a job search.
10.02	Secure information about a job.
10.03	Identify documents that may be required when applying for a job.
10.04	Complete a job application form correctly.
10.05	Demonstrate competence in job interview techniques.
10.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
10.07	Identify acceptable work habits.
10.08	Demonstrate knowledge of how to make job changes appropriately.
10.09	Demonstrate acceptable employee health habits.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. Whenever the cooperative method is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

The following ATD program articulates credit into this degree program. This statewide articulation agreement has been approved by the Articulation Coordinating Committee.

Pest Control Operations- 0101110502

Curriculum for this program is listed separately.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 62 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Marine Environmental Technology (MET)
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1103060100
Program Type	College Credit
Standard Length	62 credit hours
CTSO	N/A
SOC Codes (all applicable)	19-2041 - Environmental Scientists and Specialists, Including Health
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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.

This degree is designed to prepare students for a diverse set of employment opportunities in the field of marine environmental technology and other marine-oriented careers. During the program students will acquire the skills and knowledge necessary to enter the work force in a variety of marine oriented careers including technicians at environmental or research laboratories, environmental consulting industries, aquaculture/mariculture facilities, ecotourism, or marine conservation and restoration projects.

The purpose of this program is to provide technician level training and supply skilled employees for the growing workforce demand in marine related environmental industries. Graduates of this program will obtain the fundamental academic skills necessary to be successful at the technician level and demonstrate an understanding of the fundamental concepts behind marine environmental science. Graduates will demonstrate the ability to: (1) collect marine related data above and below the water (i.e. on scuba), (2) write technical reports, (3) navigate and operate marine vessels, and (4) understand basic business and management concepts.

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 consisting of 62 credit hours.

Standards

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

A. MET Core Learning Outcomes:

- 01.0 Demonstrate proficiency in underwater scientific research and marine data collection methods.
- 02.0 Demonstrate an understanding of the basic knowledge and practices that form the foundation of the marine sciences.
- 03.0 Compose scientific and/or technical reports.
- 04.0 Demonstrate basic knowledge and skills necessary to operate and maintain marine vessels.
- 05.0 Demonstrate an understanding of marine ecosystems, environmental management, and resource conservation
- 06.0 Demonstrate an understanding of the fundamental principles of biology.
- 07.0 Comprehension of fundamental principles governing business and entrepreneurship.
- 08.0 Demonstrate an understanding of the fundamental principles of marine aquaculture.

B. Marine Assessment and Restoration Specialization Learning Outcomes:

- 09.0 Demonstrate a basic knowledge and understanding of specific marine habitat assessment protocols.
- 10.0 Demonstrate a basic knowledge and understanding of several marine habitat restoration protocols

C. Marine Mammal Specialization Learning Outcomes:

- 11.0 Demonstrate an understanding of the fundamental principles of marine mammal anatomy and evolution.
- 12.0 Demonstrate basic knowledge of marine mammal social structure and culture.
- 13.0 Demonstrate proficiency of basic marine mammal training and husbandry techniques.
- 14.0 Demonstrate knowledge of principle marine mammal laws and regulations.
- 15.0 Describe and discuss research focused on marine mammals.
- 16.0 Demonstrate knowledge of conservation issues involving marine mammals
- 17.0 Demonstrate an understanding of the guiding principles and practices of marine mammals in human care.

D. Marine Aquaculture Specialization Learning Outcomes:

- 18.0 Demonstrate a thorough knowledge of aquaculture best management practices.
- 19.0 Identify and diagnose common diseases and parasites that infect marine aquaculture organisms.

- 20.0 Demonstrate a moderate understanding of marine aquaculture systems.
- 21.0 Recognize appropriate nutritional requirements for the most common marine aquaculture organisms.
- 22.0 Demonstrate a basic understanding of marine aquaculture husbandry principles and practices.

**Florida Department of Education
Student Performance Standards**

Program Title: Marine Environmental Technology (MET)
CIP Number: 1103030100
Program Length: 62 credit hours
SOC Code(s): 19-2041

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

A. MET Core Learning Outcomes:

01.0 Demonstrate proficiency in underwater scientific research and marine data collection methods. The student will be able to:

01.01 Demonstrate knowledge and competence at research diving techniques and procedures to support scientific research projects.

01.02 Demonstrate the use of transects and quadrants to quantify the distribution and abundance of sessile marine organisms within a defined research area.

01.03 Demonstrate methods for conducting quantitative surveys the distribution and abundance of fishes within a defined research area.

01.04 Demonstrate state-of-the-art underwater data collection, recording and preservation procedures necessary to support biological and archaeological research.

01.05 Demonstrate the basic knowledge necessary to conduct statistical analysis of the scientific data collected.

01.06 Synthesize what was learned about research diving and other data collection techniques through a presentation, project or case study.

02.0 Demonstrate an understanding of the basic knowledge and practices that form the foundation of the marine sciences. The student will be able to:

02.01 Define plate tectonic theory and distinguish between types of plate boundaries.

02.02 Illustrate the features of the sea floor that arise from tectonic activity.

02.03 Identify key oceanographic terms and apply them in discussion.

02.04 Describe the processes that created the earth and the ocean.

02.05 Explain how the physical and chemical properties of seawater are important in understanding the ocean.

02.06 Compare the physical, chemical and biological processes that affect the origin, transport and deposition of sediment.

02.07 Summarize the role of the ocean in weather and climate.

02.08	Explain the mechanisms that create both surface and sub-surface ocean currents.
02.09	Define four types of ocean waves and identify the forces that generate them.
02.10	Explain how the ocean determines the shape, features and composition of the coast line.
02.11	Describe the Scientific Method, and explain the nature and limitations of scientific investigation.
02.12	Recognize and explain the basic features that define and differentiate major marine phyla.
02.13	Describe the role of microbes in the ocean.
02.14	Describe the major anatomical features and physiologic systems of bony and cartilaginous fishes.
02.15	Explain the functional role of marine reptiles, seabirds and mammals in the marine environment.
03.0	Compose scientific and/or technical reports. The student will be able to:
03.01	List the typical components of a peer-reviewed scientific article.
03.02	Explain the peer-review process of publishing a scientific article.
03.03	Explain the function of each section of a scientific paper or technical report.
03.04	Critically analyze a scientific paper describing its thesis, methods, results and conclusions.
03.05	Create at least two reports formatted according to a scientific publishing format.
04.0	Demonstrate basic knowledge and skills necessary to operate and maintain marine vessels. The student will be able to:
04.01	Demonstrate coastwise navigation techniques using both dead reckoning and electronic methods.
04.02	Demonstrate competence at using basic knots and marlinspike skills.
04.03	Demonstrate mastery of the navigational "Rules of the Road" through the safe operation of a small vessel.
04.04	Demonstrate proper man-overboard recovery procedures.
04.05	Explain the concepts of stability, trim and hull form as they relate to vessel operation.
04.06	Demonstrate basic safe boat handling skills.
04.07	Demonstrate proper procedures for docking, anchoring, rafting and mooring a vessel.
04.08	Explain the appropriate response to vessel emergencies such as stranding, fire and damage containment.

04.09	Demonstrate proper marine radio operating procedures.
05.0	Demonstrate an understanding of marine ecosystems, environmental management, and resource conservation. The student will be able to:
05.01	Explain the essential components of ecology, and how energy flows through an ecosystem.
05.02	Explain the functional role of primary producers in the marine environment, and identify common species of marine plants and algae.
05.03	Explain the essential components of intertidal ecology, and how energy flows through various types of intertidal ecosystems.
05.04	Describe the features and functional systems in the intertidal, neritic, epipelagic and deep ocean regions.
05.05	Explain the basic functional ecology and energy flow on a coral reef.
05.06	List the various resources humans derived from the sea and what problems this presents.
05.07	Explain how humankind has and continues to impact the marine environment.
05.08	Describe methods and best practices currently in use to conserve marine ecosystems including but not limited to as marine spatial planning, integrated coastal zone management and marine protected areas.
05.09	Explain the concepts of "Tragedy of the Commons" and "Precautionary Principle" as they relate to marine ecosystem and resource conservation.
06.0	Demonstrate an understanding of the fundamental principles of biology. The student will be able to:
06.01	Describe the requirements/ingredients of life, its associated "machinery" and the special challenges of living in the sea.
06.02	Identify biological processes including photosynthesis/chemosynthesis, respiration, and homeostasis.
06.03	Explain the basic structure, growth, metabolism, reproduction, physiology, and genetics of cells and organisms.
06.04	Recognize evolutionary relationships and diversity among living organisms, and appreciate the importance of biodiversity.
06.05	Explain the characteristics and distinctive features of the domains and kingdoms of life.
06.06	Identify and classify organisms within major taxonomic groups.
06.07	Demonstrate basic biological laboratory techniques including the use of a microscope.
06.08	Interpret laboratory data and summarize the results.
06.09	Demonstrate the problem solving and critical thinking skills needed to assess and solve biologically-based questions.
07.0	Comprehension of fundamental principles governing business and entrepreneurship. The student will be able to:
07.01	Demonstrate a familiarity of entrepreneurship by understanding the characteristics and mindset of entrepreneurs.

07.02	Identify and evaluate opportunities within the marketplace, both for new venture creation and within existing organizations.
07.03	Create the tools necessary to act on an entrepreneurial opportunity by writing a business plan, building a management team, financing the opportunity and creating an innovative marketing plan.
07.04	Describe successful strategies and common mistakes made by successful entrepreneurs.
07.05	Describe the legal requirements and obstacles in starting a business venture.
08.0	Demonstrate an understanding of the fundamental principles of marine aquaculture. The student will be able to:
08.01	Demonstrate a basic understanding of marine aquaculture husbandry principles and practices.
08.02	Demonstrate the skills required to culture phytoplankton and zooplankton required for larval rearing.
08.03	Describe the basic types of marine aquaculture systems.
08.04	Describe the various types of common organisms and techniques currently used during marine aquaculture operations.
08.05	Demonstrate a basic knowledge of common diseases and parasites during marine aquaculture and methods for their control.
B.	Marine Assessment and Restoration Specialization Learning Outcomes:
09.0	Demonstrate a basic knowledge and understanding of specific marine habitat assessment protocols – The student will be able to:
09.01	Describe specific marine habitat assessment methods.
09.02	Demonstrate a basic understanding of biodiversity concepts and assessment methods.
09.03	Identify and quantify marine organisms in specific marine habitats.
09.04	Perform successful marine habitat assessments.
10.0	Demonstrate a basic knowledge and understanding of several marine habitat restoration protocols – The student will be able to:
10.01	Understand the criteria used to identify areas where habitat restoration is required.
10.02	Describe specific marine habitat restoration methods.
10.03	Obtain (e.g. culture) organisms for restoration.
10.04	Perform successful marine habitat restorations.
C.	Marine Mammal Specialization Learning Outcomes:
11.0	Demonstrate an understanding of the fundamental principles of marine mammal anatomy and evolution. The student will be able to:

11.01	Demonstrate an understanding of the external and internal aspects of dolphin anatomy and physiology, and their role in the successful survival of a mammal in the marine environment.
11.02	Demonstrate knowledge of the anatomy and evolution of various marine mammals including other cetaceans, pinnipeds and sirenians.
11.03	Demonstrate knowledge of the evolution of marine mammals.
12.0	Demonstrate basic knowledge of marine mammal social structure and culture. The student will be able to:
12.01	Demonstrate an understanding of basic dolphin ecology as related to communication, foraging, reproduction, calf rearing and social structure.
12.02	Explain and outline marine mammal maternal characteristics, behaviorism human care and the wild, as well as prenatal care, birthing situations and maternity care of mother and neonate human care facilities.
12.03	Explain how the natural social ecology of dolphins and the importance and impact of it on how they are managed at human care facility.
12.04	Demonstrate an understanding of the basic social structure of other representative marine mammal taxa.
12.05	Demonstrate how the term "culture" has been theorized to apply to certain aspects of cetacean societies and how that impacts our understanding of their cognition.
12.06	Understand the portrayal of marine mammals in the media and how and why it has changed over time.
12.07	Understand the application of animal assistance to humans throughout history and the more recent use of marine mammals in military service and how the latter has greatly contributed to our essential knowledge base of marine mammals overall.
13.0	Demonstrate proficiency of basic marine mammal training and husbandry techniques. The student will be able to:
13.01	Understand the philosophy and techniques of operant (behavioral) conditioning, with a focus on positive reinforcement in training behavior and its application to working with dolphins.
13.02	Demonstrate operant conditioning techniques through the use of learned hand signals in communicating requests for various trained behaviors from the dolphin.
13.03	Apply skills learned in animal care, handling and reinforcement during a live animal presentation for the general public.
13.04	Construct a plan for basic marine mammal care, dietary and medical needs, and animal handling.
13.05	Understand the medical issues unique to marine mammals, methods of treatment of bacterial, viral, fungal and parasitic disease, established preventive care practices.
13.06	Demonstrate the use of operant conditioning in training a new behavior through outlining, developing, implementing and modifying a behavior chain through practical application with the animals.
13.07	To summarize the importance of voluntary medical behavior training, concepts and techniques used to desensitize animals to non-invasive medical equipment and rocedures. Understand the importance of the of trainer/animal relationship with regard to properly maintaining the health and well being of the animals.
13.08	To investigate and understand the purpose and necessity of animal enrichment including cognitive, development, and social aspects. Design and implement enrichment activities to enhance the habitat and activities of the animals.
13.09	To summarize safety precautions and the social issues surrounding enrichment devices, habitat design, safety & maintenance social groupings, training and dolphin & sea lion nutrition & energetics.

13.10	To critique various career pathways and opportunities available in the field of marine mammal care and training, including necessary academics, field experience, trainer forums, further experiential education in the field, networking, etc.
14.0	Demonstrate knowledge of principle marine mammal laws and regulations. The student will be able to:
14.01	Understand and explain the laws and regulating agencies, and their evolution, designed to protect marine mammals in both the wild and human care as well as regulate facilities .
14.02	Understand the separate roles of both NOAA and the Department of Agriculture and how they impact marine mammals and marine mammal facilities.
15.0	Describe and discuss research focused on marine mammals. The student will be able to:
15.01	Describe the historical and current research efforts relating to dolphin cognition, behavior, acoustics, communication, strandings, physiology, reproduction and conservation.
15.02	Sumarize basic medical procedures and the importance and implications of husbandry techniques to marine mammal research.
15.03	Explain how research with dolphins in human care have expanded our understanding of their wild cousins and contributed to their conservation.
15.04	Sumarize trends in basic dolphin ethology, past and ongoing studies related to cognition, behavior and communication and its application in research, as well as an understanding of passive observational data collection and facilitation of active cognitive research.
15.05	Evaluate theories and research on dolphin echolocation and whistle production; implication of anthropogenic noise in the marine environment and ongoing research in the area.
15.06	Conduct independent behavioral observations.
15.07	Review research design and logistics as it applies to marine mammals in human care through a project design exercise conducted collaboratively throughout the course, including an understanding of results analyses and interpretation.
15.08	Critique career pathways and requirements toward becoming a marine mammal research scientist in human care settings (ex situ) and in the field (in situ).
16.0	Demonstrate knowledge of conservation issues involving marine mammals. The student will be able to:
16.01	Understand the current conservation issues of international/domestic concern which affect marine mammals and their environment, cumulative impacts both natural and human induced, as well as ways in which individuals can affect the environment in a positive manner to conserve the species.
16.02	Master the skills in synthesizing new information and experiences with prior conceptions of dolphins and the marine environment to clearly refine their opinions and knowledge base.
16.03	Outline the organization of the Marine Mammal Stranding Network; procedures used in assisting and rehabilitating stranded marine mammals; international and domestic issues concerning threats to dolphins and the marine environment.
16.04	List anthropogenic impacts affecting marine mammals and their environment, and demonstrate an understanding of research needed in this area, implications of impacts and associated research.
16.05	Understand past and present state of whaling operations around the world and the processes and organizations that govern these activities.
16.06	Understand status of certain endangered marine mammal species and conservation measures to sustain their populations.

17.0	Demonstrate an understanding of the guiding principles and practices of marine mammals in human care. The student will be able to:
17.01	To diagram population management, including theories, tools and strategies for maintaining a population's genetic diversity and demographic stability in order to insure its long term persistence.
17.02	Summarize specific concerns surrounding appropriate design, construction and maintenance of aquatic mammal habitats for marine mammals in human care.
D.	Marine Aquaculture Specialization Learning Outcomes:
18.0	Demonstrate a thorough knowledge of aquaculture best management practices. Students will be able to:
18.01	Describe the concept of aquaculture Best Management Practices.
18.02	Compile and analyze marine aquaculture industry management data.
18.03	Identify and demonstrate proper use of key Quality Management tools.
18.04	Develop and implement the key components and concepts of an aquaculture management plan.
19.0	Demonstrate a basic understanding of marine aquaculture husbandry principles and practices. Students will be able to:
19.01	Identify the principles of water quality specific to marine aquaculture from a variety of marine taxa.
19.02	Demonstrate a working knowledge of variety of husbandry techniques for most of the known marine species currently being cultured, including temperature and photoperiod control conducive to spawning and species specific life styles.
19.03	Understand basic selective breeding techniques for enhanced phenotypic traits.
20.0	Identify and diagnose common diseases and parasites that infect marine aquaculture organisms. Students will be able to:
20.01	Demonstrate an understanding of the basic principles of disease in marine aquatic systems
20.02	Demonstrate an understanding of how the culture environment is associated with the occurrence and outbreak of disease and parasites in marine aquaculture systems.
20.03	Identify the differences between environmental, viral, bacterial, parasitic and fungal diseases of marine species.
20.04	Demonstrate a basic understanding of methodologies for treatment of diseases commonly encountered during marine aquaculture operations.
20.05	Demonstrate an understanding of the basic principles of marine aquatic health management and biosecurity.
21.0	Demonstrate a moderate understanding of marine aquaculture systems. Students will be able to:
21.01	Describe the various types of marine aquaculture systems and demonstrate the ability to distinguish the primary components of specific marine aquaculture systems.
21.02	Identify which systems are best for the culture and business model of the target species.

21.03	Recognize the System requirements for Integrated Multi-Trophic Mariculture (IMTM) systems.
21.04	Demonstrate an understanding of the impacts of specific marine aquaculture systems on the environment and especially marine ecosystems.
21.05	Demonstrate basic skills for computer automated drafting.
22.0	Recognize appropriate nutritional requirements for the most common marine aquaculture organisms. Students will be able to:
22.01	Recognize basic marine nutrient and biochemical energy fluxes (i.e. trophodynamics and bioenergetics) especially as they relate to species commonly associated with marine aquaculture.
22.02	Demonstrate a rudimentary understanding of biochemistry (e.g. proteins, lipids, carbohydrates, etc.) and nutrient metabolism in common marine aquaculture species.
22.03	Demonstrate an understanding of the metabolic role of vitamins and minerals and recognize symptoms of vitamin deficiency.
22.04	Recognize appropriate feeding management practices based on metabolic requirements of marine aquaculture target species.
22.05	Recognize the impacts of feeding strategies on the environment.

Additional Information

Laboratory Activities

Field laboratory or field trips activities are an integral part of this program. These activities provide hands on instruction in marine conservation, habitat assessments, data collection, and ecosystem restoration. Field laboratory instruction demonstrates and teaches the proper use of common field sampling and research equipment. Field trips to regional marine laboratories or industry facilities provide operational examples of theoretical concepts taught in the classroom.

Most onsite laboratory activities associated with the MET program are centered on marine aquaculture activities. On-site laboratory facilities include: (1) an indoor marine ornamental laboratory with a sterile seawater supply, (2) a support and disease diagnostic laboratory adjacent to the marine ornamental lab, and (3) an outdoor system with six (6) 600 gallon polyethylene tanks with filtered sea-water pumped in from the ambient waters and/or drawn from a saltwater well.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fl DOE.org/workforce/dwdframe/artic_frame.asp.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fl DOE.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 62 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

A College Credit Certificate (CCC) consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This MET AS degree program includes the following College Credit Certificates:

- Marine Mammal Care and Basic Training (0103060101)
- Tropical Ornamental Mariculture Technician (0103060102)

**Florida Department of Education
Curriculum Framework**

Program Title: Turf Equipment Management
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1131030201
Program Type	College Credit
Standard Length	67 credit hours
CTSO	N/A
SOC Codes (all applicable)	49-3053 - Outdoor Power Equipment and Other Small Engine Mechanics
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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, instruction that prepares individuals to manage and maintain turf care equipment and to manage a shop facility. Instruction includes: hand tools, gasoline and diesel mechanics, paints and painting, sharpening and grinding, welding, hydraulics, electrical systems, training on specialized turf care equipment, record keeping, inventory control, safety, laws and regulations, public relations, human relations, shop management, professionalism, employability skills, communications skills, and management skills.

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 consisting of 67 credit hours.

Standards

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

- 01.0 Disassemble, reassemble, adjust, repair, and diagnose the problems related to two and four-cycle engines.
- 02.0 Service electrical systems, fuels and lubricating systems, cooling systems, power train/hydraulic drives, and controls on turf equipment.
- 03.0 Adjust, sharpen, grind, and rebuild reel and rotary mowing units.
- 04.0 Demonstrate understanding of governmental regulations and compliances pertaining to golf courses.
- 05.0 Use shop tools and equipment, and organize a shop following appropriate safety, management, and inventory techniques.
- 06.0 Order and stock parts and keep shop records.
- 07.0 Perform basic welding tasks using both gas and arc welding techniques.
- 08.0 Identify and safely operate turf care equipment.
- 09.0 Demonstrate employability skills.
- 10.0 Identify the various professional organizations and publications that pertain to the turf management industry.
- 11.0 Design a functional golf course maintenance facility and select appropriate maintenance equipment.
- 12.0 Develop a preventive maintenance program for turf care equipment.
- 13.0 Develop human relations skills.
- 14.0 Perform decision making activities.
- 15.0 Identify and demonstrate management activities.
- 16.0 Develop a management and training program for new employees.
- 17.0 Identify turfgrasses used in the golf and landscape industry.
- 18.0 Develop a plan for the functional use of turf equipment management personnel.
- 19.0 Develop communications and business management skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Turf Equipment Technology
CIP Number: 1131030201
Program Length: 67 credit hours
SOC Code(s): 49-3053

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0	Disassemble, reassemble, adjust, repair, and diagnose the problems related to two-cycle and four-cycle engines--The student will be able to:
01.01	Evaluate horsepower and torque.
01.02	Disassemble and reassemble a two-cycle and four-cycle engine.
01.03	Identify crankcase and cylinder assembly.
01.04	Identify and be able to assemble valves, piston assembly, crankshaft, cooling system, and air filters.
01.05	Identify and assemble parts of the carburetor assembly.
01.06	Identify and assemble the ignition system, governor, alternator, and starter system.
01.07	Identify types of batteries.
01.08	Follow safety rules and precautions when dealing with engines.
02.0	Service electrical systems, fuel and lubricating systems, power train/hydraulic drives, and controls on turf equipment--The student will be able to:
02.01	Identify turf equipment electrical systems.
02.02	Service hydraulic systems on a variety of turf equipment.
02.03	Service turf equipment power train systems.
02.04	Identify and service various lubricating systems and understand types of fuels and lubricants.
02.05	Operate and repair the various mechanical and hydraulic controls on turf equipment.
02.06	Repair the governor, ignition, alternator, and starter system on various pieces of turf equipment.

03.0	Adjust, sharpen, grind, and rebuild reel and rotary mowing units--The student will be able to:
03.01	Repair and sharpen various types of reel mowers.
03.02	Grind reel bedknives with various bedknife grinders.
03.03	Lap reel mower blades.
03.04	Follow safety procedures when using reel and bedknife grinders.
03.05	Adjust reel mowers to produce proper cutting heights.
03.06	Sharpen and balance rotary mower blades.
03.07	Remove and replace rotary mower blades.
04.0	Demonstrate understanding of governmental regulations and compliances pertaining to golf courses--The student will be able to:
04.01	Control pollution.
04.02	Protect water quality.
04.03	Demonstrate fire prevention methods.
04.04	Identify and prevent health hazards and demonstrate proper first aid.
04.05	Identify and manage hazardous waste on the golf course.
04.06	Manage fertilizer storage demonstrating proper handling techniques.
04.07	Demonstrate pesticide safety.
05.0	Use shop tools and equipment and organize a shop following appropriate safety, management and inventory techniques--The student will be able to:
05.01	Follow basic OSHA safety regulations and shop fire prevention techniques.
05.02	Perform basic first aid procedures.
05.03	Establish a file system for shop records.
05.04	Identify and use shop hand tools and equipment that relate to turf equipment maintenance.
05.05	Select the appropriate fasteners, bearings, seals, belts, chains, fuels, and lubricants for various turf equipment.
05.06	Establish and maintain appropriate shop space for specific shop tasks.

05.07	Establish an appropriate equipment inventory system.
06.0	Order and stock parts and keep shop records--The student will be able to:
06.01	Use the various equipment manuals to identify parts and service procedures.
06.02	Order parts properly.
06.03	Establish a system for stocking appropriate turf equipment parts.
06.04	Gather the appropriate forms for establishing a recordkeeping system.
06.05	Maintain computer-based inventory and record-keeping system.
07.0	Perform basic welding tasks using both gas and arc welding techniques--The student will be able to:
07.01	Follow welding symbols, and safety practices.
07.02	Connect and operate oxy-acetylene welding equipment.
07.03	Run beads and weld various types of joints.
07.04	Braze and solder metal.
07.05	Cut metal with and oxy-acetylene torch.
07.06	Select appropriate welding rods.
07.07	Set up an electrical arc welding machine.
07.08	Arc weld various types of joints.
08.0	Identify and safely operate turf care equipment--The student will be able to:
08.01	Identify the appropriate use for commonly used turf care equipment.
08.02	Identify the operation safety procedures for commonly used turf equipment.
08.03	Operate properly all commonly used turf care equipment.
09.0	Demonstrate employability skills--The student will be able to:
09.01	Conduct a job search.
09.02	Secure information about a job.

09.03	Identify documents which may be required when applying for a job interview.
09.04	Complete a job application correctly.
09.05	Demonstrate competence in a job interview.
09.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
09.07	Identify acceptable work habits.
09.08	Demonstrate knowledge or how to make job changes appropriately.
09.09	Demonstrate acceptable employee health habits.
09.10	Identify appropriate attire and grooming to maintain a functional and professional atmosphere in the equipment maintenance facility.
10.0	Identify the various professional organizations and publications that pertain to the turf management industry--The student will be able to:
10.01	Identify major points in the history of the golf course/turf industry.
10.02	Identify and understand various professional turf publications.
10.03	Identify and understand the basic role of professional turf organizations.
10.04	Identify the basics of the seed production and sod production industries.
10.05	Identify the various classes of golf courses and turf maintenance organizations.
11.0	Design a functional golf course maintenance facility and select appropriate maintenance equipment--The student will be able to:
11.01	Evaluate the organization and management styles utilized by various golf courses.
11.02	Classify, by use, the various equipment used on a typical 18-hole golf course.
11.03	List the equipment needed to properly maintain an 18-hole golf course.
11.04	Design and organize a golf course maintenance complex.
11.05	Develop an equipment budget for an 18-hole golf course.
12.0	Develop preventive maintenance programs for turf care equipment--The student will be able to:
12.01	Use equipment manufacturers' manuals to implement proper service procedures.
12.02	Develop a recordkeeping system to record equipment use.

12.03	Develop a recordkeeping system to record service work performed on equipment.
13.0	Develop human relations skills--The student will be able to:
13.01	Demonstrate appropriate work habits.
13.02	Identify traits that promote good human relations and increase job performance.
13.03	Develop an understanding of the role of the golf course superintendent and turf equipment service manager in the overall successful operations of the golf course.
14.0	Perform decision-making activities--The student will be able to:
14.01	Develop the ability to solve problems in a logical sequence.
14.02	Demonstrate the ability to determine proper work priorities.
14.03	Prepare a day's work schedule for the superintendent.
14.04	Choose appropriate action in situations requiring following a chain of command.
14.05	Choose appropriate action in situations requiring effective time management.
14.06	Choose appropriate action in situations requiring application of business ethics.
14.07	Identify ways to assign work to others.
15.0	Identify and demonstrate management activities--The student will be able to:
15.01	Define management.
15.02	Identify different management styles.
15.03	Identify the major functions of management.
15.04	Demonstrate knowledge of the relationship between authority and responsibility to task accomplishment.
15.05	Identify problems and make an appropriate decision.
15.06	Develop an OJT training program for new employees.
16.0	Develop a management and training program for new employees--The student will be able to:
16.01	Train new employees in proper shop management.
16.02	Teach new employees how to properly use equipment manuals.

16.03	Train equipment operators on proper and safe equipment operation.
16.04	Train equipment operators how to properly adjust mowing height.
16.05	Develop policies and procedures to be followed by employees caring for turf equipment.
17.0	Identify turfgrasses used in the golf and landscape industry--The student will be able to:
17.01	Identify the differences between warm and cool season grasses.
17.02	Demonstrate knowledge of basic management practices for various turfgrasses used in golf and landscape situations.
17.03	Demonstrate knowledge of the interaction between proper turf care and the overall health of the grass plant.
18.0	Develop a plan for the functional use of turf equipment management personnel--The student will be able to:
18.01	Determine the number of full-time and part-time staff needed.
18.02	Develop a work schedule for turf equipment management personnel.
18.03	Assign daily tasks to turf equipment management personnel.
18.04	Schedule work for smooth operation during times of personnel changes: sick leave, emergency leave, vacations, etc.
18.05	Provide the golf course superintendent with information on the use, maintenance, durability, and general characteristics of turf maintenance.
19.0	Develop communications and business management skills--The student will be able to:
19.01	Read and understand service manuals and technical service data.
19.02	Communicate effectively in writing and verbally to employees, supervisors, and small groups.
19.03	Evaluate the components of a basic business plan.
19.04	Demonstrate knowledge of effective management styles.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The Professional Turf Equipment Service Technicians Association (T.E.S.T.A.) is the appropriate industry association.

Planned and supervised occupational activities may be provided through directed laboratory experience, practicum or cooperative experience. whenever the cooperative method of instruction is offered, the following is 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 work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

The following ATD program articulates credit into this degree program. This statewide articulation agreement has been approved by the Articulation Coordinating Committee.

Turf Equipment Technology- 0131030202

Curriculum for this program is listed separately.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 67 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Veterinary Technology
Career Cluster: Agriculture, Food and Natural Resources

AS	
CIP Number	1351080800
Program Type	College Credit
Standard Length	73 credit hours
CTSO	N/A
SOC Codes (all applicable)	29-2056 - Veterinary Technologists and Technicians
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 animal office procedure; animal pharmacy and pharmacology; animal examination room/area; animal surgical preparation and assisting; large and small animal nursing; laboratory animal procedures; animal radiology, and employability skills. The curriculum also includes general course material such as computer literacy and use, applied mathematics, biological science, communications skills, fundamentals of microbiology, and humanities or liberal arts. Applicants for the certification examination given by the Florida Veterinary Medical Association must be graduates of approved two-year programs. Program approval is defined as being approved by the Committee on Veterinary Technician Education and Activities (CVTEA).

Reinforcement of basic skills in English, mathematics, and science appropriate for the job preparatory programs occurs through vocational classroom instruction and applied laboratory procedures or practice.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the health care industry; 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 consisting of 73 credit hours.

Standards

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

- 01.0 Demonstrate knowledge of the health care delivery system and health occupations.
- 02.0 Demonstrate the ability to communicate and use interpersonal skills effectively.
- 03.0 Demonstrate an understanding of and apply wellness and disease concepts.
- 04.0 Recognize and practice safety and security procedures.
- 05.0 Recognize and respond to emergency situations as related to veterinary medicine.
- 06.0 Recognize and practice infection control procedures.
- 07.0 Demonstrate an understanding of information technology applications in veterinary healthcare.
- 08.0 Demonstrate employability skills.
- 09.0 Demonstrate knowledge of blood borne diseases.
- 10.0 Apply basic math and science skills.
- 11.0 Perform office procedures utilized in the management of a veterinary office.
- 12.0 Demonstrate an understanding of animal pharmacology by the proper handling and use of related drugs.
- 13.0 Perform under supervision, physical examinations, and laboratory procedures.
- 14.0 Assist with routine surgical and obstetrical procedures.
- 15.0 Prepare animals for surgical procedures.
- 16.0 Assist with anesthesia under supervision.
- 17.0 Perform surgical clean-up.
- 18.0 Perform large and small animal nursing techniques.
- 19.0 Perform specimen analysis laboratory procedures.
- 20.0 Perform parasitology laboratory procedures.
- 21.0 Perform microbiology laboratory procedures.
- 22.0 Perform necropsy laboratory procedures.
- 23.0 Perform cytology laboratory procedures.
- 24.0 Perform veterinary radiographic procedures.
- 25.0 Demonstrate research techniques on laboratory animals.
- 26.0 Apply knowledge of hospital management and equipment standards.
- 27.0 Apply knowledge of professional ethics, jurisprudence and professionalism.

**Florida Department of Education
Student Performance Standards**

Program Title: Veterinary Technology
CIP Number: 1351080800
Program Length: 73 credit hours
SOC Code(s): 29-2056

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0	Demonstrate knowledge of the health care delivery system and veterinary health occupations--The student will be able to:
01.01	Identify the basic components of the veterinary health care delivery system including public, private, government and non-profit.
01.02	Identify common methods of payment for veterinary healthcare services.
01.03	Describe the various types of veterinary healthcare providers and the range of services available including resources for animal abuse and neglect.
01.04	Describe the composition and functions of a veterinary healthcare team.
01.05	Identify the general roles and responsibilities of the individual members of the veterinary healthcare team.
01.06	Identify characteristics of effective veterinary healthcare teams.
01.07	Recognize methods for building positive veterinary healthcare team relationships.
01.08	Analyze attributes and attitudes of an effective veterinary healthcare leader.
01.09	Recognize factors and situations that may lead to conflict.
01.10	Demonstrate effective techniques for managing team conflict.
01.11	Explain the impact of emerging issues including technology, pet insurance, epidemiology, bioethics and socioeconomics on healthcare delivery systems.
02.0	Demonstrate the ability to communicate and use interpersonal skills effectively--The student will be able to:
02.01	Develop basic speaking and active listening skills.
02.02	Develop basic observational skills and related documentation strategies in written and oral form.
02.03	Identify characteristics of successful and unsuccessful communication including barriers.

02.04	Respond to verbal and non-verbal cues.
02.05	Compose written communication using correct spelling, grammar, formatting and confidentiality.
02.06	Use appropriate veterinary medical terminology and abbreviations.
02.07	Recognize the importance of courtesy and respect for patients and other veterinary healthcare workers and maintain good interpersonal relationships.
02.08	Recognize the importance of client educations regarding veterinary healthcare.
02.09	Adapt communication skills to varied levels of understanding and cultural orientation including diverse age, cultural, economic, ethnic and religious groups.
02.10	Distinguish between and report subjective and objective information.
02.11	Report relevant information in order of occurrence.
03.0	Demonstrate an understanding of and apply wellness and disease concepts--The student will be able to:
03.01	Describe strategies for prevention of diseases including health screenings and examinations.
03.02	Identify environmental factors which affect optimal function of each of the major body systems.
03.03	Identify behavioral reactions to illness including defense mechanisms.
03.04	Identify complementary and alternative veterinary health practices.
03.05	Explain animal nutrition in health and disease.
03.06	Recognize the steps in the grief process.
04.0	Recognize and practice safety and security procedures--The student will be able to:
04.01	Recognize safe and unsafe working conditions and report safety hazards.
04.02	Demonstrate the safe use of medical equipment.
04.03	Demonstrate personal safety procedures based on Occupations Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations (including standard precautions).
04.04	Recognize Materials Data Safety Sheets (MSDS) and comply with safety signs, symbols and labels.
04.05	Demonstrate proper body mechanics and ergonomics to maintain technicians' health and safety.
04.06	Demonstrate the procedure for properly identifying patients.
04.07	Demonstrate procedures for the safe transport and transfer of patients.

04.08	Describe fire, safety, disaster and evacuations procedures.
05.0	Recognize and respond to emergency situations as related to veterinary medicine.--The student will be able to:
05.01	Monitor and record vital signs.
05.02	Describe legal parameters relating to the administration of emergency care.
05.03	Recognize adverse drug related emergencies and take appropriate first aid action.
06.0	Recognize and practice infection control procedures--The student will be able to:
06.01	Define principles of infection control.
06.02	Demonstrate knowledge of medical asepsis and practice procedures such as hand-washing and isolation.
06.03	Describe how to dispose correctly of biohazardous materials according to appropriate government guidelines such as OSHA.
07.0	Demonstrate an understanding of information technology applications in veterinary healthcare--The student will be able to:
07.01	Describe the uses of computers in veterinary healthcare.
07.02	Define terms and demonstrate basic computer skills including billing and record keeping.
07.03	Recognize technology applications in veterinary healthcare.
07.04	Interpret information from electronic veterinary medical documents.
07.05	Identify methods of communication to access and distribute data such as fax, e-mail and internet.
08.0	Demonstrate employability skills--The student will be able to:
08.01	Identify personal traits or attitudes desirable in a member of the veterinary healthcare team.
08.02	Define basic professional standards of veterinary healthcare workers as they apply to hygiene, dress, language, confidentiality and behavior (i.e. courtesy and self-introductions).
08.03	Identify documents that may be required when applying for a job.
08.04	Write an appropriate resume.
08.05	Conduct a job search.
08.06	Complete a job application form correctly.
08.07	Demonstrate competence in job interview techniques.

08.08	Recognize levels of education, credentialing requirements, employment opportunities, workplace environments and career growth potential.
08.09	Identify acceptable work habits.
08.10	Recognize appropriate affective/professional behavior.
08.11	Compare careers within the veterinary health science career pathways
09.0	Demonstrate knowledge of blood borne diseases. --The student will be able to:
09.01	Recognize emerging diseases and disorders.
09.02	Distinguish between fact and fallacy about the transmission and treatment of diseases caused by blood borne pathogens.
09.03	Apply infection control techniques designed to prevent the spread of diseases caused by blood borne pathogens following Centers for Disease Control (CDC) guidelines.
10.0	Apply basic math and science skills--The student will be able to:
10.01	Draw, read, and report on graphs, charts and tables.
10.02	Measure time, temperature, distance, capacity, and mass/weight.
10.03	Make and use measurements in both traditional and metric units.
10.04	Make estimations and approximations and judge the reasonableness of the result.
10.05	Convert from regular to 24 hour time.
10.06	Demonstrate ability to evaluate and draw conclusions.
10.07	Organize and communicate the results obtained by observation and experimentation.
10.08	Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solution of such questions.
10.09	Calculate ratios.
11.0	Perform office procedures utilized in the management of a veterinary office--The student will be able to:
11.01	Make appointments.
11.02	List state/federal health regulations and prepare health and vaccination certificated for signatures.
11.03	Admit patients, take history, and maintain records.
11.04	Demonstrate basic filing of x-rays, lab reports, etc.

11.05	Demonstrate effective client and public relations in the receiving, discharging and educating clients.
11.06	Demonstrate knowledge of First-Aid and CPR as they relate to animal care.
11.07	Identify documentation procedures for responding to veterinarian medical emergencies.
11.08	Practice basic cleanliness and orderliness in relationship to the on-going activity of a veterinary facility (including hospital, clinic, center, practice, laboratory, etc.).
11.09	Demonstrate the knowledge of the technician's role in generation of veterinary practice income.
11.10	Demonstrate basic bookkeeping.
11.11	Demonstrate business letter and report writing.
12.0	Demonstrate an understanding of animal pharmacology by the proper handling and use of related drugs--The student will be able to:
12.01	Identify and discuss general types and groups of drugs.
12.02	Label and package dispensed drugs correctly.
12.03	Read and fill prescriptions.
12.04	Calculate dosages.
12.05	Store and handle biologic and therapeutic agents appropriately.
12.06	Identify controlled substances.
12.07	Handle and record controlled drugs according to DEA regulations.
12.08	Describe inventory control.
12.09	Prepare medications for administration and dispensing.
12.10	Discuss the signs of adverse drug reactions.
12.11	Use and explain appropriate routes and methods of drug administration.
13.0	Perform under supervision physical assessments and laboratory procedures--The student will be able to:
13.01	List "normal" temperature, pulse and respiration in all common species.
13.02	Use proper medical terminology in oral and written communications as related to veterinary technology.
13.03	Perform under supervision and explain to clients schedules, procedures, and types of immunizations.

13.04	Identify common breeds of large, small, exotic, and laboratory animals.
13.05	Demonstrate basic restraint techniques in animals (encaging and removing from cages, placing on and removing from tables, haltering horses and cattle, application of nose tongs, twitches, hog holders, Elizabethan collars, dog safety muzzles; bovine tail and horse leg restraint, bird restraint, and operation of cattle chutes.
13.06	Demonstrate basic rope usage and knot tying techniques.
13.07	Identify heart and lung sounds with stethoscope.
13.08	Explain routine hospital procedures (e.g. surgeries, dental prophylaxis, deworming, patient care, etc.).
13.09	Collect blood, perform skin scrapings, and administer specific drugs under supervision of veterinarian.
13.10	Obtain and record patient history.
13.11	Describe training of companion animals and correction of behavior problems.
13.12	Identify common grains, grasses, hay.
13.13	Identify common poisonous plants.
14.0	Assist with routine surgical and obstetrical procedures--The student will be able to:
14.01	Explain routine surgical procedures and the veterinarian technicians' role in each procedure: (See Section 5 Surgical Nursing in AVMA student Essential Skills list) http://www.avma.org/education/cvea/cvtea_appendix_i.asp
14.02	Explain artificial insemination techniques and equipment in various species and the role of the veterinarian technician.
14.03	Explain pregnancy evaluation in various species.
15.0	Prepare for surgical procedures--The student will be able to:
15.01	Prepare surgical sites - aseptic techniques.
15.02	Clean surgical instruments.
15.03	Prepare sterile surgical packs.
15.04	Prepare and use gowns, masks, gloves, and drapes.
15.05	Sterilize instruments and supplies using steam and cold methods.
15.06	Identify instruments.
15.07	Operate and maintain autoclaves.
15.08	Explain the use of common surgical closure techniques and materials.

15.09	Position patients for common procedures.
15.10	Arrange lighting during surgery.
15.11	Demonstrate knowledge of alternative sterilization of instruments and supplies.
16.0	Assist with anesthesia under supervision--The student will be able to:
	(See Section 4 Anesthesia in AVMA student Essential Skills list) http://www.avma.org/education/cvea/cvtea_appendix_i.asp
17.0	Perform surgical clean-up--The student will be able to:
16.01	Describe and perform surgical clean-up including equipment, surgical room or area, instruments, patient, personnel and proper disposal of waste and tissue.
18.0	Perform large and small animal nursing techniques--The student will be able to:
	(See AVMA Essential Skills list for required skills) http://www.avma.org/education/cvea/cvtea_appendix_i.asp
18.01	Demonstrate common injection techniques.
18.02	Demonstrate common intravenous catheterization.
18.03	Maintain fluid therapy.
18.04	Describe and perform pre and post-operative patient care.
18.05	Administer oral medication by means of dose syringe, balling gun, oral speculum in large animals; hand pilling - small animals and gastric lavage in small animals.
18.06	Demonstrate bandaging techniques.
18.07	Apply and remove casts and splints.
18.08	Perform suture removal.
18.09	Apply emergency splint application.
18.10	Perform dental prophylaxis, using hand and machine techniques.
18.11	Demonstrate understanding in therapeutic bathing, grooming, and anti-parasitic treatment.
18.12	Demonstrate routine recordkeeping, care, and observation of hospitalized patients.
18.13	Observe stomach tubing of dogs, cats, cattle and horses.
18.14	Describe and perform intramammary treatment (mastitis therapy only).

18.15	Implement patient and personnel safety measures.
18.16	Describe and perform orphan animal care of small, large and exotic animals.
18.17	Perform feed preparation and therapeutic diets for animals.
18.18	Clean and care for cages, kennels, and stalls.
18.19	Practice nail trimming for dogs, cats, and birds, and observe beak-trimming and wing trimming for birds.
18.20	Practice equine leg and tail wraps.
18.21	Express canine anal sacs.
18.22	Practice blood collection.
18.23	Practice ear cleaning and dressing.
18.24	Observe enema administration.
18.25	Demonstrate catheterization of urinary tract of canine and feline.
18.26	Demonstrate emergency care of trauma patients.
18.27	Clean, prep, and medicate wounds or abscesses.
18.28	Apply topical medication to the eye.
18.29	Describe nursing care of newborns.
18.30	Care for and repair equipment.
18.31	Prepare for equine vaginal examination and cervical culture.
18.32	Demonstrate bovine mastitis testing.
18.33	Describe the procedures and purposes for marking, tattooing, and microchipping animals.
18.34	Practice physical therapy.
18.35	Describe the principles of blood transfusion.
19.0	Perform specimen analysis laboratory procedures--The student will be able to:
19.01	Perform and demonstrate skill in specimen analysis.

	(See Section 6 Laboratory Procedures- Specimen Analysis- in AVMA student Essential Skills list) http://www.avma.org/education/cvea/cvtea_appendix_i.asp
20.0	Perform parasitology laboratory procedures--The student will be able to:
20.01	Perform and demonstrate skill in the parasitology.
	(See Section 6 Laboratory Procedures- Specimen Analysis- in AVMA student Essential Skills list) http://www.avma.org/education/cvea/cvtea_appendix_i.asp
21.0	Perform microbiology laboratory procedures--The student will be able to:
21.01	Perform and demonstrate skill in microbiology: <ul style="list-style-type: none"> • Sample collection. • Bacteriology to include culture and sensitivity, identification of common bacteria, common biological tests and staining procedures. • Mycology to include fungal culture and wet mount and identification of common fungi. • Virology to include principles of sampling and testing. • Principles of immunology.
22.0	Observe necropsy laboratory procedures--The student will be able to:
22.01	Observe skill in necropsy procedures such as sample collection, storage and shipment, disposal of dead animals.
22.02	Describe euthanasia procedures and handling of rabies suspects.
23.0	Perform fluid analysis laboratory procedures--The student will be able to:
23.01	Explain skill in the following: Cytology: <ul style="list-style-type: none"> • smear preparation and staining procedures • basic cell identification (normal and abnormal) • Tissue aspirates and impressions • smear preparation and staining procedures • basic cell identification (normal and common abnormal)
23.02	Assist in collecting, preparing, and evaluating transudate, exudates, and cytologic specimens.
23.03	Prepare and stain bone marrow specimen.
23.04	Collect, prepare and evaluate vaginal smears.
23.05	Evaluate semen.
23.06	Collect, prepare, and evaluate ear cytology.
24.0	Perform veterinary radiographic procedures--The student will be able to:

24.01	Perform and demonstrate the following radiographic procedures: <ul style="list-style-type: none"> • Implement safety measures. • Prepare and use technique charts. • Take and process diagnostic radiographs including small, large and laboratory, avian, and exotic animal positioning and techniques. • Use darkroom procedures. • Replace or replenish developer and fixer. • Demonstrate film labeling, filing, and storage. • Maintain radiographic quality control. • Maintain equipment including hanging or storage of gloves or aprons, cleaning screens, detecting or suspecting faulty equipment operation. • Proper use of both stationary and portable x-ray machines. • Perform special radiographic techniques (including contrast media studies). • Discuss use of digital systems.
25.0	Demonstrate research techniques on laboratory animals--The student will be able to:
25.01	Explain basic principles of research, and necessity for use of laboratory animals.
25.02	Identify and restrain common species of small laboratory animals.
25.03	Determine sex of laboratory animals.
25.04	Perform and/or supervise basic animal care procedures, e.g. feeding, watering, breeding, identification, and handling.
25.05	Administer or inject drugs or medicaments using appropriate sites and routes.
25.06	Collect body tissues or fluids.
25.07	Demonstrate knowledge of gnotobiotic techniques.
25.08	Perform oral dosing (intubation, blunt needle, stomach tube)
25.09	Anesthetize laboratory animals.
25.10	Identify common disease signs of laboratory animals.
25.11	Identify species of non-human primates.
26.0	Apply knowledge of hospital management and equipment standards--The student will be able to:
26.01	Demonstrate knowledge of the principles of infection control, cross contamination, and zoonosis.

26.02	Maintain inventory of supplies, medications and disposables.
26.03	Demonstrate knowledge of personnel management, assignments.
26.04	Determine personnel needs on each shift.
26.05	Perform routine maintenance checks and monitor equipment use.
26.06	Describe risk management techniques.
27.0	Apply knowledge of professional ethics, jurisprudence and professionalism--The student will be able to:
27.01	List the benefits of belonging to a professional organization.
27.02	Describe the technician/veterinarian relationship.
27.03	Discuss the legal framework of the healthcare occupations including scope of practice legislation.
27.04	Explain practices that could results in malpractice, liability and/or negligence.
27.05	Demonstrate procedures for accurate documentation and record keeping.
27.06	Interpret healthcare facility policy and procedures.
27.07	Describe informed consent.
27.08	Explain the laws governing harassment, labor and employment.
27.09	Differentiate between legal and ethical issues in healthcare.
27.10	Describe a code of ethics consistent with the healthcare occupation.
27.11	Identify and compare personal, professional, and organizational ethics.
27.12	Recognize the limits of authority and responsibility of healthcare workers.
27.13	Recognize and report illegal and/or unethical practices of healthcare workers.
27.14	Demonstrate knowledge of ethics and jurisprudence as related to veterinary technology.
27.15	Describe a valid veterinary/client relationship.
27.16	Describe laws governing veterinary medicine in Florida.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

AVMA Student Essential and Recommended Skills

In order to properly prepare students for certification please refer to Appendix I in the certification manual for the most up to date listings of Essential and Recommended skills required of students. The list is updated at least once a year, because the list is updated more frequently than our frameworks in some standards you see a reference to the list to ensure you are teaching the most update material and not just was is listed in the framework. Please use the link below to access the skills list.

http://www.avma.org/education/cvea/cvtea_appendix_i.asp

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 73 credit hours according to Rule 6A-14.030, F.A.C.

**Florida Department of Education
Curriculum Framework**

Program Title: Environmental Science Technology
Career Cluster: Agriculture, Food & Natural Resources

AS	
CIP Number	1703010401
Program Type	College Credit
Standard Length	64 credit hours
CTSO	N/A
SOC Codes (all applicable)	19-4091 - Environmental Science and Protection Technicians, Including Health
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 conducting environmental surveys, and investigations and evaluations of noise, air and water conditions to determine compliance with public laws and regulations.

Reinforcement of basic skills in English, mathematics, and science appropriate for the job preparatory programs is provided through vocational classroom instruction and applied laboratory procedures or practice. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the public service industry; 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 consisting of 64 credit hours.

Standards

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

- 01.0 Demonstrate knowledge of the principles of managing and remediation of water pollution.
- 02.0 Demonstrate knowledge of the principles of managing and remediation of air pollution.
- 03.0 Demonstrate awareness of environmental noise sources and their monitoring.
- 04.0 Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants.
- 05.0 Sample, analyze and calculate data related to air and water pollutants.
- 06.0 Demonstrate an awareness of radiation monitoring and radioactive contamination control.
- 07.0 Demonstrate and awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems.
- 08.0 Demonstrate employability skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Environmental Science Technology
CIP Number: 1703010401
Program Length: 64 credit hours
SOC Code(s): 19-4091

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:

01.0 Demonstrate knowledge of the principles of managing and remediation of water pollution--The student will be able to:

01.01 Determine chemical and physical properties of water.

01.02 Describe microbial systems.

01.03 Describe surface water, groundwater systems, hydrologic cycle, and potable water treatment processes.

01.04 Describe the marine environment.

01.05 Identify types and sources of water contamination.

01.06 Describe legal aspects and consequences of pollution.

01.07 Collect water samples for analysis.

01.08 Identify the accepted water quality standards for effluent from wastewater treatment plants.

01.09 Identify the correct and accepted water quality standards for industrial waste effluent.

01.10 Demonstrate the technology applied to non-point source pollution control (stormwater and agriculture runoff).

02.0 Demonstrate knowledge of the principles of managing and remediation of air pollution--The student will be able to:

02.01 Define and discuss atmosphere, meteorology and topography.

02.02 Identify natural and manmade pollutants; their sources, effects, and control techniques.

02.03 Collect and analyze air samples.

02.04 Describe legal aspects and consequences of air pollution.

02.05 List the regulated parameters of emission for selected industrial sources.

02.06	List the types of air pollution control devices used to control emissions of sulfur oxides, nitrogen oxides, particulates and volatile organic contaminants.
02.07	Measure the air pollutant of a specific source.
02.08	Record, interpret and report laboratory analyses.
03.0	Demonstrate awareness of environmental noise sources and their monitoring--The student will be able to:
03.01	Define and discuss the physical properties of sound.
03.02	Discuss the threshold of hearing, tolerance, and hearing loss.
03.03	Discuss environmental noise, its effect on humans, and solutions to noise pollution.
03.04	Discuss legal aspects and consequences of noise pollution.
03.05	List the sources of noise.
03.06	Select the regulatory agency that controls noise sources.
03.07	List the control devices for different noise sources.
04.0	Operate and calibrate laboratory and field instruments used in quantitative and qualitative analysis of pollutants--The student will be able to:
04.01	Demonstrate knowledge of basic laboratory operation.
04.02	Operate and calibrate selected laboratory instruments.
04.03	Operate and calibrate selected field instruments and equipment.
05.0	Sample, analyze and calculate data related to air and water pollutants--The student will be able to:
05.01	Gather and analyze selected samples.
05.02	Manipulate data and reach firm conclusions.
05.03	Write selected formal technical reports.
05.04	Identify and perform the correct analysis for selected air pollutants listed with state and federal regulations.
05.05	Identify and perform the correct analysis for selected parameters listed with state and federal regulations for wastewater effluent.
06.0	Demonstrate an awareness of radiation monitoring and radioactive contamination control--The student will be able to:
06.01	Discuss atomic structure, radiation and radioactive decay.

06.02	Discuss types and sources of radiation.
06.03	Demonstrate knowledge of radiation exposure and dosimetry experiments.
06.04	Discuss the immediate and long range effects of radiation on animals and plants.
06.05	Discuss nuclear power plant design, nuclear power hazards, and safety features.
06.06	Discuss nuclear fuel reprocessing and storage.
06.07	Discuss legal aspects and consequences of radioactive pollution.
07.0	Demonstrate an awareness of solid waste, the problems engendered by solid waste accumulation and disposal and solutions to those problems--The student will be able to:
07.01	Discuss the composition, sources and quantity of solid waste.
07.02	Discuss methods of solid waste disposal.
07.03	Discuss various solutions to solid waste accumulations and disposal.
07.04	Discuss the legal aspects and consequences of solid waste pollution.
07.05	Identify the solid wastes from domestic households, municipalities and industry.
07.06	Identify a sanitary landfill.
07.07	Discuss the construction features of a safe landfill.
07.08	Discuss the possibilities of contaminants (leachates) seeping into the groundwater.
07.09	Discuss the need to have monitoring well located around a sanitary landfill.
07.10	Discuss those wastes that are permitted by state and federal regulation to be disposed at a landfill site.
08.0	Demonstrate employability skills--The student will be able to:
08.01	Conduct a job search.
08.02	Secure information about a job.
08.03	Identify documents that may be required when applying for a job.
08.04	Complete a job application.
08.05	Demonstrate competence in job interview techniques.

08.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.

08.07 Identify acceptable work habits.

08.08 Demonstrate knowledge of how to make job changes appropriately.

08.09 Demonstrate acceptable employee health habits.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

Articulation

To be transferable statewide between institutions, this program must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific articulation agreements with each other.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp .

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 64 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.). This AS degree program includes the following College Credit Certificates:

- Assessment and Safety Compliance (0703010402) – 13 hours
- Environmental Science Technician (0703010407 – 30 hours
- Hazardous Materials Specialist (0703010403) – 14 hours
- Mold Assessment Specialist (0703010405) – 16 hours

Mold Remediation Specialist (0703010406) – 13 hours
Water Quality Specialist (0703010404) – 12 hours

Standards for the above certificate programs are contained in separate curriculum frameworks.

**Florida Department of Education
Curriculum Framework**

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

Secondary – Career Preparatory

Program Number	8003100
CIP Number	0126120101
Grade Level	9-12, 30, 31
Standard Length	5 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4021 -Biological Technicians 19-1011 - Animal Scientists 19-1013 - Soil and Plant Scientists
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

This program can be taken by students as a three credit program by completing OCP A, a four credit program by completing OCP A and B or OCP A and C, or a 5 credit program by completing OCP A, B and C.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations	1 credit	19-4021	3
	8106850	Agricultural Biotechnology 2	1 credit		3
	8106860	Agricultural Biotechnology 3	1 credit		3
B	8106120	Animal Biotechnology	1 credit	19-1011	3
C	8106510	Plant Biotechnology	1 credit	19-1013	3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Ag Biotechnology 2	^^	^^	^^	12/53 23%	6/52 12%	33/56 59%	13/55 24%	8/58 14%	19/35 54%	11/42 26%	12/56 21%	8/53 15%

Ag Biotechnology 3	^^	^^	^^	10/53 19%	13/52 25%	31/56 55%	34/55 62%	14/58 24%	27/35 77%	18/42 43%	25/56 45%	19/53 36%
Animal Biotechnology	^^	^^	^^	8/53 15%	8/52 15%	21/56 38%	13/55 24%	8/58 14%	13/35 37%	7/42 17%	12/56 21%	9/53 17%
Plant Biotechnology	^^	^^	^^	7/53 13%	9/52 17%	22/56 40%	13/55 24%	9/58 16%	12/35 34%	10/42 24%	12/56 21%	10/53 19%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Identify the historical, social, cultural and potential applications of biotechnology.
- 14.0 Conduct scientific investigation and apply results.
- 15.0 Practice agricultural laboratory safety.
- 16.0 Apply genetic principles to agricultural production.
- 17.0 Demonstrate laboratory skills as applied to biotechnology.
- 18.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).
- 19.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 20.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 21.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 22.0 Recognize and follow quality control procedures and regulatory guidelines.
- 23.0 Analyze the historical, social, cultural and potential applications of biotechnology.
- 24.0 Demonstrate proper tissue/cell culture techniques.
- 25.0 Demonstrate the application of biotechnology to the Agriculture, Food and Natural Resources (AFNR) industries.
- 26.0 Demonstrate leadership, employability, communication and human relation skills.

Animal Biotechnology

- 27.0 Apply genetic principles to animal science.
- 28.0 Interpret the relationship between total digestible nutrients (TDN) in feeds and its utilization.

- 29.0 Examine the developmental processes that determine animal growth.
- 30.0 Investigate the reproduction system of animals.
- 31.0 Describe animal science and the role of animals in society.

Plant Biotechnology

- 32.0 Describe plant classifications and the economic impact to your region.
- 33.0 Apply genetic principles to plant improvement.
- 34.0 Demonstrate methods of micropropagating plants.
- 35.0 Demonstrate methods of plant production.
- 36.0 Use plants to demonstrate growth disorders (nutrients, pathogens, pests)
- 37.0 Identify the historical, social, cultural and potential applications of plant biotechnology

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.	
01.01 Key Ideas and Details		
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure		
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c PST.01.03.01.a
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 2
Course Number: 8106850
Course Credit: 1

Course Description:

This course was developed as a core and is designed to develop competencies in the areas of agricultural biotechnology in agriculture, scientific investigation, laboratory safety, scientific and technological concepts; and the fundamentals of biotechnology.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Identify the historical, social, cultural and potential applications of biotechnology--The student will be able to:		SC.912.L.15.1, 2, 3, 5, 8, 14; SC.912.L.16.10; SC.912.L17.13; SC.912.N.2.1, 2	
13.01 Define biotechnology and explore the historical impact on agriculture.			BS.01.01.01.a. BS.01.01.01.b.
13.02 Explain the developmental progression of biotechnology.			
13.03 Examine current research and applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.			BS.01.01.01.c. BS.01.01.02.a. BS.01.01.02.b BS.01.01.03.a.
13.04 Describe the role of agencies that regulate biotechnology.			
13.05 Interpret the major regulatory issues related to biotechnology.			
13.06 Explore ethical, legal and social biotechnology issues.			
13.07 Research emerging problems and issues and evaluate the benefits and risks associated with biotechnology.			BS.01.01.03.b. BS.01.01.03.c.
13.08 Investigate the emergence and evolution of biological organisms and their use in biotechnology.			BS.01.03.02.a
13.09 Examine intellectual properties associated with biotechnology by defining their components.			BS.01.03.03.a.

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
13.10 Examine an ethical dilemma associated with biotechnology by identifying its components.			BS.01.03.01.a.
14.0 Conduct scientific investigation and apply results--The student will be able to:	MAFS.912.S-IC.2; MAFS.912.N-Q.1.3	SC.912.N.3.1, 4	
14.01 Discuss the differences between scientific laws and scientific theories.			
14.02 Design an agricultural experiment using appropriate control measures.			
14.03 Collect and record data using SI units.			
14.04 Using the scientific method summarize data, draw conclusions, and plan follow-up experiments.			
15.0 Practice agricultural laboratory safety--The student will be able to:			
15.01 Identify first aid supplies, personnel and emergency protection areas.			
15.02 Monitor, use, store and dispose of hazardous materials and disposal of biological pathogens according to industry practices.			
15.03 Document safety training and practices (reading and interpreting) using Material Safety Data Sheets (MSDS) and Occupational Safety and Health Administration (OSHA) standards.			
15.04 Demonstrate and utilize safety equipment.			
15.05 Identify safety symbols and signs.			
15.06 Demonstrate appropriate safety procedures and guidelines, and discuss implications of safety violations.			
16.0 Apply genetic principles to agricultural production--The student will be able to:	MAFS.912.S-IC.2 MAFS.912.N-Q.1.3	SC.912.L.15.5, 9, 13, 15 SC.912.L.16.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17 SC.912.L.17.13, 20 SC.912.N.1.2, 4, 6 SC.912.P.8.3, 4, 5, 6, 7, 12, 13	
16.01 Describe the relationship between reproduction and genetic improvement.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
16.02 Demonstrate how traits are inherited.			Bs.02.05.02.c
16.03 Describe how genetic processes and structures control inheritance.			
16.04 Predict probable results of single or multiple trait crosses.			
16.05 Differentiate between dominant and recessive traits.			
16.06 Describe the chemical and physical properties of DNA.			BS.02.05.02.a
16.07 Develop a hypothetical species using genetic engineering.			
16.08 Debate the safeguards used in research in genetic engineering.			
16.09 Perform DNA manipulations, such as cloning/subcloning, blotting, sequencing and amplification.			BS.02.05.03.c
16.10 Analyze factors that influence gene expression.			BS.02.05.02.c
16.11 Describe the process of genetic marker assisted selection.			
17.0 Demonstrate laboratory skills as applied to biotechnology--The student will be able to:	MAFS.912.N-Q.1.3	SC.912.L.14.4, 6, 52 SC.912.L.16.1, 2, 3, 5, 9, 15, 16 SC.912.L.18. 4, 12 SC.912.P.8.7	
17.01 Maintain and interpret biotechnology laboratory and production records.			
17.02 Operate laboratory equipment and measurement devices.			
17.03 Demonstrate aseptic techniques in the biotechnology laboratory.			
17.04 Select an appropriate standard operating procedure for working with biological materials and equipment.			
17.05 Prepare buffers, reagents, solutions and media.			BS.02.04.01.b.
17.06 Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.			BS.02.04.02.b.
17.07 Isolate, maintain, quantify and store cell cultures.			BS.02.05.01.b.
17.08 Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations.			BS.02.05.02.b.
17.09 Extract and purify DNA.			BS.02.05.03.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.10 Perform protein separation techniques and interpret the results.			
17.11 Describe how antibodies are formed and how they can be used in biotechnology applications.			BS.02.05.05.a
17.12 Research and describe the use of biotechnology to detect microbes.			BS.02.05.06.b.
18.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.14.2; SC.912.L.15.13, 14, 15; SC.912.L.16.10; SC.912.L.17.2, 8, 11, 20; SC.912.L.18.1, 2, 3, 4, 6, 7, 8, 11; SC.912.P.8.12	
18.01 Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.			BS.03.01.01.a
18.02 Differentiate the roles of carbohydrates, fats, and proteins in biotechnology applications.			
18.03 Describe the role of fermentation in biotechnology applications.			BS.03.02.03.a
18.04 Diagram the processes used to produce transgenic eukaryotes.			
18.05 Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions.			BS.03.01.02.a
18.06 Describe processes by which enzymes are produced through biotechnology.			BS.03.01.02.b.
18.07 Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.			BS.03.01.03.a
18.08 Diagram the process by which organisms are genetically engineered for waste treatment.			BS.03.01.03.b.
18.09 Investigate-and report on-genetic engineering procedures used in the production of agricultural products.			
18.10 Explain the functions of hormones in animals.			BS.03.02.01.a.
18.11 Describe the processes used to produce animal hormones from transgenic organisms.			BS.03.02.01.b.
18.12 Identify foods produced through fermentation.			BS.03.02.02.a.
18.13 Compare and contrast bioengineering and conventional pathways used in food processing.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
18.14 Explain biomass and sources of biomass.			BS.03.03.08.a
18.15 Assess the characteristics of biomass that make it useful for biofuels production.			
18.16 Describe the process used in producing alcohol from biomass.			BS.03.02.03.b.
18.17 Diagram the process used in producing biodiesel from biomass.			BS.03.02.04.b
18.18 Illustrate the process used in producing methane from biomass.			BS.03.02.05.b
18.19 Describe the selective plant breeding process.			BS.03.03.01.a.

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 3
Course Number: 8106860
Course Credit: 1

Course Description:

This course is designed to enhance competencies in the areas of current agricultural biotechnology applications, genetic principles, tissue/cell culture, and the potential for biotechnology in the area of agriculture.

Florida Standards		Correlation to CTE Program Standard #
19.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology	
	19.01 Key Ideas and Details	
19.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
19.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
19.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	19.02 Craft and Structure	
19.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
19.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
19.02.3	Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
19.03 Integration of Knowledge and Ideas		
19.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
19.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
19.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
19.04 Range of Reading and Level of Text Complexity		
19.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
19.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology		
20.01 Text Types and Purposes		
20.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
20.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
20.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
20.02 Production and Distribution of Writing		
20.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>20.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>20.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
<p>20.03 Research to Build and Present Knowledge</p>	
<p>20.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>20.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>20.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
<p>20.04 Range of Writing</p>	
<p>20.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
<p>21.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology</p>	
<p>21.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>21.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>21.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards	Correlation to CTE Program Standard #
21.04 Model with mathematics.	MAFS.K12.MP.4.1
21.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
21.06 Attend to precision.	MAFS.K12.MP.6.1
21.07 Look for and make use of structure.	MAFS.K12.MP.7.1
21.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.0 Recognize and follow quality control procedures and regulatory guidelines--The student will be able to:			
22.01 Design and conduct an experiment using tools to evaluate biotechnology derived products.			
22.02 Describe the need for and function of regulatory agencies such as those in government, industry, and society.			BS.01.02.01.a
22.03 Discuss quality control as it relates to products, safety, quality to the end user, and meeting regulatory specifications.			
22.04 Perform quality control methods utilizing proper documentation.			
22.05 Conduct a polymerase chain reaction to determine the presence of genetic modifications in a common food item.			
22.06 Troubleshoot aberrant results or parameters.			
23.0 Analyze the historical, social, cultural and potential applications of agricultural biotechnology--The student will be able to:	MAFS.912.S-IC.2 MAFS.912.N-Q.1.3	SC.912.L.16.10 SC.912.L.17.1, 11, 13, 15, 16, 20 SC.912.N.1.4, 5, 6, 7 SC.912.N.3.1, 2, 4, 5 SC.912.N.4.1	
23.01 Research and report on the major innovators and milestones in the development of biotechnology.			BS.01.01.01.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.02 Assess the future impact biotechnology could have on world populations.			BS.01.01.03.c
23.03 Research and debate a major regulatory issue pertaining to biotechnology.			BS.01.01.03.b
23.04 Research, evaluate and articulate the implications of an ethical, legal, social or cultural biotechnology issue in agricultural production.			BS.01.02.01.c
23.05 Debate an ethical issue associated with biotechnology.			BS.01.03.01.c
23.06 Analyze an intellectual property issue associated with bioethics in agricultural production.			BS.01.03.02.c
23.07 Identify and discuss emerging technologies in agriculture production (transgenics, biologics, biosecurity, food safety, sustainability, etc.).			BS.01.03.03.c
23.08 Use web-based resources to find information on the genetic sequence of a protein using bioinformatics.			
24.0 Demonstrate proper tissue/cell culture techniques--The student will be able to:	MAFS.912.S-IC.2 MAFS.912.N-Q.1.3	SC.912.L.14.1, 2, 7, 32 SC.912.L.16.1, 2, 3, 4, 5, 6, 7, 8, 9, 14 SC.912.L.17.13, 20 SC.912.N.1.2 SC.912.P.8.8, 9, 10, 11 SC.912.P.10.7 SC.912.P.12.12, 13	
24.01 Prepare a lab using aseptic techniques for use a tissue culture facility.			BS.02.03.01.a
24.02 Describe the effects of growth hormones on tissue/cell culture.			
24.03 Demonstrate the use of sterile instruments and materials.			
24.04 Produce plants using tissue culture methods and prepare a written report of data and results.			
25.0 Demonstrate the application of biotechnology to the Agriculture, Food and Natural Resources(AFNR) industries--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.14.4, 52 SC.912.L.16.3, 4, 5, 7, 11, 12, 13, 20 SC.912.L.17.13, 14, 15, 18, 19; SC.912.L.18.1, 4, 11 SC.912.N.1.2 SC.912.N.3.5	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.P.8.1, 2, 4, 8, 9, 10, 11, 12, 13 SC.912.P.10.1, 2, 7 SC.912.P.12.12, 13	
25.01 Develop a standard operating procedure for a biological process in agriculture.			
25.02 Maintain and calibrate equipment logs documenting use, maintenance, calibration and repair Simulate the process needed to order, stock, and maintain supplies of biological and chemical materials.			
25.03 Devise a management plan to reduce laboratory waste.			
25.04 Characterize the biochemical properties of proteins.			
25.05 Use antibodies to detect and quantify antigens.			
25.06 Conduct an Enzyme-Linked Immunosorbent Assay (ELISA).			
25.07 Produce ethanol and co-products from biomass.			BS.03.03.08.c
25.08 Produce biodiesel and co-products from biomass.			BS.03.03.08.c
25.09 Produce methane and co-products from biomass.			BS.03.03.08.c
25.10 Evaluate the technologies used to create biofuels from biomass.			
25.11 Discuss (or demonstrate) algae growth (culture to large scale) for biofuel production.			
25.12 Describe the principles (purpose) of centrifugation and filtration.			
25.13 Assess the benefits, risks and opportunities associated with using biotechnology to promote animal health.			BS.03.03.02.b
25.14 Describe the use of biotechnology in bioremediation.			
25.15 Describe the processes involved in biotreatment of biological and chemical wastes.			BS.03.03.05.b
25.16 Explain the global importance of biodiversity.			
25.17 Explain the positive and negative impacts of agricultural practices on wild populations.			BS.03.03.07.a
25.18 Explain how biotechnology tools can be used to monitor the effects of agricultural practices on wild populations.			BS.03.03.07.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
25.19 Describe the processes used in the production of molecules for use in industrial applications.			BS.03.03.09.b
26.0 Demonstrate leadership, employability, communication and human relation skills--The student will be able to:		SC.912.N.1.1, 3, 5, 7 SC.912.N.2.2, 5 SC.912.N.4.1, 2	
26.01 Conduct group meetings using parliamentary procedure and public speaking skills.			
26.02 Follow acceptable work habits, personal characteristics and hygiene habits for the biotechnology workplace.			
26.03 Identify or demonstrate appropriate responses to criticism and coaching from employer, supervisor, or other persons.			CS.03.03.03.c
26.04 Demonstrate appropriate methods for asking questions, and providing constructive criticism and feedback.			
26.05 Conduct a job search and identify advanced training opportunities and the requirements.			CS.02.03.03.a
26.06 Prepare a resume.			CS.03.01.02.b
26.07 Demonstrate appropriate methods for asking questions, and providing constructive criticism and feedback to supervisor, employer, supervisor, or other persons.			

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Biotechnology
Course Number: 8106120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of biotechnology in animal science, animal growth and reproduction, and the role of animals in society.

Florida Standards	Correlation to CTE Program Standard #
19.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology	
19.01 Key Ideas and Details	
19.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
19.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
19.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
19.02 Craft and Structure	
19.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
19.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
19.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
19.03	Integration of Knowledge and Ideas	
19.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
19.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
19.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
19.04	Range of Reading and Level of Text Complexity	
19.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
19.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
20.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology	
20.01	Text Types and Purposes	
20.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
20.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
20.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
20.02	Production and Distribution of Writing	
20.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
20.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
20.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
20.03 Research to Build and Present Knowledge		
20.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
20.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
20.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
20.04 Range of Writing		
20.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
21.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
21.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
21.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
21.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
21.04 Model with mathematics.	MAFS.K12.MP.4.1
21.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
21.06 Attend to precision.	MAFS.K12.MP.6.1
21.07 Look for and make use of structure.	MAFS.K12.MP.7.1
21.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
27.0 Apply genetic principles to animal science--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.15.15 SC.912.L.16.1, 2, 3, 4, 9, 16 SC.912.N.1.1, 3, 4, 6, 7	
27.01 Describe how the concept of heritability is used in the selection of livestock.			
27.02 Chart the difference between phenotypic and genotypic characteristics and determine probabilities.			
27.03 Analyze performance data used in the selection process of livestock.			
27.04 Use computer data to assist in the selection process of livestock.			
27.05 Extract a visible mass of DNA from animal or plant tissue.			
27.06 Develop a hypothetical species using genetic engineering.			
27.07 Debate the safeguards used in research in genetic engineering.			
28.0 Interpret the relationship between total digestible nutrients (TDN) in feeds and its utilization--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.18.1; 2, 3, 4, 6, 9, 10, 11	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.P.8.7, 12 SC.912.P.10.1	
28.01 Determine nutritional requirements of selected animals.			
28.02 Select appropriate feed samples for analysis of nutritional values and develop a balanced ration.			
28.03 Conduct experiments comparing growth rates using selected rations.			
28.04 Compare how the body's cells metabolize fats, carbohydrates and proteins.			
28.05 Analyze the effect of diseases on nutritional utilization.			
29.0 Examine the developmental processes that determine animal growth--The student will be able to:			
29.01 Develop a growth curve using selected animal species.			
29.02 Differentiate between muscle, fat, and bone development.			
29.03 Evaluate the effects of hormones in animal production.			
29.04 Compare morphology of developing embryos.			
29.05 Analyze the diseases that affect development growth.			
30.0 Investigate the reproduction system of animals--The student will be able to:		SC.912.L.16.10, 13	
30.01 Analyze the quality of semen of selected animals.			
30.02 Compare and contrast sperm anatomy of selected animal species.			
30.03 Analyze the factors that affect sperm mobility and development.			
30.04 Compare and contrast the reproductive cycles of selected animal species.			
30.05 Compare and contrast the breeding time and conception rates of selected animal species.			
30.06 Describe the functions of hormones that control reproduction.			
30.07 Discuss the use of hormone therapy to manipulate ovarian activity.			
30.08 Describe and compare the different pathogens that cause animal diseases.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.09 Analyze the mating process of selected animal species.			
31.0 Describe animal science and the role of animals in society--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.16.10 SC.912.L.17.13, 20 SC.912.N.1.1, 3, 4, 6, 7 SC.912.N.2.1, 2 SC.912.P.8.7, 12 SC.912.P.10.1,10	
31.01 Debate current events concerning animal welfare and animal rights.			
31.02 Demonstrate safe procedures when working with animal related equipment in laboratory settings.			
31.03 Practice safety precautions around animals.			
31.04 Analyze the mating process of selected animal species.			
31.05 Develop a research project related to biotechnology and animal science.			
31.06 Discuss the benefits of biotechnology in producing and marketing animals and animal products.			
31.07 Research how biotechnology affects the consumer.			

**Florida Department of Education
Student Performance Standards**

Course Title: Plant Biotechnology
Course Number: 8106510
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of biotechnology in plant science, growth and reproduction, and the role of plants in biotechnology.

Florida Standards		Correlation to CTE Program Standard #
19.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology	
	19.01 Key Ideas and Details	
	19.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	19.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	19.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	19.02 Craft and Structure	
	19.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	19.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	19.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
19.03 Integration of Knowledge and Ideas		
19.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
19.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
19.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
19.04 Range of Reading and Level of Text Complexity		
19.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
19.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology		
20.01 Text Types and Purposes		
20.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
20.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
20.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
20.02 Production and Distribution of Writing		

Florida Standards		Correlation to CTE Program Standard #
20.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
20.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
20.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
20.03 Research to Build and Present Knowledge		
20.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
20.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
20.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
20.04 Range of Writing		
20.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
21.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
21.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
21.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
21.03	Construct viable arguments and critique the reasoning of others.	

Florida Standards		Correlation to CTE Program Standard #
	MAFS.K12.MP.3.1	
21.04 Model with mathematics.	MAFS.K12.MP.4.1	
21.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
21.06 Attend to precision.	MAFS.K12.MP.6.1	
21.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
21.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
32.0 Describe plant classifications and the economic impact to your region--The student will be able to:		SC.912.L.14.7 SC.912.L.15.5, 6	
32.01 Classify plants based upon their regional use and importance.			
32.02 Describe the economic impact of regionally produced products.			
32.03 Describe the regional growing conditions that impact the feasibility of producing particular plant products.			
32.04 Identify economically significant plant families.			
32.05 Identify at least fifty plants by common and scientific names.			
33.0 Apply genetic principles to plant improvement--The student will be able to:		SC.912.L.14.7 SC.912.L.15.15 SC.912.L.16.1, 2, 3	
33.01 Describe the relationship between reproduction and plant improvement.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.02 Demonstrate the reproductive cycle in seed plants, angiosperms and gymnosperms, mosses and ferns.			
33.03 Describe how genetic processes and structures control inheritance in plants.			
33.04 Explain polyploidy in both natural settings and in commercial plant production.			
33.05 Differentiate phenotypic versus genotypic expression in plant crosses.			
33.06 Describe the processes used for mutation induction.			
34.0 Demonstrate methods of micropropagating plants--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.N.1.1	
34.01 Evaluate the advantages and disadvantages of using micropropagation techniques.			
34.02 Demonstrate aseptic/sterile technique.			
34.03 Prepare and mix stock solutions of media for micro-propagation.			
34.04 Produce a crop using tissue culture methods and prepare a written report of results.			
34.05 Propagate plants using tissue culture techniques for producing synthetic seed culture.			
34.06 Develop and write a protocol to insert a gene of interest in plants.			
34.07 Propagate plants using cell cultures, callus culture, and algae culture.			
34.08 Research uses of cryopreservation in seed and in-vitro propagation methods.			
35.0 Demonstrate methods of plant production--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.N.1.1	
35.01 Evaluate the advantages and disadvantages of non-traditional crop production techniques (hydroponic/substrate, greenhouse, tunnel/hoop, etc.).			
35.02 Demonstrate different production methods used in hydroponics production.			
35.03 Determine the cultural needs in hydroponics production.			
35.04 Describe crops grown commercially by non-traditional techniques in your region.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
36.0 Use plants to demonstrate growth disorders (nutrients, pathogens, pests)-- The student will be able to:		SC.912.L.14.2 SC.912.L.18.12 SC.912.P.8.7, 12	
36.01 Identify plant nutrient-related disorders.			
36.02 Identify pathogen-related disorders in plants.			
36.03 Identify pest-related disorders in plants.			
36.04 Discuss how IPM and biotechnology are used to solve plant disorders.			
36.05 Prepare plant tissue samples for submission to determine nutrient levels.			
36.06 Demonstrate factors that affect the nutrient levels in plant tissue.			
37.0 Identify the historical, social, cultural and potential applications of plant biotechnology--The student will be able to:		SC.912.L.16.10 SC.912.N.1.3, 4, 6, 7 SC.912.N.2.1, 2	
37.01 Research and report on the major innovators and milestones in the development of biotechnology.			
37.02 Analyze the scope and impact of plant biotechnology in today's global society.			
37.03 Assess the future impact plant biotechnology could have on world populations.			
37.04 Research, evaluate, and articulate a major regulatory issue pertaining to plant biotechnology.			
37.05 Research, evaluate, and articulate the implications of an ethical, legal, social, or cultural biotechnology issue in plant production.			
37.06 Research and debate an ethical issue associated with plant biotechnology.			
37.07 Analyze an intellectual/genetic property issue associated with bioethics in plant production.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)
- Agricultural Biotechnology 3 (8106860)

**Florida Department of Education
Curriculum Framework**

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

Secondary – Career Preparatory

Program Number	8005100
CIP Number	0101020500
Grade Level	9-12, 30, 31
Standard Length	5 credits
Teacher Certification	AGRICULTUR 1 @2 AGRI MECH #7
CTSO	FFA
SOC Codes (all applicable)	49-3041- Farm Equipment Mechanics and Service Technicians 45-2091 - Agricultural Equipment Operators
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 mechanics industry within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to mechanical operations, welding, small engine maintenance and repair, 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 consisting two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	45-2091	3
	8005110	Technical Agricultural Operations 2	1 credit		2
	8005120	Technical Agricultural Operations 3	1 credit		2
B	8005130	Technical Agriculture Operations 4	1 credit	49-3041	2
	8005140	Technical Agriculture Operations 5	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Technical Agriculture Operations 2	^^	^^	^^	2/53 4%	13/52 25%	4/56 7%	11/55 20%	9/58 16%	3/35 9%	8/42 19%	15/56 27%	18/53 34%
Technical Agriculture Operations 3	^^	^^	^^	2/53 4%	14/52 27%	7/56 13%	23/55 42%	15/58 26%	6/35 17%	14/42 33%	25/56 45%	26/53 49%
Technical Agriculture Operations 4	^^	^^	^^	#	3/52 6%	#	6/55 11%	3/58 5%	1/35 3%	1/42 2%	5/56 9%	4/53 8%
Technical Agriculture Operations 5	^^	^^	^^	#	2/52 4%	#	1/55 2%	2/58 3%	#	#	5/56 9%	6/53 11%

^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review
Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Technical Agriculture Operations.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Technical Agriculture Operations.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Technical Agriculture Operations.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Practice personal, equipment, and shop safety.
- 14.0 Select and use hand and power tools.
- 15.0 Install simple electrical circuits.
- 16.0 Plan, draw, and construct a project.
- 17.0 Perform basic plumbing procedures.
- 18.0 Mix and pour concrete and use masonry materials.
- 19.0 Construct and maintain agricultural structures.
- 20.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 21.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 22.0 Demonstrate employability skills.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Technical Agriculture Operations.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Technical Agriculture Operations.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Technical Agriculture Operations.
- 26.0 Demonstrate electric and gas welding.
- 27.0 Service and maintain small gasoline engines.
- 28.0 Perform preventative maintenance, checks, and services for agricultural equipment.
- 29.0 Perform minor repairs on an irrigation system.
- 30.0 Discuss the role of refrigeration in agriculture.
- 31.0 Demonstrate knowledge of new and emerging technologies in agriculture.

- 32.0 Explain the components of the American business system.
- 33.0 Investigate agricultural cooperatives structure and function.
- 34.0 Apply basic financial management skills.
- 35.0 Keep records.
- 36.0 Weld, braze, and cut, using appropriate equipment.
- 37.0 Operate, service, test, and maintain agricultural machinery and equipment.
- 38.0 Demonstrate positive customer-relations skills.
- 39.0 Diagnose, service, and repair the lubrication system.
- 40.0 Test, repair and/or replace, and maintain the cooling system.
- 41.0 Test, repair and/or replace the intake, exhaust, and turbo-charged systems.
- 42.0 Test, repair and/or replace the fuel-delivery system, using service manuals.
- 43.0 Test, repair and/or replace, and maintain the brake system.
- 44.0 Diagnose, service, repair, and maintain the hydraulic system.
- 45.0 Diagnose, service, and repair transmission systems.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Technical Agriculture Operations.	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Technical Agriculture Operations.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Technical Agriculture Operations.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.			CS.11.01.01 CS.11.02.01
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b .
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a .
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c . PST.01.03.01.a .
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Technical Agriculture Operations 2
Course Number: 8005110
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; selection and use of tools; planning and building projects and construction of agricultural structures, including the use of electrical circuits, plumbing, concrete and masonry; and employability skills.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Technical Agriculture Operations	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Technical Agriculture Operations	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Technical Agriculture Operations	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Practice personal, equipment, and shop safety--The student will be able to:			
13.01 Identify and eliminate hazards in agricultural mechanics settings.			
13.02 Observe color-coded warnings in work areas and on equipment and machinery.			
13.03 Describe appropriate actions in case of fire, accident, or other emergencies.			CS.07.03.01.b
13.04 Describe personal protective equipment (PPE) and appropriate clothing.			CS.06.02.01.a
13.05 Demonstrate safety procedures and workplace "housekeeping" practices.			CS.06.03.01.a
13.06 Safely handle and store flammable and non-restricted chemicals.			CS.07.04.02.a
13.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.			CS.08.01.02.a
13.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.			CS.07.04.01.a
13.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).			CS.07.04.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.0 Select and use hand and power tools--The student will be able to:			
14.01 Identify the capabilities and limitations of hand and power tools.			
14.02 Select and safely use hand and power tools.			CS.08.01.01.c CS.08.01.02.a
14.03 Select and use proper PPE for hand and power tools.			CS.06.02.01.a
14.04 Identify worn, damaged, or abused tools.			
14.05 Select and demonstrate the appropriate procedures for sharpening tools.			
14.06 Demonstrate the use of measurement tools common to agriculture.			
15.0 Install simple electrical circuits--The student will be able to:		SC.912.P.10.2, 13, 14, 15, 17;	
15.01 Demonstrate the principles of AC and DC circuitry.			PST.03.04.02. a
15.02 Demonstrate series and parallel circuitry.			PST.03.04.01. b
15.03 Explain the scientific principles of electrical systems.			
15.04 Plan and install a simple wiring circuit.			PST.03.04.01. b
15.05 Test electrical circuits using a multi-test meter.			
15.06 Identify and describe the use and function of sensors in Agriculture			
16.0 Plan, draw, and construct a project--The student will be able to:			
16.01 Plan and sketch a project.			PST.04.01.01. a
16.02 Design and draw a project using drawing instruments and/or computer-assisted design (CAD) software.			PST.04.01.01. b PST.04.01.01. c
16.03 Calculate a bill of materials.			PST.04.01.02. a
16.04 Construct a project.			PST.04.04.01. a
16.05 Identify and select appropriate finishes (such as paint, varnish, and			PST.04.04.03. b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
stain).			
17.0 Perform basic plumbing procedures--The student will be able to:			
17.01 Identify and select plumbing materials and tools.			
17.02 Plan and construct a simple water-delivery system.			
17.03 Troubleshoot and perform minor plumbing repairs.			PST.04.04.01. b
17.04 Locate the state and local codes and standards and describe the importance of complying with them.			PST.04.02.03. b
18.0 Mix and pour concrete and use masonry materials--The student will be able to:			
18.01 Calculate concrete and other materials for a masonry project.			PST.04.04.05. a
18.02 Prepare forms; mix and pour concrete.			PST.04.04.05. b
19.0 Construct and maintain agricultural structures--The student will be able to:		SC.912.P.12.2, 3, 4, 5, 6, 9, 11, 13;	
19.01 Read and interpret basic construction plans.			PST.04.02.01. a
19.02 Lay out an agricultural structure for construction with the use of a transit.			
19.03 Demonstrate basic carpentry construction and procedures.			
19.04 Construct a fence.			PST.04.04.06. b
19.05 Maintain and repair agricultural structures.			
20.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
20.01 Assess the agricultural impact upon the US gross national product and the total global economy.			CS.09.01.01.c
20.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.			
20.03 Identify and describe the primary government agencies involved with agriculture.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
20.04 Research new and emerging technologies and their impact on the economy.			CS.10.02.01.b
20.05 Recognize the value of the food and agribusiness industry.			
21.0 Examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:			
21.01 Explore agriculture and agribusinesses and their role in the economy.			
21.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
21.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.			
21.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.			
22.0 Demonstrate employability skills--The student will be able to:		SC.N.1.1	
22.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.			
22.02 Identify the documents that are required for a job application.			
22.03 Complete a job application form.			
22.04 Demonstrate competencies in job-interview techniques.			

**Florida Department of Education
Student Performance Standards**

Course Title: Technical Agriculture Operations 3
Course Number: 8005120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; refrigeration; new and emerging technologies; financial management skills; and employability skills.

Florida Standards	Correlation to CTE Program Standard #
23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Technical Agriculture Operations	
23.01 Key Ideas and Details	
23.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
23.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
23.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
23.02 Craft and Structure	
23.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
23.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
23.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved.	LAFS.1112.RST.2.6
23.03	Integration of Knowledge and Ideas	
23.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.	LAFS.1112.RST.3.7
23.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	LAFS.1112.RST.3.8
23.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	LAFS.1112.RST.3.9
23.04	Range of Reading and Level of Text Complexity	
23.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
23.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.	LAFS.1112.RST.4.10
24.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Technical Agriculture Operations	
24.01	Text Types and Purposes	
24.01.1	Write arguments focused on discipline-specific content.	LAFS.1112.WHST.1.1
24.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	LAFS.1112.WHST.1.2
24.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	LAFS.1112.WHST.1.3
24.02	Production and Distribution of Writing	
24.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.WHST.2.4	
24.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	
	LAFS.1112.WHST.2.5	
24.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	
	LAFS.1112.WHST.2.6	
24.03	Research to Build and Present Knowledge	
24.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
	LAFS.1112.WHST.3.7	
24.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	
	LAFS.1112.WHST.3.8	
24.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	
	LAFS.1112.WHST.3.9	
24.04	Range of Writing	
24.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	
	LAFS.1112.WHST.4.10	
25.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Technical Agriculture Operations	
25.01	Make sense of problems and persevere in solving them.	
	MAFS.K12.MP.1.1	
25.02	Reason abstractly and quantitatively.	
	MAFS.K12.MP.2.1	
25.03	Construct viable arguments and critique the reasoning of others.	
	MAFS.K12.MP.3.1	
25.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
25.06 Attend to precision.	MAFS.K12.MP.6.1
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.0 Demonstrate electric and gas welding--The student will be able to:		SC.912.P.10.2, 13, 14, 15, 17;	
26.01 Select and use gas to complete a weld.			PST.04.04.07. b PST.04.04.07. c
26.02 Select and use electric arc to complete a weld.			PST.04.04.07. b PST.04.04.07. c
27.0 Service and maintain small gasoline engines--The student will be able to:		SC.P.10.3, 4, 5, 6, 8; SC.912.P.12.1, 2, 7;	
27.01 Explain the scientific principles of small engines.			
27.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).			PST.03.01.02. a
27.03 Practice appropriate safety precautions.			PST.02.02.02. b
27.04 Troubleshoot and perform minor repairs on small gasoline engines.			PST.03.01.01. c
28.0 Perform preventive maintenance, checks, and services for agricultural equipment--The student will be able to:		SC.912.P.8.2; SC.912.9.10.8;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.P.12.2, 12	
28.01 Explain the scientific principles of hydraulic and transmission systems.			PST.03.02.01. a PST.03.03.01. b
28.02 Perform daily operator maintenance checks for equipment.			
28.03 Determine the preventive-maintenance procedures, using the equipment's operator manual.			
28.04 Perform scheduled preventive-maintenance procedures.			
28.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.			
28.06 Keep records of equipment maintenance and services.			
29.0 Perform minor repair on an irrigation system--The student will be able to:		SC.912.P.8.11	
29.01 Identify the basic components of irrigation systems.			
29.02 Differentiate various types of irrigation systems.			
29.03 Identify state and local regulatory agencies for water management.			
29.04 Perform minor repair on an irrigation system.			
30.0 Discuss the role of refrigeration in agriculture.—The student will be able to:			
30.01 Describe the primary components of a refrigeration system.			
31.0 Demonstrate knowledge of new and emerging technologies in agriculture.—The student will be able to:		SC.912.L. 17.11, 15, 19; SC.912.P.8.10, 12; SC.912.P.10.1, 2;	
31.01 Discuss new power technologies.			
31.02 Discuss developing energy sources			
31.03 Discuss energy management issues.			
32.0 Explain the components of the American business system.—The student			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
will be able to:			
32.01 Describe the five basic ways American business is organized.			
32.02 Distinguish and identify between the characteristics of each method of doing business.			
32.03 Evaluate the advantages and disadvantages provided by each business method.			
32.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			
33.0 Investigate agricultural cooperatives structure and function.—The student will be able to:			
33.01 Explain the definition of a cooperative.			
33.02 Understand the history of cooperative principles and practices.			
33.03 Describe the five areas that classify cooperative structure.			
33.04 Distinguish and identify between the five types of cooperative structure and their functions.			
34.0 Apply basic financial-management skills--The student will be able to:			
34.01 Complete basic financial records.			
34.02 Demonstrate the use of banking procedures.			
34.03 Calculate interest on loans.			
34.04 Complete selected income-tax-return forms.			

**Florida Department of Education
Student Performance Standards**

Course Title: Technical Agriculture Operations 4
Course Number: 8005130
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; refrigeration; new and emerging technologies; financial management skills; and employability skills.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Technical Agriculture Operations	
23.01	Key Ideas and Details	
23.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
23.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
23.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
23.02	Craft and Structure	
23.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
23.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
23.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
23.03 Integration of Knowledge and Ideas		
23.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
23.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
23.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
23.04 Range of Reading and Level of Text Complexity		
23.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
23.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Technical Agriculture Operations		
24.01 Text Types and Purposes		
24.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
24.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
24.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
24.02 Production and Distribution of Writing		
24.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
24.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
24.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
24.03 Research to Build and Present Knowledge		
24.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
24.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
24.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
24.04 Range of Writing		
24.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
25.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Technical Agriculture Operations.	
25.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
25.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
25.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
25.04 Model with mathematics.	MAFS.K12.MP.4.1
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
25.06 Attend to precision.	MAFS.K12.MP.6.1
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
35.0 Keep records--The student will be able to:			
35.01 Explain the purpose and importance of keeping records.			
35.02 Demonstrate procedures for keeping records of equipment maintenance and services.			
35.03 Keep records on each job or project assignment.			
35.04 Complete work orders, service invoices, and requisitions.			
35.05 Prepare a written cost estimate of repair work.			
36.0 Weld, braze, and cut, using appropriate equipment--The student will be able to:		SC.912.E.6.6; SC.912.P.8.2, 4, 6, 10, 12, 13; SC.912.P.10.4, 5; SC.912.P.12.9, 12	
36.01 Set up, adjust, operate, and maintain MIG (metal inert gas) and TIG (tungsten inert gas) welding equipment.			PST.04.04.07
36.02 Set up, adjust, and operate plasma cutting equipment.			PST.04.04.07

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
36.03 Select recommended operational procedures and supplies for specific jobs.			
36.04 Practice all recommended safety precautions.			
36.05 Demonstrate the different welding positions.			PST.04.04.07
36.06 Cut and pierce metals, using oxyacetylene and plasma.			PST.04.04.07
36.07 Braze metals.			PST.04.04.07
36.08 Describe the process of hard-surfacing.			
36.09 Store welding equipment and supplies according to the recommended storage procedures.			
37.0 Operate, service, test, and maintain agricultural machinery and equipment--The student will be able to:			
37.01 Operate, diagnose, and adjust agricultural machinery and equipment that are used in the local area, according to the operator's manuals.			
37.02 Diagnose, remove, clean, test, repair, and reinstall parts of machinery and equipment, using repair manuals.			
37.03 Test GPS and precision farming equipment.			PST.05.03.01
37.04 Follow safety precautions when operating, servicing, and maintaining machines and equipment.			
38.0 Demonstrate positive customer-relations skills--The student will be able to:			
38.01 Exercise self-control.			
38.02 Identify and demonstrate appropriate responses to criticism.			
38.03 Explain the effects of positive human-relations skills on success in the business.			
38.04 Demonstrate respect for people and property.			

**Florida Department of Education
Student Performance Standards**

Course Title: Technical Agriculture Operations 5
Course Number: 8005140
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of service, repair and maintenance of the following: the lubrication system; the cooling system; the intake, exhaust, and turbo-charged systems; the fuel-delivery system; hydraulics and pneumatics; transmissions; and the brake system.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
39.0 Diagnose, service, and repair the lubrication system--The student will be able to:		SC.912.P.10.3, 4, 5, 6, 8; SC.912.P.12.1, 2, 7	
39.01 Change oil filters.			
39.02 Check and change oils and other lubricants in engines.			
39.03 Diagnose and replace damaged or worn components of the system.			
40.0 Test, repair and/or replace, and maintain the cooling system--The student will be able to:		SC.912.P.10.3, 4, 5, 6, 8; SC.912.P.12.1, 2, 7	
40.01 Test coolant.			PST.03.05.01. c
40.02 Flush and clean the system.			PST.03.05.01. c

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
40.03 Test, repair and/or replace parts of the system.			PST.03.05.01. c
40.04 Adjust parts of the system for proper operation.			PST.03.05.01. c
41.0 Test, repair and/or replace the intake, exhaust, and turbo-charged systems--The student will be able to		SC.912.P.10.3, 4, 5, 6, 8; SC.912.P.12.1, 2, 7	
41.01 Troubleshoot the intake, exhaust, and turbo-charged systems, using recommended diagnostic equipment.			
41.02 Repair and replace parts of the systems.			
41.03 Service and adjust the systems for proper operation.			
42.0 Test, repair and/or replace the fuel-delivery system, using service manuals--The student will be able to:			
42.01 Remove, clean, rebuild, and reinstall carburetors.			
42.02 Bleed the diesel-fuel system.			
42.03 Remove and reinstall a diesel-fuel-injection pump, according to the manufacturer's specifications.			
42.04 Replace components of the fuel system.			
42.05 Service and adjust parts of the fuel system for proper operation.			
42.06 Service electronic fuel injection for gas engines.			
43.0 Test, repair and/or replace, and maintain the brake system--The student will be able to:			
43.01 Drain, refill, and adjust the brake system.			
43.02 Repair and replace parts of the system.			
43.03 Service and adjust the system for proper operation.			
44.0 Diagnose, service, repair, and maintain the hydraulic system--The student will be able to:		SC.912.P.10.3, 4, 5, 5, 6, 8; SC.912.P.12.1, 2;	
44.01 Change filters and drain, flush, and refill the hydraulic system.			
44.02 Troubleshoot hydraulic-system components, using recommended			PST.03.03.03. c

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
diagnostic equipment.			
44.03 Repair and replace parts of the system.			PST.03.03.03. c
44.04 Service and adjust the system for proper operation			PST.03.03.03. c
45.0 Diagnose, service, and repair transmission systems--The student will be able to:		SC.912.P.10.3, 4, 5, 5, 6, 8; SC.912.P.12.1, 2;	
45.01 Troubleshoot transmission components, using recommended diagnostic equipment.			
45.02 Repair and replace parts of transmission systems.			
45.03 Service and adjust parts of different transmission systems for proper operation.			
45.04 Service and repair transfer case			
45.05 Troubleshoot transfer case components.			
45.06 Service and adjust system components.			
45.07 Repair and replace system components.			
45.08 Change filters and drain, flush, and refill the transfer case system.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Environmental Water Technology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8007100
CIP Number	0715050608
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	ENV WAT TEC 7G
CTSO	FFA
SOC Codes (all applicable)	51-8031 - Water and Wastewater Treatment Plant and System Operators
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 & 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 & Natural Resources career cluster.

The content includes but is not limited to applications of water resource management, application of safety procedures, record keeping and sampling, wetland management, reclamation treatment techniques, solid waste disposal, storm water management, hazardous material storage, government water technology regulations, filtrations, sedimentation, fluoridation process, and perform maintenance and inspections on equipment..

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 consisting of three courses and one occupational completion point points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8007110	Introduction to Environmental Water Technology	1 credit	51-8031	2
	8007120	Intermediate Environmental Water Technology	1 credit		2
	8007130	Advanced Environmental Water Technology	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Introduction to Environmental Water Technology	∞	∞	∞	9/53 17%	13/52 25%	22/56 39%	25/55 46%	21/58 36%	13/35 37%	26/42 62%	26/56 46%	16/53 30%
Intermediate Environmental Water Technology	∞	∞	∞	3/53 6%	12/52 23%	13/56 23%	27/55 49%	15/58 29%	3/35 9%	28/42 66%	23/56 41%	18/53 34%

Advanced Environmental Water Technology	∞	∞	∞	**	**	**	**	**	**	**	**	**
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∞ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Water Technology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Water Technology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Water Technology.
- 04.0 Identify the historical, social, cultural and potential applications of water resource management.
- 05.0 Describe and discuss hydrology.
- 06.0 Practice safety skills and procedures.
- 07.0 Demonstrate record keeping and sampling procedures.
- 08.0 Describe and discuss geologic principles of water resources.
- 09.0 Manage wetlands.
- 10.0 Identify career opportunities and organizational dynamics.
- 11.0 Apply scientific and technological principles.
- 12.0 Describe water reclamation treatment techniques.
- 13.0 Collect and dispose of solid waste.
- 14.0 Explain water treatment techniques.
- 15.0 Discuss and manage stormwater systems.
- 16.0 Describe water distribution.
- 17.0 Demonstrate the management and environmentally sound use of water resources.
- 18.0 Maintain water treatment equipment and facilities.
- 19.0 Discuss related standards and regulations.
- 20.0 Conduct site assessment.
- 21.0 Practice safety skills and procedures.
- 22.0 Manage data and physical resources.
- 23.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
- 24.0 Control incidents.
- 25.0 Prepare a plan.
- 26.0 Perform remediation.
- 27.0 Collect and dispose of solid waste.
- 28.0 Identify continuing education needs and opportunities.
- 29.0 Conduct recordkeeping and sampling procedures.
- 30.0 Review stormwater permit procedures.
- 31.0 Demonstrate the use of industry appropriate tools, equipment, and instruments
- 32.0 Demonstrate industry specific mathematical calculations.
- 33.0 Demonstrate industry specific science skills and techniques.
- 34.0 Identify career opportunities and organizational dynamics in water resources.

- 35.0 Demonstrate water treatment techniques.
- 36.0 Discuss an Industrial Pretreatment Program/Inspection.
- 37.0 Discuss comprehensive quality assurance plan.
- 38.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Environmental Water Technology.
- 39.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Environmental Water Technology.
- 40.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Environmental Water Technology.
- 41.0 Identify professions related to the water technology field.
- 42.0 Identify scientific concepts common in water and wastewater treatment.
- 43.0 Identify safety hazards associated with water technologies.
- 44.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 45.0 Solve basic math problems common to water technologies.
- 46.0 Define pumping and basic hydraulic principles.
- 47.0 Define principles of disinfection.
- 48.0 Define sampling techniques.
- 49.0 Define federal, state, and local regulations that apply to water technologies.
- 50.0 Demonstrate employability skills.
- 51.0 Identify sampling techniques and explain the significance of the steps.
- 52.0 Identify chemical, biological, and physical constituents of water entering the water treatment facility or distribution systems.
- 53.0 Describe the principles, operational and troubleshooting practices of the aeration process.
- 54.0 Describe the principles, operational and troubleshooting practices of the mixing, coagulation, and flocculation processes.
- 55.0 Describe the principles, operational and troubleshooting practices of the sedimentation process.
- 56.0 Describe the principles, operational and troubleshooting practices of the filtration process.
- 57.0 Describe the principles, operational and troubleshooting practices of the water-softening process.
- 58.0 Describe the principles, operational and troubleshooting practices of the stabilization process.
- 59.0 Describe the principles, operational and troubleshooting practices of the corrosion control process.
- 60.0 Describe the principles, operational and troubleshooting practices of the disinfection process.
- 61.0 Describe the principles, operational and troubleshooting practices for the control and treatment of trihalomethanes.
- 62.0 Describe the principles, operational and troubleshooting practices of the iron and manganese removal processes.
- 63.0 Describe the principles, operational and troubleshooting practices for taste and odor control.
- 64.0 Describe the principles, operational and troubleshooting practices of the demineralization processes.
- 65.0 Describe the principles, operational and troubleshooting practices of the fluoridation process.
- 66.0 Identify facility operational problems.
- 67.0 Describe basic hydraulics and pumping operations.
- 68.0 Identify appropriate federal, state, and local regulations for the operation and maintenance of a public potable water facility.
- 69.0 Perform equipment inspection, and identify basic maintenance for the treatment train, treatment residuals disposal, and solids management.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Environmental Water Technology
Course Number: 8007110
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of hydrology, safety skills and procedures, geological principles of water resources, management of wetlands, storm water systems, environmental water resources, equipment and facility maintenance, scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Standards included in this course of instruction have been aligned to the academic courses shown below. This table shows the number of aligned benchmarks, the total number of academic benchmarks, and the percentage of alignment.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Water Technology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text,	

Florida Standards		Correlation to CTE Program Standard #
	including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. LAFS.910.RST.4.10	
01.04.2		By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Water Technology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Water Technology.		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.2.1
03.03 Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Identify the historical, social, cultural and potential applications of water resource management--The student will be able to:		SC.912.E.7.8; HE.912.C.1.3; SC.912.L.15.8, 13; SC.912.L.16.4, 7, 8, 9, 10, SC.912.L.17.1, 8, 11, 16, 19, 20; SC.912.L.18.12; SC.912.N.1.1	
04.01 Explain the developmental progression of water resource management.			
04.02 Research emerging problems and issues with water resource management.			
04.03 Explain the global importance of water conservation.			
04.04 Explain international issues affecting water resources and water quality.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.05 Compare practices that either enhance or hinder water quality.			
04.06 Differentiate between point and non-point sources of pollution.			
04.07 Identify diseases and illnesses associated with water borne pathogens.			
04.08 Explain methods to control and eradicate diseases and illnesses associated with water borne pathogens.			
04.09 Explain the significance genetic factors, environmental factors and pathogenic agents to health from the perspective of both individual and public health.			
04.10 Analyze how population size is affected by water quantity and quality.			
04.11 Evaluate the cost and benefits of renewable and nonrenewable resources such as water, energy, fossil fuels, flora and fauna.			
04.12 Predict the impact of individuals on water quality and quantity and how human lifestyles affect sustainability.			
04.13 Discuss the special properties of water that contribute to earth's suitability as an environment for life.			
05.0 Describe and discuss hydrology--The student will be able to:		SC.912.E.5.2, 4; SC.912.E.6.2, 3, 4, 5; SC.912.E.7.1, 3; SC.912.L.17.16; SC.912.P.8.1, 5, 7	
05.01 Define basic hydrological terms.			ESS.03.03.02.a ESS.03.03.02.b
05.02 Explain surface water systems.			ESS.03.03.02.a ESS.03.03.02.b
05.03 Explain ground water systems.			ESS.03.03.02.c ESS.03.03.03.a ESS.03.03.03.b ESS.03.03.03.C
05.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.			
05.05 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.			
05.06 Identify alternative sources of water.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.07 Identify soil conditions as they relate to water quality.			ESS.03.02.03
05.08 Research and explain saltwater intrusion.			
05.09 Identify and discuss water wells and water reservoirs.			
06.0 Practice safety skills and procedures--The student will be able to:		SC.912.P.8.5, 7, 11	
06.01 Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment.			CS.06.02.01.a CS.07.01.01.b
06.02 Identify and utilize safe work practices.			CS.06.02.01.a
06.03 Identify physical, chemical, biological, and zoological hazards.			
06.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Agency (OSHA), and Hazard Communication (HAZCOM) regulations.			
06.05 Determine, review, and follow regulations.			
06.06 Develop and maintain appropriate safety records.			
06.07 Identify and describe "on the job" hazards and risks including fire/explosive, lead asbestos, weather hazards and emergency response preparedness			
06.08 Perform lifting activities safely.			
06.09 Identify ladder safety and fall protection.			
06.10 Become certified in first aid/CPR and describe First Responder responsibilities.			CS.07.02.01.c
07.0 Demonstrate record keeping and sampling procedures--The student will be able to:		SC.912.N.1.1, 4, 6; SC.912.P.8.8, 11;	
07.01 Define sampling objectives, protocol and Chain of Custody.			ESS.01.01.01.a
07.02 Operate, calibrate, and maintain sampling equipment.			ESS.01.01.02.c
07.03 Develop sampling strategy.			ESS.01.01.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
07.04 Perform applicable field measurements including pH, dissolved oxygen, temperature, chlorine residual, and turbidity.			
07.05 Appropriately preserve, document, and dispose of samples.			
07.06 Identify cross-contamination and other risks associated with sampling.			
07.07 Describe, plan, and utilize quality assurance practices.			
07.08 Submit samples for analysis.			ESS.01.01.01.b
07.09 Perform periodic follow-up sampling.			
07.10 Identify permit requirements and procedures.			
07.11 Define and follow federal, state and local sampling guidelines.			
08.0 Describe and discuss geologic principles of water resources--The student will be able to:		SC.912.E.6.1, 2, 4; SC.912.L.17.13; SC.912.P.8.6, 7, 8, 11	
08.01 Explain the geological history of Florida.			
08.02 Create a soil profile and describe the associated components.			
08.03 Evaluate soil profiles, land-capability classes, and soil conservation practices.			
08.04 Interpret legal descriptions of land.			
08.05 Identify mapping and surveying techniques and equipment.			
08.06 Analyze local mineral resources.			
08.07 Describe lithological descriptions of local units/formations.			
08.08 Describe Florida aquifer system.			
08.09 Discuss basic groundwater chemistry.			
08.10 Describe local geology related problems.			
09.0 Manage wetlands--student will be able to:		SC.912.E.5.4; SC.912.L.14.35; SC.912.L.17.4, 8,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		16, 19, 20;	
09.01 Identify ecosystems.			
09.02 Discuss the structure and function of wetlands.			ESS.03.04.01.b
09.03 Define limits of wetlands.			
09.04 Discuss habitat value.			
09.05 Identify fauna and flora.			ESS.03.04.02
09.06 Determine desirable vs. nuisance plant and animal species.			
09.07 Describe changes in ecosystems resulting from seasonal variations, climate change, environmental impacts, and succession.			
09.08 Explain the general distribution of life in aquatic systems as a function of effluent discharge, stormwater runoff and drought.			
10.0 Identify career opportunities and organizational dynamics--The student will be able to:			
10.01 Describe the nature and origin of career opportunities in water, water reclamation and environmental industries.			CS.02.03.01.a
10.02 Compare supervisory and administrative responsibilities.			
10.03 Identify organizational structures.			
10.04 Identify team building communication skills.			CS.01.01.01.a
10.05 Identify problem-solving techniques.			CS.02.04.02.c
10.06 Identify employee responsibility/benefits.			
10.07 Identify legal aspects of personnel relations.			
10.08 Communicate effectively in verbal, written, and nonverbal modes.			
10.09 Recognize and demonstrate good listening skills.			
10.10 Conduct small informal and formal group meetings.			
10.11 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
10.12 Recognize and demonstrate effective communications skills in the workplace.			
10.13 Identify related associated professional associations.			
10.14 List and describe the careers associated with water treatment, distribution, and management.			
10.15 Determine the educational requirements and experience needed to enter and advance in water, water reclamation and environmental occupations.			
11.0 Apply scientific and technological principles--The student will be able to:			
11.01 Employ scientific measurement skills.			BS.02.02.01.b
11.02 Demonstrate safe and effective use of common laboratory equipment.			
11.03 Implement the scientific method and science process skills through the design and completion of a research project.			
11.04 Interpret, analyze, and report data.			
11.05 Evaluate advances in biotechnology and its impact on water resources.			
11.06 Compare and contrast structure and function of various types of microscopes.			
12.0 Describe reclaimed water treatment techniques--The student will be able to:		SC.912.L.17.16, 19, 20 SC.912.L.18.6, 8;	
12.01 Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater.			
12.02 Describe disposal options.			
12.03 Identify septic tanks types and functions.			
12.04 Apply principles of nutrients, water and waste management to environmental problems.			
13.0 Collect and dispose of solid waste--The student will be able to:		SC.912.17.16, 19, 20	
13.01 Describe history of solid waste disposal.			
13.02 Identify types of waste.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.03 Identify household hazardous waste collection and disposal programs.			
13.04 Research and evaluate solid waste disposal options. (landfill, incineration, and composting, etc.)			
14.0 Explain water treatment techniques--The student will be able to:		SC.912.E.6.5; SC.912.L.17.16, 19, 20; SC.912.L.18.6, 8; SC.912.P.8.2;	
14.01 Describe drinking water treatments.			
14.02 Identify and describe the desirable water qualities.			
14.03 Explain how changes in water quality affect life cycles.			
14.04 Explain, monitor, and maintain freshwater/salt water quality standards.			
14.05 Calculate volume in circular, rectangular and irregular shaped water structures.			
14.06 List and explain sources of pollution and methods of preventing and/or correcting these pollution problems.			
15.0 Discuss and manage stormwater systems--The student will be able to:		SC.912.E.6.2; SC.912.L.17.16, 19, 20;	
15.01 Determine boundaries of watersheds.			
15.02 Identify runoff coefficients.			
15.03 Identify the relationship between construction sites and stormwater systems.			
15.04 Research rules and regulations in regards to stormwater systems.			
15.05 Contact local municipalities to determine stormwater regulations.			
15.06 Research current construction trends and methods of stormwater systems.			
15.07 Define topography and its effects on stormwater.			
15.08 Discuss the affects that uncollected stormwater has on lakes, rivers, ponds and wetlands.			
16.0 Describe water distribution--The student will be able to:		SC.912.P.12.11	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.01 Identify the need for backflow prevention and cross connections controls.			
16.02 Identify necessary equipment for water distribution purposes e.g.; pumps, motors, valves, storage tanks, pipes and fittings.			
16.03 Read and maintain meters.			
16.04 Identify maintenance requirements for fire hydrants, pipes, and valves.			
16.05 Identify proper procedures for operation and maintenance of lift stations.			
16.06 Discuss importance of period flushing of water distribution systems.			
17.0 Demonstrate the management and environmentally sound use of water resources--The student will be able to:			
17.01 Determine quality of groundwater and surface water.			
17.02 Identify solids and dissolved solids found in water.			
17.03 Identify primary and secondary contaminants.			
17.04 Identify unregulated organic compounds.			
18.0 Maintain water treatment equipment and facilities--The student will be able to:		SC.912.N.1.1; SC.912.P.10.4, 5, 7;	
18.01 Research water treatment equipment and facility components.			
18.02 Identify appropriate temperatures and other external conditions.			
18.03 Identify the effect of weather conditions and changes.			
18.04 Describe appropriate flow rates and tank levels.			
18.05 Create a checklist and/or policies of necessary procedures to handle daily conditions, hazards and/or malfunctions.			
18.06 Describe maintenance procedures and techniques of filters, pipes, generators, meters, motors, valves, instruments, injectors, storage basins etc.			

**Florida Department of Education
Student Performance Standards**

Course Title: Intermediate Environmental Water Technology
Course Number: 8007120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of standards and regulations, site assessments, safety, managing data and physical resources, prepare a plan, perform remediation, collect and dispose of solid waste, record keeping and sampling procedures, career opportunities, leadership, teamwork, and money management concepts. 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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Water Technology	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	
	LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	
	LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	
	LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	
	LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.	
	LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Water Technology	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content.	
	LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	
	LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	
	LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	

Florida Standards		Correlation to CTE Program Standard #
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Water Technology		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.3.1
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.0 Discuss related standards and regulations--The student will be able to:		SC.912.N.1, 2, 3, 4	
19.01 Explain the importance and impacts of local, state, and federal regulations and required documentation.			
19.02 Describe the Florida Administrative Code's (F.A.C.) impact on environmental issues.			
19.03 Discuss the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA).			
19.04 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statutes.			
19.05 Research how rules and laws are made and mandated.			
19.06 Describe permitting procedures.			
19.07 Identify regulation resources.			
19.08 Describe various licensing procedures.			
19.09 Research governmental regulation authorities associated with Florida's water sources.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.10 Describe National Pollution Discharge Elimination System (NPDES).			
19.11 Identify appropriate agencies and their functions			
19.12 Describe the role of environmental protection.			
19.13 Create, evaluate and present a well-head protection plan.			
19.14 Discuss the need for adequate monitoring of environmental parameters when making policy decisions.			
20.0 Conduct site assessment--The student will be able to:		SC.912.L.17.20; SC.912.N.1.1;	
20.01 Identify the purposes of site assessment.			
20.02 Describe required documentation.			
20.03 Interpret blueprints			
20.04 Demonstrate map reading			
20.05 Obtain physical and performance measurements.			
20.06 Assess needed equipment and processes.			
21.0 Practice safety skills and procedures--The student will be able to:		SC.912.N.4.2	
21.01 Identify safety procedures for: wells, pumps, electrical equipment, motor vehicles, buildings, and other necessary equipment.			
21.02 Handle compressed gasses, solids, and liquids safely.			
21.03 Summarize "Right of Access" law.			
21.04 Summarize "Confined Space" regulations.			
21.05 Identify Zero Tolerance policies.			
21.06 Identify employee limitations.			
21.07 Identify appropriate decontamination procedures.			
21.08 Identify principles of toxicology.			
21.09 Identify routes of exposure.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.10 Identify respirator safety procedures.			
21.11 Discuss history of hazardous materials and hazardous categories.			
21.12 Discuss common chemical compatibility.			
21.13 Describe and discuss OSHA concepts.			
21.14 Describe and discuss the Vulnerability Assessment process.			
22.0 Manage data and physical resources--The student will be able to:		SC.912.N.1, 2, 3, 4, 5, 6, 7	
22.01 Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and security.			
22.02 Identify possible funding sources.			
22.03 Prepare budgets and purchase orders.			
22.04 Prepare a time management plan.			
22.05 Utilize information databases.			
22.06 Locate and interpret printed reference materials.			
22.07 Describe network opportunities.			
22.08 Maintain necessary/required record keeping practices and procedures.			
22.09 Keep inventory, time sheets, and equipment maintenance logs.			
22.10 Identify suppliers and technical resources.			
23.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems--The student will be able to:		SC.912.N.1.1	
23.01 Define GIS and its function.			PST.05.03.01.a PST.05.03.01.b PST.05.03.02.b
23.02 Use GIS software.			PST.05.03.01.c PST.05.03.02.c
23.03 Learn GIS applications.			PST.05.03.03.c
23.04 Develop a GIS model.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.05 Define GPS and its function.			
23.06 Collect GPS data and load on GIS.			PST.05.03.02.c
23.07 Research and identify other remote sensing tools.			PST.05.03.04.b
23.08 Identify and plot points on a map.			
24.0 Control incidents--The student will be able to:		SC.912.N.1.1	
24.01 Identify and describe reasons for controlling incidents.			
24.02 Describe levels of response.			
24.03 Determine and use proper chain of command.			
24.04 Determine methods of control.			
24.05 Demonstrate site access restriction methods.			
24.06 Identify appropriate authorities to be notified.			
24.07 Place equipment appropriately.			
24.08 Orient zones.			
24.09 Identify possible geographic hazards.			
24.10 Identify media protocol and procedures for communicating with the public.			
24.11 Prepare a press release for a mock incident.			
24.12 Identify abnormal event management processes utilizing the National Information Management System (NIMS).			
25.0 Prepare a plan--The student will be able to:		SC.912.N.1.1	
25.01 Describe the need for and the types of pre-planning.			
25.02 Identify and select necessary agency involvement.			
25.03 Identify possible contamination zones.			
25.04 Review contingency plans			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
25.05 Create contingency plans for hurricanes, tornadoes, floods, fires, and/or nuclear accidents (emergency response plan).			
25.06 Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act (EPCRA) regulations.			
25.07 Create plan for deployment.			
25.08 Conduct mock disaster activities.			
26.0 Perform remediation--The student will be able to:		SC.912.L.17.16	
26.01 Research appropriate cleaning methods.			
26.02 Create a plan for a disaster clean up including needed materials and equipment.			
26.03 Understand entry and closure methods.			
26.04 Identify contamination removal procedures.			
26.05 Design a site/system cleanliness verification procedure.			
26.06 Identify tear down and demobilization procedures.			
27.0 Collect and dispose of solid waste--The student will be able to:		SC.912.L.17.20	
27.01 Describe history of solid waste disposal.			
27.02 Identify types of waste.			
27.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.)			
28.0 Identify continuing education needs and opportunities--The student will be able to:			
28.01 Determine continuing education needs/goals.			
28.02 Identify available educational and financial resources.			
28.03 Identify appropriate professional associations and attend meetings where applicable.			
28.04 Read and review trade journals.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
29.0 Conduct recordkeeping and sampling procedures--The student will be able to:		SC.912.N.1.1, 2	
29.01 Demonstrate sampling, testing and recordkeeping.			
29.02 Collect and analyze water samples: grab, composite and representative.			
29.03 Record data into identified database program.			
29.04 Interpret lab results.			
29.05 Evaluate data.			
29.06 Measure well volumes.			
29.07 Describe organism sampling techniques.			
30.0 Review stormwater permit procedures--The student will be able to:			
30.01 Research and demonstrate Best Management Practices (BMP), Standard Operating Procedures (SOP) and Preventive Maintains (PM).			
30.02 Describe proper ditch, pond, culvert, and manhole inspection techniques.			
30.03 Evaluate a storm cleanup and prevention plan.			
30.04 Discuss pollutants, illegal dumping and discharge and demonstrate appropriate handling procedures.			
30.05 Describe the importance of outfall structures, inlets, and treatment systems.			
30.06 Describe the procedures to clean and televise pipes.			
30.07 Describe the importance of ditch banks and right of ways.			
30.08 Maintain, repair and replace pipe sections.			
31.0 <u>Demonstrate the use of industry appropriate tools, equipment, and instruments</u> --The student will be able to:		SC.912.P.10.2, 3, 10	
31.01 Select and demonstrate proper use of industry appropriate tools, equipment, and instruments.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.02 Demonstrate various physical science principles as applied in selected mechanical applications (e.g. levers, pulleys, hydraulics, and internal combustion).			
31.03 Service and maintain industry appropriate equipment, instruments, facilities, and supplies.			
32.0 Demonstrate industry specific mathematical calculations–The student will be able to:		SC.912.E.5.6; SC.912.N.1.1; SC.912.P.8.9; SC.912.P.10.5; SC.912.P.12.2, 3	
32.01 Calculate area and volume.			
32.02 Convert temperature.			
32.03 Calculate velocities and flow rates.			
32.04 Calculate detention time.			
32.05 Calculate parts per million/pounds.			
32.06 Calculate chemical concentrations.			
32.07 Utilize conversion factors.			
32.08 Calculate ratios and percentages.			
32.09 Calculate water, brake and motor horsepower for chemical pumps.			
32.10 Calculate force.			
32.11 Calculate sedimentation and loading rates.			
32.12 Use calculations to determine activated sludge characteristics.			
32.13 Use calculations to determine sludge digestion characteristics.			
32.14 Use a variety of problem-solving strategies such as drawing a diagram, making a chart, guessing-and-checking, solving a simpler problem, writing an equation working backwards, and creating a table.			
33.0 Demonstrate industry specific science skills and techniques–The student will be able to:		SC.912.L.18.12; SC.912.P.8.1, 2, 3, 4, 5, 6, 7, 8, 9,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		10, 11; SC.912.P.10.7	
33.01 Differentiate between chemical and physical properties of solids, dissolved solids, gases and liquids.			
33.02 Identify chemical symbols on the periodic table and explain their relationships.			
33.03 Interpret formula representations of molecules and compounds in water treatment.			
33.04 Characterize chemical reactions in water treatment processes for example redox, acid base, synthesis and single and double replacement reactions.			
33.05 Utilize the mole concept and the law of conservation of mass to calculate quantities of chemicals precipitating in reactions occurring in water treatment processes.			
33.06 Describe the properties of the water molecule.			
33.07 Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH in environmental processes.			
33.08 Distinguish between endothermic and exothermic chemical processes in environmental systems.			
34.0 Identify career opportunities and organizational dynamics in water resources--The student will be able to:			
34.01 Research and create a presentation about occupations in water resources.			
34.02 Determine the educational requirements and experience needed to enter and advance in water resource occupations			
34.03 Prepare a resume.			
35.0 Demonstrate water treatment techniques--The student will be able to:		SC.912.N.1.1	
35.01 Determine soil types, land slope, and other factors to consider in choosing a location for a manmade pond.			
35.02 Identify/explain environmentally safe methods of wastewater disposal.			
35.03 Identify and consult agencies regulating water quality standards in order to prevent compliance problems.			
35.04 Observe different stages of construction of ponds.			
36.0 Discuss an industrial pretreatment program/inspection--The student will be able to:		SC.912.L.18.11; SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
36.01 Utilize spot location program.			
36.02 Survey business and industry water consumption and discharge.			
36.03 Conduct pretreatment sampling.			
36.04 Analyze data and document reports.			
36.05 Design monitoring plan.			
36.06 Monitor sites.			
37.0 Discuss comprehensive quality assurance plan--The student will be able to:			
37.01 Discuss quality assurance rules.			
37.02 Develop and follow standard operating procedures.			
37.03 Describe preventative maintenance techniques.			
37.04 Describe cleaning/decontamination techniques.			
37.05 Determine accuracy and precision of sampling techniques.			
37.06 Discuss need for corrective action.			
37.07 Document Quality Assurance per regulatory agencies.			

**Florida Department of Education
Student Performance Standards**

Course Title: Advanced Environmental Water Technology
Course Number: 8007130
Course Credit: 1

Course Description:

Florida Standards	Correlation to CTE Program Standard #
38.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Environmental Water Technology	
38.01 Key Ideas and Details	
38.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
38.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
38.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
38.02 Craft and Structure	
38.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
38.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
38.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards	Correlation to CTE Program Standard #
LAFS.1112.RST.2.6	
38.03 Integration of Knowledge and Ideas	
38.03.1 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
38.03.2 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
38.03.3 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
38.04 Range of Reading and Level of Text Complexity	
38.04.1 By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. 38.04.2 By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
39.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Environmental Water Technology	
39.01 Text Types and Purposes	
39.01.1 Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
39.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
39.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
39.02 Production and Distribution of Writing	
39.02.1 Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>39.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>39.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
<p>39.03 Research to Build and Present Knowledge</p>	
<p>39.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>39.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>39.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
<p>39.04 Range of Writing</p>	
<p>39.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
<p>40.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Environmental Water Technology.</p>	
<p>40.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>40.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>40.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
40.04 Model with mathematics.	MAFS.K12.MP.4.1	
40.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
40.06 Attend to precision.	MAFS.K12.MP.6.1	
40.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
40.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
41.0 Identify professions related to the water technology field--The student will be able to:			
41.01 List duties of water technology workers such as wastewater operator, water operator, systems operator, stormwater operator, residual (bio-solids) hauler operator, cross connection operator, pretreatment operator, and meter reading/maintenance operator.			
41.02 Identify the basic terms and concepts involved in processes used in these professions.			
41.03 List potential employers in the water technology field: federal, municipal, county, state and private.			
41.04 Identify resources to assist in finding employment in the field.			
41.05 Identify professional organizations related to the water technology field.			
41.06 Identify career ladder levels in the water technology field: trainee, C Level, B Level, A Level.			
42.0 Identify scientific concepts common in water and wastewater treatment--The student will be able to:			
42.01 Identify chemical symbols used in water and wastewater treatment.			
42.02 Describe the hydrologic cycle.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
42.03 Describe the basic concepts of the pH scale and its importance in the treatment process.			
42.04 Identify the differences between mixtures, elements, and compounds, and organic and inorganic chemicals.			
42.05 Identify principle states of matter: liquid, solid, and gas.			
42.06 Identify the basic nitrogen, phosphorous, and carbon cycles.			
43.0 Identify safety hazards associated with water technologies--The student will be able to:			
43.01 Identify the types of hazards common to water technology facilities.			
43.02 Recognize unsafe conditions and prescribe corrective measures.			
43.03 Identify and safely handle hazardous chemicals common to water technology facilities.			
43.04 Recognize electrical hazards.			
43.05 Recognize fire hazards, identify types of fires, and describe appropriate extinguishing techniques.			
44.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials--The student will be able to:			
44.01 Identify the kinds of information presented on Material Safety Data Sheets.			
44.02 Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (chapter 442, F.S.).			
45.0 Solve basic math problems common to water technologies--The student will be able to:			
45.01 Perform basic arithmetic problems, including addition, subtraction, multiplication, division, fractions, decimals, percentages, rounding (significant figures), graphing, etc.			
45.02 Identify metric measurements and perform conversions.			
45.03 Perform calculations that involve areas, volumes, capacities, retention times, pounds, mg/L, velocities, flow rates, pressure, and head.			
46.0 Define pumping and basic hydraulic principles--The student will be able to:			
46.01 Identify types of pumps.			
46.02 Discuss application and use of different types of pumps.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
46.03 Identify components/characteristics of pumps including pump operation and basic pump curves including centrifugal pumps, positive displacement pumps, and air lift pumps.			
46.04 Identify types of pipes, valves, and fittings.			
46.05 Define cross connections.			
46.06 Identify the appropriate equipment used in the treatment processes.			
47.0 Define principles of disinfection--The student will be able to:			
47.01 List the need/reasons for disinfection (list of waterborne diseases).			
47.02 Define concepts related to disinfection.			
47.03 List methods and chemicals used in disinfection.			
47.04 Define the physical properties of chlorine.			
47.05 List kinds of disinfection equipment used.			
48.0 Define sampling techniques--The student will be able to:			
48.01 Define the reasons for sampling and types of samples.			
48.02 Define methods of sample collection and handling.			
48.03 Define the basic procedure for quality control and quality assurance in sampling.			
48.04 Define the chain of custody for samples.			
48.05 Perform chlorine residual analysis.			
48.06 Perform pH analysis.			
49.0 Define federal, state, and local regulations that apply to water technologies--The student will be able to:			
49.01 List regulatory agencies and their roles in monitoring the water technology field.			
49.02 Define regulations associated with the appropriate federal, state or local agencies.			
49.03 Define training and certification requirements for water technology			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
workers.			
50.0 Demonstrate employability skills--The student will be able to:			
50.01 Conduct a job search.			
50.02 Secure information about a job.			
50.03 Identify documents that may be required for a job application.			
50.04 Complete a job application.			
50.05 Demonstrate competence in job-interview techniques.			
50.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.			
50.07 Identify acceptable work habits.			
50.08 Demonstrate knowledge of how to make job changes appropriately.			
50.09 Demonstrate acceptable employee-health habits for the treatment facility environment.			
50.10 Identify materials and documents needed for a professional library.			
50.11 Demonstrate productive and positive customer interactions.			
50.12 Demonstrate effective interpersonal communication skills.			
51.0 Identify sampling techniques and explain the significance of the steps--The student will be able to:			
51.01 Identify the laboratory tests that are commonly performed by operators in Florida water-treatment facilities, including those required by the Safe Drinking Water Regulation.			
51.02 Define pathogenic organisms, including bacteria, protozoa, and virus, and describe their disease associations.			
51.03 Describe the laboratory test performed for the presence of bacteria.			
51.04 Describe the correct procedure for obtaining a bacteriological sample.			
51.05 Describe correct sample collection procedures for inorganic and organic analyses.			
51.06 Describe the laboratory quality-control checks and required			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
documentation.			
51.07 Identify the chain of custody for a sample.			
52.0 Identify chemical, biological, and physical constituents of water entering the water treatment facility or distribution systems--The student will be able to:			
52.01 Determine which constituents are inherent to groundwater and/or surface water.			
52.02 Describe the relationship between turbidity and the microbiological quality of water.			
52.03 Describe the uses of chemical analysis in water-treatment operations.			
52.04 Identify symbols and common names for elements and chemical compounds.			
52.05 Select the primary constituents to be measured and the most commonly used units of measurement for each.			
52.06 Explain the importance of water treatment for the control of coliform bacteria and algae.			
53.0 Describe the principles, operational and troubleshooting practices of the aeration process--The student will be able to:			
53.01 Describe the aeration and air stripping processes and explain how they differ.			
53.02 Identify the types of aeration systems.			
53.03 Identify the benefits of aeration.			
53.04 Describe the components of an air-stripping system.			
53.05 Troubleshoot aeration and air stripping processes.			
54.0 Describe the principles, operational and troubleshooting practices of the mixing, coagulation, and flocculation processes--The student will be able to:			
54.01 Define concepts such as turbidity, color, coagulation, and flocculation.			
54.02 Define the difference between sweep and enhanced coagulation.			
54.03 Identify the kinds of equipment used in the coagulation process.			
54.04 Identify coagulant chemicals used in water-treatment facilities.			
54.05 Identify the steps of coagulation, in order.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
54.06 Identify the specific sampling locations for process control in a coagulation process.			
54.07 Identify factors that would contribute to poor floc formation.			
54.08 Compute the feed rate in pounds per day (lbs/d) when the chemical coagulant (mg/1) and flow rate (MGD) are known.			
54.09 Compute the dosage (mg/1) of coagulant when the rate of flow (MGD) and the feed rate (lbs/day) of the chemical coagulant are known.			
54.10 Compute the dosage rate that is needed to treat a different flow (MGD) at the current dosage when the current rate of flow (MGD) and the current coagulant feed rate (lbs/d) are known.			
54.11 Describe troubleshooting techniques for basic mixing, coagulation, and flocculation processes.			
55.0 Describe the principles, operational and troubleshooting practices of the sedimentation process--The student will be able to:			
55.01 Describe an upflow clarifier and basin sedimentation.			
55.02 Identify factors that affect efficient sedimentation.			
55.03 Identify the measures that would be effective in preventing or controlling algae growth on surfaces of coagulation and sedimentation basins.			
55.04 Identify methods of sludge removal from sedimentation basins.			
55.05 Describe troubleshooting techniques for sedimentation and upflow clarifier processes.			
56.0 Describe the principles, operational and troubleshooting practices of the filtration process--The student will be able to:			
56.01 Explain concepts related to filtration, including types of filters, filter-system components, and the steps for normal filtration operations.			
56.02 Explain common problems of filtering systems, including head loss, mud balls, and filter media loss.			
56.03 Determine when to backwash a filter.			
56.04 Identify the steps for backwashing a filter.			
56.05 Describe troubleshooting techniques for filtration processes.			
57.0 Describe the principles, operational and troubleshooting practices of the water-softening process--The student will be able to:			
57.01 Describe the two types of hardness.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
57.02 Identify the appropriate chemical(s) to use in chemical-precipitation softening processes for the two kinds of hardness.			
57.03 Describe alkalinity and its components.			
57.04 Identify treatment processes used for water softening.			
57.05 Calculate the distribution of bicarbonate, carbonate, and/or hydroxide ions when given the total alkalinity and phenolphthalein alkalinity.			
57.06 Describe selective carbonate removal.			
57.07 Identify the important zones of an upflow clarifier unit.			
57.08 Describe the lime soda ash softening process, including its control.			
57.09 Compute lime demand from raw-water analyses.			
57.10 Describe the reasons for recarbonation.			
57.11 Compute carbon dioxide demands for recarbonation.			
57.12 Compute hardness removal when the ion-exchange capacity is known.			
57.13 Describe troubleshooting techniques for water-softening processes.			
58.0 Describe the principles, operational and troubleshooting practices of the stabilization process--The student will be able to:			
58.01 Identify the chemicals used in stabilization.			
58.02 Identify two stabilization indices.			
58.03 Determine water stability, using the Langelier index and the marble test.			
58.04 Troubleshoot stabilization processes.			
59.0 Describe the principles, operational and troubleshooting practices of the corrosion control process--The student will be able to:			
59.01 Identify the factors that influence corrosion.			
59.02 Describe the problems that can be created by corrosive waters.			
59.03 Describe the basic concepts related to electrolysis.			
59.04 Define electrochemical reaction.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
59.05 Identify the chemicals used in corrosion control.			
59.06 Describe the conditions for calcium carbonate film formation.			
59.07 Define cathode film formation.			
59.08 Define cathodic protection and describe its application in water-treatment facilities.			
59.09 Describe troubleshooting techniques for corrosion-control processes.			
60.0 Describe the principles, operational and troubleshooting practices of the disinfection process--The student will be able to:			
60.01 Identify the chemicals used in primary disinfection.			
60.02 Identify commonly used chlorinators and hypochlorinators.			
60.03 Determine the maximum amount of chlorine gas (in pounds) that may be taken from a cylinder in a 24-hour period.			
60.04 Identify proper maintenance procedures for equipment chlorination.			
60.05 Identify terminology related to chlorination and disinfection.			
60.06 Identify common safety problems or emergency situations that might occur during chlorination.			
60.07 Identify the properties of chlorine and describe its use in water treatment.			
60.08 Explain the points at which chlorine is applied most effectively in water treatment.			
60.09 Compute the feed rate (lbs/d) when given the rate of flow (MGD) and dosage of chlorine (mg/1).			
60.10 Compute the feed rate (lbs/d) of a hypochlorite compound that contains a given percentage of available chlorine when given a problem where the rate of flow (MGD) and the chlorine dosage (mg/1) are known.			
60.11 Compute the new rate of flow and the feed rate that will be needed to maintain the current dosage when given the current rate of flow (MGD); the current chlorine feed rate (lbs/d), and the amount by which the rate of flow is to be increased or decreased.			
60.12 Compute the feed rate needed to treat a given amount of water when given a chlorine demand and the desired chlorine residual.			
60.13 Describe troubleshooting techniques for disinfection processes.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
61.0 Describe the principles, operational and troubleshooting practices for the control and treatment of trihalomethanes--The student will be able to:			
61.01 Describe the formation of total trihalomethanes (TTHM).			
61.02 Identify the specific procedure for collecting samples to determine trihalomethane levels.			
61.03 Compute the quarterly average and the annual TTHM measurements when sample results are given.			
61.04 Identify processes that remove trihalomethane precursors.			
61.05 Identify processes that remove trihalomethanes after they are formed.			
61.06 Identify the benefits of alternate disinfectants.			
61.07 Describe chloramination as a control of TTHM.			
61.08 Describe troubleshooting techniques for the control and treatment of trihalomethanes.			
62.0 Describe the principles, operational and troubleshooting practices of the iron and manganese removal processes--The student will be able to:			
62.01 Explain the occurrence of iron and manganese in source water and in treated water.			
62.02 Describe the importance of controlling iron and manganese.			
62.03 Describe sample-collection and analysis procedures for iron and manganese.			
62.04 Describe remedial processes for controlling iron and manganese.			
62.05 Compute the potassium permanganate dosage for a known concentration of iron and manganese in the water being treated.			
62.06 Describe troubleshooting techniques for iron and manganese-removal processes.			
63.0 Describe the principles, operational and troubleshooting practices for taste and odor control--The student will be able to:			
63.01 Identify common types of complaints about water quality.			
63.02 Identify causes of tastes and odors.			
63.03 Describe how microbial growths affect tastes and odors.			
63.04 Describe how eutrophication contributes to surface-water tastes and			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
odors.			
63.05 Describe a cross-connection.			
63.06 Identify the chemicals used in the control and treatment of tastes and odors.			
63.07 Describe the Threshold Odor Number (TON) test.			
63.08 Determine the TON when dilution volumes and positive samples are given.			
63.09 Describe troubleshooting techniques for taste and odor control.			
64.0 Describe the principles, operational and troubleshooting practices of the demineralization processes--The student will be able to:			
64.01 Define concepts related to demineralization, such as reverse osmosis (RO), flux, feedwater, permeate, and salinity.			
64.02 Describe the structure, composition, and performance of an RO membrane.			
64.03 Describe feedwater impurities, physical parameters, and conditions potentially harmful to the RO process.			
64.04 Identify items included in a typical RO-facility-operation checklist.			
64.05 Describe the common causes of membrane damage.			
64.06 Describe the procedure for membrane cleaning.			
64.07 Compute the percent of recovery when product flow and feed flow are known.			
64.08 Compute the percent of mineral rejection when total dissolved solids are known for the feedwater and product water.			
64.09 Describe the basic concepts of electrodialysis (ED), such as the cathode and anode relationship and the removal of typical inorganic salts.			
64.10 Describe the most common problem of ED operation in a facility.			
64.11 Explain how the cation membrane and the anion membrane differ.			
64.12 Describe the multi-compartment unit used in the ED process.			
64.13 Describe ED operating procedures in detail.			
64.14 Describe the two most common chemical solutions used to flush ED stack membranes.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
64.15 Describe troubleshooting techniques for demineralization processes.			
65.0 Describe the principles, operational and troubleshooting practices of the fluoridation process--The student will be able to:			
65.01 Define the basic concepts related to fluoridation, including its purpose and the kinds of chemicals used.			
65.02 Identify the properties of fluoride and describe its use.			
65.03 Identify the types of equipment used in fluoridation.			
65.04 Describe proper maintenance procedures for fluoridation equipment.			
65.05 Describe potential safety problems or emergency situations in the fluoridation process, and ways to avoid them.			
65.06 Compute the feed rate of chemicals used in the fluoridation process.			
65.07 Describe troubleshooting techniques for the fluoridation processes.			
66.0 Identify facility operational problems--The student will be able to:			
66.01 Respond to customer questions about taste or odor in the water.			
66.02 Respond to customer questions about red water or rust stains.			
66.03 Identify the probable cause(s) for a sudden change in chlorine demand; take corrective action.			
67.0 Describe basic hydraulics and pumping operations--The student will be able to:			
67.01 Describe the relationship between the system head and pressure, and make conversions between them.			
67.02 Describe three types of head, i.e., pressure, suction, and atmospheric.			
67.03 Describe proper operation of centrifugal and displacement pumps.			
67.04 Describe causes and methods that are effective in preventing "water hammer."			
67.05 Troubleshoot pump operations.			
68.0 Identify appropriate federal, state, and local regulations for the operation and maintenance of a public potable water facility.--The student will be able to:			
68.01 Complete the Drinking Water Bacteriological Analysis Form correctly.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
68.02 Complete the DEP daily operation report (DOR) form correctly.			
68.03 Complete the DEP monthly operation report (MOR) form correctly.			
68.04 Identify the DEP requirements for the operation of standby and emergency equipment.			
68.05 Identify the DEP requirements for microbiological monitoring and analyses.			
68.06 Identify the DEP requirements for sampling and testing.			
69.0 Perform equipment inspection, and identify basic maintenance for the treatment train, treatment residuals disposal, and solids management--The student will be able to:			
69.01 Identify the appropriate equipment used in the treatment train, treatment residuals disposal, and solids management.			
69.02 Describe a preliminary site inspection of the equipment used in the treatment train, treatment residuals disposal, and solids management.			
69.03 Identify the maintenance needs of equipment used in the treatment train, treatment residuals disposal, and solids management, including safe procedures for maintenance.			
69.04 Describe proper record keeping for preventive and corrective maintenance.			
69.05 Describe preventive and corrective maintenance procedures for equipment used in the treatment process, treatment residuals disposal, and solids management.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Program Title: Environmental Water Reclamation Technology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8007200
CIP Number	0703010400
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	ENV WAT TEC 7G
CTSO	FFA
SOC Codes (all applicable)	51-8031 - Water and Wastewater Treatment Plant and System Operators
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 & 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 & Natural Resources career cluster.

The content includes but is not limited to applications of water resource management, application of safety procedures, record keeping and sampling, wetland management, reclamation treatment techniques, solid waste disposal, storm water management, hazardous material storage, government water technology regulations, filtrations, sedimentation, fluoridation process, and performs maintenance and inspections on equipment.

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 consisting of three courses and one occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8007110	Introduction to Environmental Water Technology	1 credit	51-8031	2
	8007120	Intermediate Environmental Water Technology	1 credit		2
	8007210	Advanced Environmental Water Reclamation Technology	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Introduction to Environmental Water Technology	^^	^^	^^	9/53 17%	13/52 25%	22/56 39%	25/55 46%	21/58 36%	13/35 37%	26/42 62%	26/56 46%	16/53 30%
Intermediate Environmental Water Technology	^^	^^	^^	3/53 6%	12/52 23%	13/56 23%	27/55 49%	15/58 29%	3/35 9%	28/42 66%	23/56 41%	18/53 34%

Advanced Environmental Water Reclamation Technology	∧	∧	∧	**	**	**	**	**	**	**	**	**
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∧ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Water Reclamation Technology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Water Reclamation Technology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Water Reclamation Technology.
- 04.0 Identify the historical, social, cultural and potential applications of water resource management.
- 05.0 Describe and discuss hydrology.
- 06.0 Practice safety skills and procedures.
- 07.0 Demonstrate record keeping and sampling procedures.
- 08.0 Describe and discuss geologic principles of water resources.
- 09.0 Manage wetlands.
- 10.0 Identify career opportunities and organizational dynamics.
- 11.0 Apply scientific and technological principles.
- 12.0 Describe water reclamation treatment techniques.
- 13.0 Collect and dispose of solid waste.
- 14.0 Explain water treatment techniques.
- 15.0 Discuss and manage stormwater systems.
- 16.0 Describe water distribution.
- 17.0 Demonstrate the management and environmentally sound use of water resources.
- 18.0 Maintain water treatment equipment and facilities.
- 19.0 Discuss related standards and regulations.
- 20.0 Conduct site assessment.
- 21.0 Practice safety skills and procedures.
- 22.0 Manage data and physical resources.
- 23.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
- 24.0 Control incidents.
- 25.0 Prepare a plan.
- 26.0 Perform remediation.
- 27.0 Collect and dispose of solid waste.
- 28.0 Identify continuing education needs and opportunities.
- 29.0 Conduct recordkeeping and sampling procedures.
- 30.0 Review stormwater permit procedures.
- 31.0 Demonstrate the use of industry appropriate tools, equipment, and instruments
- 32.0 Demonstrate industry specific mathematical calculations.
- 33.0 Demonstrate industry specific science skills and techniques.
- 34.0 Identify career opportunities and organizational dynamics in water resources.

- 35.0 Demonstrate water treatment techniques.
- 36.0 Discuss an Industrial Pretreatment Program/Inspection.
- 37.0 Discuss comprehensive quality assurance plan.
- 38.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Environmental Water Reclamation Technology.
- 39.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Environmental Water Reclamation Technology.
- 40.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Environmental Water Reclamation Technology.
- 41.0 Identify professions related to the water technology field.
- 42.0 Identify scientific concepts common in water and wastewater treatment.
- 43.0 Identify safety hazards associated with water technologies.
- 44.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 45.0 Solve basic math problems common to water technologies.
- 46.0 Define pumping and basic hydraulic principles.
- 47.0 Define principles of disinfection.
- 48.0 Define sampling techniques.
- 49.0 Define federal, state, and local regulations that apply to water technologies.
- 50.0 Demonstrate employability skills.
- 51.0 Identify the basic characteristics and principles of wastewater treatment.
- 52.0 Identify sampling techniques and interpret the results.
- 53.0 Describe the sources of wastewater and the types of collection systems.
- 54.0 Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management.
- 55.0 Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management.
- 56.0 Perform equipment inspection, and identify basic maintenance for the treatment train, effluent disposal, and solids management.
- 57.0 Identify and correct facility operational problems.
- 58.0 Identify appropriate federal, state, and local regulations.
- 59.0 Describe federal, state, and local laws for the handling, storage, and use of toxic and hazardous materials.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Environmental Water Technology
Course Number: 8007110
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of hydrology, safety skills and procedures, geological principles of water resources, management of wetlands, storm water systems, environmental water resources, equipment and facility maintenance, scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Standards included in this course of instruction have been aligned to the academic courses shown below. This table shows the number of aligned benchmarks, the total number of academic benchmarks, and the percentage of alignment.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Water Reclamation Technology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text,	

Florida Standards		Correlation to CTE Program Standard #
	including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. LAFS.910.RST.4.10	
01.04.2		
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Water Reclamation Technology.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	

Florida Standards	Correlation to CTE Program Standard #
	LAFS.910.WHST.1.3
02.02 Production and Distribution of Writing	
02.02.1 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	LAFS.910.WHST.2.4
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.910.WHST.2.5
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	LAFS.910.WHST.2.6
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.910.WHST.3.7
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	LAFS.910.WHST.3.8
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.910.WHST.3.9
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.910.WHST.4.10
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Water Reclamation Technology.	
03.01 Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
03.02 Reason abstractly and quantitatively.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.2.1
03.03 Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Identify the historical, social, cultural and potential applications of water resource management--The student will be able to:		SC.912.E.7.8; HE.912.C.1.3; SC.912.L.15.8, 13; SC.912.L.16.4, 7, 8, 9, 10, SC.912.L.17.1, 8, 11, 16, 19, 20; SC.912.L.18.12; SC.912.N.1.1	
04.01 Explain the developmental progression of water resource management.			
04.02 Research emerging problems and issues with water resource management.			
04.03 Explain the global importance of water conservation.			
04.04 Explain international issues affecting water resources and water quality.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.05 Compare practices that either enhance or hinder water quality.			
04.06 Differentiate between point and non-point sources of pollution.			
04.07 Identify diseases and illnesses associated with water borne pathogens.			
04.08 Explain methods to control and eradicate diseases and illnesses associated with water borne pathogens.			
04.09 Explain the significance genetic factors, environmental factors and pathogenic agents to health from the perspective of both individual and public health.			
04.10 Analyze how population size is affected by water quantity and quality.			
04.11 Evaluate the cost and benefits of renewable and nonrenewable resources such as water, energy, fossil fuels, flora and fauna.			
04.12 Predict the impact of individuals on water quality and quantity and how human lifestyles affect sustainability.			
04.13 Discuss the special properties of water that contribute to earth's suitability as an environment for life.			
05.0 Describe and discuss hydrology--The student will be able to:		SC.912.E.5.2, 4; SC.912.E.6.2, 3, 4, 5; SC.912.E.7.1, 3; SC.912.L.17.16; SC.912.P.8.1, 5, 7	
05.01 Define basic hydrological terms.			ESS.03.03.02.a ESS.03.03.02.b
05.02 Explain surface water systems.			ESS.03.03.02.a ESS.03.03.02.b
05.03 Explain ground water systems.			ESS.03.03.02.c ESS.03.03.03.a ESS.03.03.03.b ESS.03.03.03.C
05.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.			
05.05 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.			
05.06 Identify alternative sources of water.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.07 Identify soil conditions as they relate to water quality.			ESS.03.02.03
05.08 Research and explain saltwater intrusion.			
05.09 Identify and discuss water wells and water reservoirs.			
06.0 Practice safety skills and procedures--The student will be able to:		SC.912.P.8.5, 7, 11	
06.01 Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment.			CS.06.02.01.a CS.07.01.01.b
06.02 Identify and utilize safe work practices.			CS.06.02.01.a
06.03 Identify physical, chemical, biological, and zoological hazards.			
06.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Agency (OSHA), and Hazard Communication (HAZCOM) regulations.			
06.05 Determine, review, and follow regulations.			
06.06 Develop and maintain appropriate safety records.			
06.07 Identify and describe "on the job" hazards and risks including fire/explosive, lead asbestos, weather hazards and emergency response preparedness			
06.08 Perform lifting activities safely.			
06.09 Identify ladder safety and fall protection.			
06.10 Become certified in first aid/CPR and describe First Responder responsibilities.			CS.07.02.01.c
07.0 Demonstrate record keeping and sampling procedures--The student will be able to:		SC.912.N.1.1, 4, 6; SC.912.P.8.8, 11;	
07.01 Define sampling objectives, protocol and Chain of Custody.			ESS.01.01.01.a
07.02 Operate, calibrate, and maintain sampling equipment.			ESS.01.01.02.c
07.03 Develop sampling strategy.			ESS.01.01.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
07.04 Perform applicable field measurements including pH, dissolved oxygen, temperature, chlorine residual, and turbidity.			
07.05 Appropriately preserve, document, and dispose of samples.			
07.06 Identify cross-contamination and other risks associated with sampling.			
07.07 Describe, plan, and utilize quality assurance practices.			
07.08 Submit samples for analysis.			ESS.01.01.01.b
07.09 Perform periodic follow-up sampling.			
07.10 Identify permit requirements and procedures.			
07.11 Define and follow federal, state and local sampling guidelines.			
08.0 Describe and discuss geologic principles of water resources--The student will be able to:		SC.912.E.6.1, 2, 4; SC.912.L.17.13; SC.912.P.8.6, 7, 8, 11	
08.01 Explain the geological history of Florida.			
08.02 Create a soil profile and describe the associated components.			
08.03 Evaluate soil profiles, land-capability classes, and soil conservation practices.			
08.04 Interpret legal descriptions of land.			
08.05 Identify mapping and surveying techniques and equipment.			
08.06 Analyze local mineral resources.			
08.07 Describe lithological descriptions of local units/formations.			
08.08 Describe Florida aquifer system.			
08.09 Discuss basic groundwater chemistry.			
08.10 Describe local geology related problems.			
09.0 Manage wetlands--student will be able to:		SC.912.E.5.4; SC.912.L.14.35; SC.912.L.17.4, 8,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		16, 19, 20;	
09.01 Identify ecosystems.			
09.02 Discuss the structure and function of wetlands.			ESS.03.04.01.b
09.03 Define limits of wetlands.			
09.04 Discuss habitat value.			
09.05 Identify fauna and flora.			ESS.03.04.02
09.06 Determine desirable vs. nuisance plant and animal species.			
09.07 Describe changes in ecosystems resulting from seasonal variations, climate change, environmental impacts, and succession.			
09.08 Explain the general distribution of life in aquatic systems as a function of effluent discharge, stormwater runoff and drought.			
10.0 Identify career opportunities and organizational dynamics--The student will be able to:			
10.01 Describe the nature and origin of career opportunities in water, water reclamation and environmental industries.			CS.02.03.01.a
10.02 Compare supervisory and administrative responsibilities.			
10.03 Identify organizational structures.			
10.04 Identify team building communication skills.			CS.01.01.01.a
10.05 Identify problem-solving techniques.			CS.02.04.02.c
10.06 Identify employee responsibility/benefits.			
10.07 Identify legal aspects of personnel relations.			
10.08 Communicate effectively in verbal, written, and nonverbal modes.			
10.09 Recognize and demonstrate good listening skills.			
10.10 Conduct small informal and formal group meetings.			
10.11 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
10.12 Recognize and demonstrate effective communications skills in the workplace.			
10.13 Identify related associated professional associations.			
10.14 List and describe the careers associated with water treatment, distribution, and management.			
10.15 Determine the educational requirements and experience needed to enter and advance in water, water reclamation and environmental occupations.			
11.0 Apply scientific and technological principles--The student will be able to:			
11.01 Employ scientific measurement skills.			BS.02.02.01.b
11.02 Demonstrate safe and effective use of common laboratory equipment.			
11.03 Implement the scientific method and science process skills through the design and completion of a research project.			
11.04 Interpret, analyze, and report data.			
11.05 Evaluate advances in biotechnology and its impact on water resources.			
11.06 Compare and contrast structure and function of various types of microscopes.			
12.0 Describe reclaimed water treatment techniques--The student will be able to:		SC.912.L.17.16, 19, 20 SC.912.L.18.6, 8;	
12.01 Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater.			
12.02 Describe disposal options.			
12.03 Identify septic tanks types and functions.			
12.04 Apply principles of nutrients, water and waste management to environmental problems.			
13.0 Collect and dispose of solid waste--The student will be able to:		SC.912.17.16, 19, 20	
13.01 Describe history of solid waste disposal.			
13.02 Identify types of waste.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.03 Identify household hazardous waste collection and disposal programs.			
13.04 Research and evaluate solid waste disposal options. (landfill, incineration, and composting, etc.)			
14.0 Explain water treatment techniques--The student will be able to:		SC.912.E.6.5; SC.912.L.17.16, 19, 20; SC.912.L.18.6, 8; SC.912.P.8.2;	
14.01 Describe drinking water treatments.			
14.02 Identify and describe the desirable water qualities.			
14.03 Explain how changes in water quality affect life cycles.			
14.04 Explain, monitor, and maintain freshwater/salt water quality standards.			
14.05 Calculate volume in circular, rectangular and irregular shaped water structures.			
14.06 List and explain sources of pollution and methods of preventing and/or correcting these pollution problems.			
15.0 Discuss and manage stormwater systems--The student will be able to:		SC.912.E.6.2; SC.912.L.17.16, 19, 20;	
15.01 Determine boundaries of watersheds.			
15.02 Identify runoff coefficients.			
15.03 Identify the relationship between construction sites and stormwater systems.			
15.04 Research rules and regulations in regards to stormwater systems.			
15.05 Contact local municipalities to determine stormwater regulations.			
15.06 Research current construction trends and methods of stormwater systems.			
15.07 Define topography and its effects on stormwater.			
15.08 Discuss the affects that uncollected stormwater has on lakes, rivers, ponds and wetlands.			
16.0 Describe water distribution--The student will be able to:		SC.912.P.12.11	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.01 Identify the need for backflow prevention and cross connections controls.			
16.02 Identify necessary equipment for water distribution purposes e.g.; pumps, motors, valves, storage tanks, pipes and fittings.			
16.03 Read and maintain meters.			
16.04 Identify maintenance requirements for fire hydrants, pipes, and valves.			
16.05 Identify proper procedures for operation and maintenance of lift stations.			
16.06 Discuss importance of period flushing of water distribution systems.			
17.0 Demonstrate the management and environmentally sound use of water resources--The student will be able to:			
17.01 Determine quality of groundwater and surface water.			
17.02 Identify solids and dissolved solids found in water.			
17.03 Identify primary and secondary contaminants.			
17.04 Identify unregulated organic compounds.			
18.0 Maintain water treatment equipment and facilities--The student will be able to:		SC.912.N.1.1; SC.912.P.10.4, 5, 7;	
18.01 Research water treatment equipment and facility components.			
18.02 Identify appropriate temperatures and other external conditions.			
18.03 Identify the effect of weather conditions and changes.			
18.04 Describe appropriate flow rates and tank levels.			
18.05 Create a checklist and/or policies of necessary procedures to handle daily conditions, hazards and/or malfunctions.			
18.06 Describe maintenance procedures and techniques of filters, pipes, generators, meters, motors, valves, instruments, injectors, storage basins etc.			

**Florida Department of Education
Student Performance Standards**

Course Title: Intermediate Environmental Water Technology
Course Number: 8007120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of standards and regulations, site assessments, safety, managing data and physical resources, prepare a plan, perform remediation, collect and dispose of solid waste, record keeping and sampling procedures, career opportunities, leadership, teamwork, and money management concepts. 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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Water Reclamation Technology	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	
	LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	
	LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	
	LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	
	LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.	
	LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Water Reclamation Technology	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content.	
	LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	
	LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	
	LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	

Florida Standards		Correlation to CTE Program Standard #
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Water Reclamation Technology		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others.	

Florida Standards		Correlation to CTE Program Standard #
	MAFS.K12.MP.3.1	
03.04	Model with mathematics.	MAFS.K12.MP.4.1
03.05	Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06	Attend to precision.	MAFS.K12.MP.6.1
03.07	Look for and make use of structure.	MAFS.K12.MP.7.1
03.08	Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.0 Discuss related standards and regulations--The student will be able to:		SC.912.N.1, 2, 3, 4	
19.01 Explain the importance and impacts of local, state, and federal regulations and required documentation.			
19.02 Describe the Florida Administrative Code's (F.A.C.) impact on environmental issues.			
19.03 Discuss the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA).			
19.04 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statutes.			
19.05 Research how rules and laws are made and mandated.			
19.06 Describe permitting procedures.			
19.07 Identify regulation resources.			
19.08 Describe various licensing procedures.			
19.09 Research governmental regulation authorities associated with Florida's water sources.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.10 Describe National Pollution Discharge Elimination System (NPDES).			
19.11 Identify appropriate agencies and their functions			
19.12 Describe the role of environmental protection.			
19.13 Create, evaluate and present a well-head protection plan.			
19.14 Discuss the need for adequate monitoring of environmental parameters when making policy decisions.			
20.0 Conduct site assessment--The student will be able to:		SC.912.L.17.20; SC.912.N.1.1;	
20.01 Identify the purposes of site assessment.			
20.02 Describe required documentation.			
20.03 Interpret blueprints			
20.04 Demonstrate map reading			
20.05 Obtain physical and performance measurements.			
20.06 Assess needed equipment and processes.			
21.0 Practice safety skills and procedures--The student will be able to:		SC.912.N.4.2	
21.01 Identify safety procedures for: wells, pumps, electrical equipment, motor vehicles, buildings, and other necessary equipment.			
21.02 Handle compressed gasses, solids, and liquids safely.			
21.03 Summarize "Right of Access" law.			
21.04 Summarize "Confined Space" regulations.			
21.05 Identify Zero Tolerance policies.			
21.06 Identify employee limitations.			
21.07 Identify appropriate decontamination procedures.			
21.08 Identify principles of toxicology.			
21.09 Identify routes of exposure.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.10 Identify respirator safety procedures.			
21.11 Discuss history of hazardous materials and hazardous categories.			
21.12 Discuss common chemical compatibility.			
21.13 Describe and discuss OSHA concepts.			
21.14 Describe and discuss the Vulnerability Assessment process.			
22.0 Manage data and physical resources--The student will be able to:		SC.912.N.1, 2, 3, 4, 5, 6, 7	
22.01 Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and security.			
22.02 Identify possible funding sources.			
22.03 Prepare budgets and purchase orders.			
22.04 Prepare a time management plan.			
22.05 Utilize information databases.			
22.06 Locate and interpret printed reference materials.			
22.07 Describe network opportunities.			
22.08 Maintain necessary/required record keeping practices and procedures.			
22.09 Keep inventory, time sheets, and equipment maintenance logs.			
22.10 Identify suppliers and technical resources.			
23.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems--The student will be able to:		SC.912.N.1.1	
23.01 Define GIS and its function.			PST.05.03.01.a PST.05.03.01.b PST.05.03.02.b
23.02 Use GIS software.			PST.05.03.01.c PST.05.03.02.c
23.03 Learn GIS applications.			PST.05.03.03.c
23.04 Develop a GIS model.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.05 Define GPS and its function.			
23.06 Collect GPS data and load on GIS.			PST.05.03.02.c
23.07 Research and identify other remote sensing tools.			PST.05.03.04.b
23.08 Identify and plot points on a map.			
24.0 Control incidents--The student will be able to:		SC.912.N.1.1	
24.01 Identify and describe reasons for controlling incidents.			
24.02 Describe levels of response.			
24.03 Determine and use proper chain of command.			
24.04 Determine methods of control.			
24.05 Demonstrate site access restriction methods.			
24.06 Identify appropriate authorities to be notified.			
24.07 Place equipment appropriately.			
24.08 Orient zones.			
24.09 Identify possible geographic hazards.			
24.10 Identify media protocol and procedures for communicating with the public.			
24.11 Prepare a press release for a mock incident.			
24.12 Identify abnormal event management processes utilizing the National Information Management System (NIMS).			
25.0 Prepare a plan--The student will be able to:		SC.912.N.1.1	
25.01 Describe the need for and the types of pre-planning.			
25.02 Identify and select necessary agency involvement.			
25.03 Identify possible contamination zones.			
25.04 Review contingency plans			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
25.05 Create contingency plans for hurricanes, tornadoes, floods, fires, and/or nuclear accidents (emergency response plan).			
25.06 Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act (EPCRA) regulations.			
25.07 Create plan for deployment.			
25.08 Conduct mock disaster activities.			
26.0 Perform remediation--The student will be able to:		SC.912.L.17.16	
26.01 Research appropriate cleaning methods.			
26.02 Create a plan for a disaster clean up including needed materials and equipment.			
26.03 Understand entry and closure methods.			
26.04 Identify contamination removal procedures.			
26.05 Design a site/system cleanliness verification procedure.			
26.06 Identify tear down and demobilization procedures.			
27.0 Collect and dispose of solid waste--The student will be able to:		SC.912.L.17.20	
27.01 Describe history of solid waste disposal.			
27.02 Identify types of waste.			
27.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.)			
28.0 Identify continuing education needs and opportunities--The student will be able to:			
28.01 Determine continuing education needs/goals.			
28.02 Identify available educational and financial resources.			
28.03 Identify appropriate professional associations and attend meetings where applicable.			
28.04 Read and review trade journals.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
29.0 Conduct recordkeeping and sampling procedures--The student will be able to:		SC.912.N.1.1, 2	
29.01 Demonstrate sampling, testing and recordkeeping.			
29.02 Collect and analyze water samples: grab, composite and representative.			
29.03 Record data into identified database program.			
29.04 Interpret lab results.			
29.05 Evaluate data.			
29.06 Measure well volumes.			
29.07 Describe organism sampling techniques.			
30.0 Review stormwater permit procedures--The student will be able to:			
30.01 Research and demonstrate Best Management Practices (BMP), Standard Operating Procedures (SOP) and Preventive Maintains (PM).			
30.02 Describe proper ditch, pond, culvert, and manhole inspection techniques.			
30.03 Evaluate a storm cleanup and prevention plan.			
30.04 Discuss pollutants, illegal dumping and discharge and demonstrate appropriate handling procedures.			
30.05 Describe the importance of outfall structures, inlets, and treatment systems.			
30.06 Describe the procedures to clean and televise pipes.			
30.07 Describe the importance of ditch banks and right of ways.			
30.08 Maintain, repair and replace pipe sections.			
31.0 <u>Demonstrate the use of industry appropriate tools, equipment, and instruments</u> --The student will be able to:		SC.912.P.10.2, 3, 10	
31.01 Select and demonstrate proper use of industry appropriate tools, equipment, and instruments.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.02 Demonstrate various physical science principles as applied in selected mechanical applications (e.g. levers, pulleys, hydraulics, and internal combustion).			
31.03 Service and maintain industry appropriate equipment, instruments, facilities, and supplies.			
32.0 Demonstrate industry specific mathematical calculations–The student will be able to:		SC.912.E.5.6; SC.912.N.1.1; SC.912.P.8.9; SC.912.P.10.5; SC.912.P.12.2, 3	
32.01 Calculate area and volume.			
32.02 Convert temperature.			
32.03 Calculate velocities and flow rates.			
32.04 Calculate detention time.			
32.05 Calculate parts per million/pounds.			
32.06 Calculate chemical concentrations.			
32.07 Utilize conversion factors.			
32.08 Calculate ratios and percentages.			
32.09 Calculate water, brake and motor horsepower for chemical pumps.			
32.10 Calculate force.			
32.11 Calculate sedimentation and loading rates.			
32.12 Use calculations to determine activated sludge characteristics.			
32.13 Use calculations to determine sludge digestion characteristics.			
32.14 Use a variety of problem-solving strategies such as drawing a diagram, making a chart, guessing-and-checking, solving a simpler problem, writing an equation working backwards, and creating a table.			
33.0 Demonstrate industry specific science skills and techniques–The student will be able to:		SC.912.L.18.12; SC.912.P.8.1, 2, 3, 4, 5, 6, 7, 8, 9,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		10, 11; SC.912.P.10.7	
33.01 Differentiate between chemical and physical properties of solids, dissolved solids, gases and liquids.			
33.02 Identify chemical symbols on the periodic table and explain their relationships.			
33.03 Interpret formula representations of molecules and compounds in water treatment.			
33.04 Characterize chemical reactions in water treatment processes for example redox, acid base, synthesis and single and double replacement reactions.			
33.05 Utilize the mole concept and the law of conservation of mass to calculate quantities of chemicals precipitating in reactions occurring in water treatment processes.			
33.06 Describe the properties of the water molecule.			
33.07 Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH in environmental processes.			
33.08 Distinguish between endothermic and exothermic chemical processes in environmental systems.			
34.0 Identify career opportunities and organizational dynamics in water resources--The student will be able to:			
34.01 Research and create a presentation about occupations in water resources.			
34.02 Determine the educational requirements and experience needed to enter and advance in water resource occupations			
34.03 Prepare a resume.			
35.0 Demonstrate water treatment techniques--The student will be able to:		SC.912.N.1.1	
35.01 Determine soil types, land slope, and other factors to consider in choosing a location for a manmade pond.			
35.02 Identify/explain environmentally safe methods of wastewater disposal.			
35.03 Identify and consult agencies regulating water quality standards in order to prevent compliance problems.			
35.04 Observe different stages of construction of ponds.			
36.0 Discuss an industrial pretreatment program/inspection--The student will be able to:		SC.912.L.18.11; SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
36.01 Utilize spot location program.			
36.02 Survey business and industry water consumption and discharge.			
36.03 Conduct pretreatment sampling.			
36.04 Analyze data and document reports.			
36.05 Design monitoring plan.			
36.06 Monitor sites.			
37.0 Discuss comprehensive quality assurance plan--The student will be able to:			
37.01 Discuss quality assurance rules.			
37.02 Develop and follow standard operating procedures.			
37.03 Describe preventative maintenance techniques.			
37.04 Describe cleaning/decontamination techniques.			
37.05 Determine accuracy and precision of sampling techniques.			
37.06 Discuss need for corrective action.			
37.07 Document Quality Assurance per regulatory agencies.			

**Florida Department of Education
Student Performance Standards**

Course Title: Advanced Environmental Water Reclamation Technology
Course Number: 8007210
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of career opportunities, scientific concepts in water treatment, safety hazards, government regulations, facility operational principles, and equipment inspections. 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.

Florida Standards	Correlation to CTE Program Standard #
38.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Environmental Water Reclamation Technology	
38.01 Key Ideas and Details	
38.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
38.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
38.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
38.02 Craft and Structure	
38.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
38.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
38.02.3 Analyze the author's purpose in providing an explanation,	

Florida Standards	Correlation to CTE Program Standard #
<p>describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p> <p style="text-align: right;">LAFS.1112.RST.2.6</p>	
<p>38.03 Integration of Knowledge and Ideas</p>	
<p>38.03.1 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.</p> <p style="text-align: right;">LAFS.1112.RST.3.7</p>	
<p>38.03.2 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p style="text-align: right;">LAFS.1112.RST.3.8</p>	
<p>38.03.3 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p style="text-align: right;">LAFS.1112.RST.3.9</p>	
<p>38.04 Range of Reading and Level of Text Complexity</p>	
<p>38.04.1 By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> <p>38.04.2 By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.</p> <p style="text-align: right;">LAFS.1112.RST.4.10</p>	
<p>39.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Environmental Water Reclamation Technology</p>	
<p>39.01 Text Types and Purposes</p>	
<p>39.01.1 Write arguments focused on discipline-specific content.</p> <p style="text-align: right;">LAFS.1112.WHST.1.1</p>	
<p>39.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p style="text-align: right;">LAFS.1112.WHST.1.2</p>	
<p>39.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.</p> <p style="text-align: right;">LAFS.1112.WHST.1.3</p>	

Florida Standards	Correlation to CTE Program Standard #
39.02 Production and Distribution of Writing	
39.02.1 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
39.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
39.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
39.03 Research to Build and Present Knowledge	
39.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
39.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
39.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
39.04 Range of Writing	
39.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
40.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Environmental Water Reclamation Technology.	
40.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
40.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards		Correlation to CTE Program Standard #
40.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
40.04	Model with mathematics.	MAFS.K12.MP.4.1
40.05	Use appropriate tools strategically.	MAFS.K12.MP.5.1
40.06	Attend to precision.	MAFS.K12.MP.6.1
40.07	Look for and make use of structure.	MAFS.K12.MP.7.1
40.08	Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
41.0 Identify professions related to the water technology field.--The student will be able to:			
41.01 List duties of water technology workers such as wastewater operator, water operator, systems operator, stormwater operator, residual (bio-solids) hauler operator, cross connection operator, pretreatment operator, and meter reading/maintenance operator.			
41.02 Identify the basic terms and concepts involved in processes used in these professions.			
41.03 List potential employers in the water technology field: federal, municipal, county, state and private.			
41.04 Identify resources to assist in finding employment in the field.			
41.05 Identify professional organizations related to the water technology field.			
41.06 Identify career ladder levels in the water technology field: trainee, C Level, B Level, A Level.			
42.0 Identify scientific concepts common in water and wastewater treatment.--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.01 Identify chemical symbols used in water and wastewater treatment.			
42.02 Describe the hydrologic cycle.			
42.03 Describe the basic concepts of the pH scale and its importance in the treatment process.			
42.04 Identify the differences between mixtures, elements, and compounds, and organic and inorganic chemicals.			
42.05 Identify principle states of matter: liquid, solid, and gas.			
42.06 Identify the basic nitrogen, phosphorous, and carbon cycles.			
43.0 Identify safety hazards associated with water technologies.--The student will be able to:			
43.01 Identify the types of hazards common to water technology facilities.			
43.02 Recognize unsafe conditions and prescribe corrective measures.			
43.03 Identify and safely handle hazardous chemicals common to water technology facilities.			
43.04 Recognize electrical hazards.			
43.05 Recognize fire hazards, identify types of fires, and describe appropriate extinguishing techniques.			
44.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.--The student will be able to:			
44.01 Identify the kinds of information presented on Material Safety Data Sheets (MSDS).			
44.02 Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (chapter 442, F.S.).			
45.0 Solve basic math problems common to water technologies.--The student will be able to:			
45.01 Perform basic arithmetic problems, including addition, subtraction, multiplication, division, fractions, decimals, percentages, rounding (significant figures), graphing, etc.			
45.02 Identify metric measurements and perform conversions.			
45.03 Perform calculations that involve areas, volumes, capacities, retention times, pounds, mg/L, velocities, flow rates, pressure, and head.			
46.0 Define pumping and basic hydraulic principles.--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
46.01 Identify types of pumps.			
46.02 Discuss application and use of different types of pumps.			
46.03 Identify components/characteristics of pumps including pump operation and basic pump curves including centrifugal pumps, positive displacement pumps, and air lift pumps.			
46.04 Identify types of pipes, valves, and fittings.			
46.05 Define cross connections.			
46.06 Identify the appropriate equipment used in the treatment processes.			
47.0 Define principles of disinfection.--The student will be able to:			
47.01 List the need/reasons for disinfection (list of waterborne diseases).			
47.02 Define concepts related to disinfection.			
47.03 List methods and chemicals used in disinfection.			
47.04 Define the physical properties of chlorine.			
47.05 List kinds of disinfection equipment used.			
48.0 Define sampling techniques.--The student will be able to:			
48.01 Define the reasons for sampling and types of samples.			
48.02 Define methods of sample collection and handling.			
48.03 Define the basic procedure for quality control and quality assurance in sampling.			
48.04 Define the chain of custody for samples.			
48.05 Perform chlorine residual analysis.			
48.06 Perform pH analysis.			
49.0 Define federal, state, and local regulations that apply to water technologies.--The student will be able to:			
49.01 List regulatory agencies and their roles in monitoring the water technology field.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
49.02 Define regulations associated with the appropriate federal, state or local agencies.			
49.03 Define training and certification requirements for water technology workers.			
50.0 Demonstrate employability skills.--The student will be able to:			
50.01 Conduct a job search.			
50.02 Secure information about a job.			
50.03 Identify documents that may be required for a job application.			
50.04 Complete a job application.			
50.05 Demonstrate competence in job-interview techniques.			
50.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.			
50.07 Identify acceptable work habits.			
50.08 Demonstrate knowledge of how to make job changes appropriately.			
50.09 Demonstrate acceptable employee-health habits for the treatment facility environment.			
50.10 Identify materials and documents needed for a professional library.			
50.11 Demonstrate productive and positive customer interactions.			
50.12 Demonstrate effective interpersonal communication skills.			
51.0 Identify the basic characteristics and principles of wastewater treatment.--The student will be able to:			
51.01 Identify the sources of wastewater and the objectives of wastewater treatment.			
51.02 Identify terms used in wastewater treatment.			
51.03 Identify the impact of wastewater on receiving bodies of water.			
51.04 Identify biological organisms present in treatment processes.			
51.05 Identify waterborne diseases.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
51.06 Identify commonly measured wastewater parameters.			
51.07 Identify factors affecting raw wastewater.			
51.08 Correlate treatment processes to types of facility influent and solids.			
52.0 Identify sampling techniques and interpret the results.--The student will be able to:			
46.01 Identify the reasons for sampling and the types of samples (e.g., simple, representative, grab, composite).			
46.02 Describe methods of sample collection and handling.			
46.03 Identify specific samples (biological or chemical) and determine the significance of sample results required for process quality control, for compliance with standards, and for reporting.			
46.04 Identify representative sampling points.			
46.05 Identify the significance of the flow measurement on process control.			
53.0 Describe the sources of wastewater and the types of collection systems.--The student will be able to:			
53.01 Describe the types of wastewater collection systems.			
53.02 Identify flow variations and conditions that affect plant treatment, including infiltration, inflow, and lift stations.			
53.03 Identify methods to detect and correct infiltration.			
53.04 Identify dissolved gases in wastewater and the effect of their presence/absence on treatment.			
54.0 Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management.--The student will be able to:			
54.01 Describe concepts related to preliminary and primary treatment.			
54.02 Describe the types of preliminary treatment equipment, the way they function, and the relationship of each to the treatment train.			
54.03 Describe the types of primary treatment equipment, the way they function, and the relationship of each to the treatment train.			
54.04 Describe concepts related to secondary treatment, including attached growth processes, suspended growth processes, aeration, and clarification.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
54.05 Describe the types of secondary treatment equipment, the way they function, and the relationship of each to the treatment train.			
54.06 Describe concepts related to tertiary treatment processes, including sand filtration, nitrification/denitrification, oxic/anoxic, activated carbon, and artificial wetlands.			
54.07 Describe the types of tertiary treatment equipment, the way they function, and the relationship of each to the treatment train.			
54.08 Describe concepts related to disinfection and effluent disposal, including surface water, reuse reclamation, deep well, and ocean outfall.			
54.09 Describe the types of disinfection and the types of effluent-disposal equipment, the way they function, and the relationship of each to the system.			
54.10 Describe concepts related to solids management, including thickening, aerobic and anaerobic digestion, stabilization, de-watering, and reuse.			
54.11 Describe the types of solids-management equipment, the way they function, and the relationship of each to the system.			
55.0 Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management.--The student will be able to:			
55.01 Describe the grit-removal process and the operational efficiency of each step.			
55.02 Describe the laboratory tests performed on influent.			
55.03 Describe the primary-clarifier removal efficiencies, including settleable solids, suspended solids, total solids, BOD, and bacteria.			
55.04 Describe sampling points, frequency of sampling, and the laboratory tests and results that are used for the proper operation of the primary clarifier.			
55.05 Select and plot on a trend chart the parameters for primary clarification.			
55.06 Use the operational data required to evaluate the performance of secondary-treatment processes, including attached growth, suspended growth, aeration, and clarification.			
55.07 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for proper operation of the secondary-treatment processes.			
55.08 Select and plot on a trend chart the parameters for secondary clarification.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
55.09 Describe how nitrification affects secondary processes and clarification.			
55.10 Describe how denitrification affects secondary processes and clarification.			
55.11 Use operational data to evaluate the performance of sand filtration.			
55.12 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for checking the proper operation of sand filtration. Select and plot on a trend chart the parameters for sand filtration.			
55.13 Use operational data to evaluate the nitrification/denitrification process.			
55.14 Use operational data to evaluate the performance of effluent-disposal processes, including disinfection and dechlorination.			
55.15 Describe sampling points, the frequency of sampling, and the laboratory tests used for checking the proper operation of effluent disposal.			
55.16 Select and plot on a trend chart the parameters for effluent disposal.			
55.17 Describe various methods of effluent disinfection including UV, chlorination, and ozonation.			
55.18 Describe the chemical and physical properties of chlorine, and describe the reactions of chlorine with water, ammonia compounds, and sulfides.			
55.19 Describe the safe storage and handling of chlorine, including the use of testing compounds.			
55.20 Explain the points of application of chlorine in wastewater treatment.			
55.21 Describe the methods of dechlorination.			
55.22 Describe the methods commonly used to dispose of wastewater effluents, including reuse applications.			
55.23 Describe the laboratory tests commonly used on the reuse of effluent.			
55.24 Describe the types of sludge and their characteristics.			
55.25 Use operational data to evaluate the performance of solids management, including sludge thickening, digestion, de-watering, and disposal processes.			
55.26 Describe sampling points, the frequency of sampling, and the			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
laboratory tests and results used for checking the proper operation of solids management and for compliance with Chapter 62-640 F.A.C.			
56.0 Perform equipment inspection, and identify basic maintenance for the treatment train, effluent disposal, and solids management.--The student will be able to:			
56.01 Identify the appropriate equipment used in the treatment train, effluent disposal, and solids management.			
56.02 Describe a preliminary site inspection of the equipment used in the treatment train, effluent disposal, and solids management.			
56.03 Identify the maintenance needs of equipment used in the treatment train, effluent disposal, and solids management, including safe procedures for maintenance.			
56.04 Describe proper record keeping for preventive and corrective maintenance.			
56.05 Describe preventive and corrective maintenance procedures for equipment used in the treatment process, effluent disposal, and solids management.			
57.0 Identify and correct facility operational problems.--The student will be able to:			
57.01 Describe common facility operational problems in the treatment train, effluent disposal, and solids management.			
57.02 Describe methods to evaluate operational problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.			
57.03 Select appropriate corrective actions for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.			
57.04 Describe the methods for monitoring results of corrective action taken for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.			
58.0 Identify appropriate federal, state, and local regulations.--The student will be able to:			
58.01 Identify federal, state and local regulations that apply to the operation of a wastewater-treatment facility.			
58.02 Describe the operator's duties and responsibilities, certification requirements, testing, renewal, staffing, and facility classification (sections of Chapter 62-602 F.A.C.).			
58.03 Explain and describe the contents of an operating permit.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
58.04 Identify state regulations that apply to procedures such as reclaimed water, reuse, and residuals management.			
59.0 Describe federal, state and local laws for the handling, storage, and use of toxic and hazardous materials. – The student will be able to:			
59.01 Identify the kinds of information presented on the MSDS.			
59.02 Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (Chapter 442, F.S.).			
59.03 Identify the reporting requirements as specified in SARA Title III and Chapter 252, F.S.			
59.04 Describe the responsibilities toward the community as specified in SARA Title III and Chapter 252, F.S.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Program Title: Principles of Agribusiness & Management
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8009100
CIP Number	0101010200
Grade Level	9-12, 30, 31
Standard Length	3 credit
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	11-9013 - Farmers, Ranchers, and Other Agricultural Managers
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 purpose of this program is to serve as a supplemental program to provide Agriculture, Food, and Natural Resource Education students with the opportunity, to learn the business side of agriculture commodities as well as essential functions of leadership and management.

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 consisting of an agricultural mechanics core with two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations	1 credit	11-9013	3
	8009110	Agriculture Leadership & Management	1 credit		3
	8009120	Principles of Agribusiness	1 credit		3

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Principles of Agribusiness & Management.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Principles of Agribusiness & Management.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Principles of Agribusiness & Management.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills
- 12.0 Apply leadership and citizenship skills.
- 13.0 Compare and contrast differing theories of leadership styles.
- 14.0 Develop personal leadership qualities.
- 15.0 Associate leadership styles for specific situations.
- 16.0 Establish a clear image of what the future of the organization should look like.
- 17.0 Acquire the skills necessary to complete a project as a team.
- 18.0 Build a constituency through listening, coaching, understanding and appreciating others.
- 19.0 Conduct professional and personal activities based on ethical reasoning
- 20.0 Demonstrate personal awareness of community relations.
- 21.0 Pursue learning and growth opportunities related to professional and personal aspirations.
- 22.0 Interact with others in a manner that respects the differences of a diverse and changing society.
- 23.0 Develop awareness and apply skills necessary for achieving career success
- 24.0 Demonstrate the effective application of reasoning, thinking, and coping skills to solve problems.
- 25.0 Demonstrate leadership opportunities available in FFA
- 26.0 Prepare documents and skills for pursuing career success.
- 27.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Principles of Agribusiness & Management.
- 28.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Principles of Agribusiness & Management.
- 29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Principles of Agribusiness & Management.
- 30.0 Explain the components of the American business system.
- 31.0 Analyze the basic concepts of agribusiness.

- 32.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.
- 33.0 Examine the scope of career opportunities in and the importance of agriculture to the economy.
- 34.0 Compose and analyze a business plan for an enterprise.
- 35.0 Prepare and maintain all files needed to accomplish effective record keeping
- 36.0 Use accounting fundamentals to accomplish dependable bookkeeping and fiscal management.
- 37.0 Maintain and interpret financial information (income statements, balance sheets, inventory, purchase orders, accounts receivable and cash-flow analyses) for businesses
- 38.0 Conduct appropriate market and marketing research
- 39.0 Develop a marketing plan
- 40.0 Develop specific tactics to market AFNR products and services.
- 41.0 Develop a production and operational plan.
- 42.0 Apply appropriate management skills to organize a business.
- 43.0 Summarize the changes in American agricultural cooperatives from their beginning to today.
- 44.0 Differentiate between agricultural cooperative principles and practices.
- 45.0 Explain the responsibilities of people involved with agriculture cooperatives.
- 46.0 Explain the benefits and limitations of agricultural cooperatives.
- 47.0 Describe the various organization that serve agricultural cooperatives.
- 48.0 Construct a plan for financing and taxation within an agricultural cooperative.
- 49.0 Explain the steps for starting an agricultural cooperative.
- 50.0 Validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well rounded agricultural education.
- 51.0 Complete a Supervised Agricultural Experience (SAE) program as a critical component to a well rounded agricultural education.
- 52.0 Interpret and apply state and federal rules and regulations to enterprise
- 53.0 Perform accounting activities
- 54.0 Perform communication activities.
- 55.0 Demonstrate an understanding of legal and ethical issues in a business environment.

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Principles of Agribusiness & Management.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Principles of Agribusiness & Management.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
<p>02.03 Research to Build and Present Knowledge</p>	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
<p>02.04 Range of Writing</p>	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
<p>03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Principles of Agribusiness & Management.</p>	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agriculture Leadership & Management
Course Number: 8009110
Course Credit: 1

Course Description:

This course 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 leadership and careers within the Agriculture, Food and Natural Resources career cluster.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Principles of Agribusiness & Management	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Principles of Agribusiness & Management		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Principles of Agribusiness & Management		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #	
	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Compare and contrast differing theories of leadership styles.-- The student will be able to:			
13.01 Define different types of leadership.			
13.02 Research different theories of leadership.			
13.03 Determine expectations of a leader.			
13.04 Determine what type of leadership style best fits you.			
13.05 Compare commonalities of differing styles of leadership.			
13.06 Analyze Maslow's hierarchy of human needs as it relates to leadership development.			
13.07 Analyze motivation necessary for a leader as it relates to perception, judgment, and groups.			
14.0 Develop personal leadership qualities.—The student will be able to:			
14.01 Define personal leadership.			
14.02 Develop personal responsibility in leadership.			
15.0 Associate leadership styles for specific situations. – The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
15.01 Define situational leadership.			
15.02 Identify the different types of problem solving models and their applicability to specific situations.			
15.03 Select the best leadership style for a given situation.			
16.0 Establish a clear image of what the future of the organization should look like.—The student will be able to:			
16.01 Utilize visioning skills to develop a plan.			CS.01.03.01.b
16.02 Develop vision statements and plans for an organization.			CS.01.03.01.c
16.03 Analyze the risks and rewards of new experiences.			CS.01.03.03.a
16.04 Conduct a self-evaluation for personal reactions to new experiences.			CS.01.03.03.c
16.05 Describe techniques used to build consensus.			CS.01.03.04.a
16.06 Lead a meeting or activity that engages all participants in the process.			CS.01.03.04.c
17.0 Acquire the skills necessary to complete a project as a team.—The student will be able to:			
17.01 Discuss stages of group dynamics (eg. Inclusion, control, and intimacy).			
17.02 Create a task analysis.			CS.01.01.02.a
17.03 Create measurable short term, intermediate and long term goals.			
17.04 Set personal goals using the SMART goals method (Specific, Measurable, Approved by you, Realistic, Time-stamped).			CS.01.01.07.a
17.05 Assess the physical, financial and professional risks associated with a particular task.			
17.06 Facilitate the movement of team members through the stages of group development.			
17.07 Evaluate the strengths/talents of team members needed to achieve a desired task.			
17.08 Delegate project parts equitably amongst team members to achieve a given task.			
17.09 Use a variety of strategies to evaluate goals (e.g., observe, apply, and demonstrate).			CS.01.01.07.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.10 Identify characteristics of effective teams.			CS.01.02.04.a
18.0 Build a constituency through listening, coaching, understanding and appreciating others.—The student will be able to:			CS.01.02
18.01 Demonstrate human relation skills including compassion, empathy, unselfishness, trustworthiness, reliability and being friendly to co-workers.			CS.01.02.01.c
18.02 Use communication (verbal and non-verbal) skills to collaborate in a group setting.			
18.03 Formulate a strategy in a conflict management plan that responds to obstacles.			
18.04 Describe the role and purpose of a personal mentor.			
18.05 Synthesize strategies to successfully coach/mentor others. (eg. Building trust, praising, reprimanding).			
18.06 Identify strategies for motivating others.			
19.0 Conduct professional and personal activities based on ethical reasoning.—The student will be able to:			
19.01 Explain a personal decision where integrity played a role in the decision.			CS.01.04.01.b
19.02 Compare and contrast the benefits of living by positive ethical choices.			
19.03 Analyze the causes for team members to accept or reject responsibility.			CS.01.04.03.c
19.04 Explain the benefits of mutual respect.			CS.01.04.04.a
19.05 Differentiate between habits, practices and behaviors consistent with principles of self-discipline.			CS.01.04.04.a
19.06 Evaluate professional and personal values and how they are applied in the service to others.			CS.01.04.06.c
20.0 Demonstrate personal awareness of community relations.—The student will be able to:			
20.01 Analyze the impact of trends and issues on the community.			CS.01.05.01.b
20.02 Articulate current issues that are important to the local, state, national and global communities.			CS.01.05.01.c
20.03 Identify civic leadership role opportunities.			CS.01.05.02.a
20.04 Demonstrate responsible citizenship.			CS.01.05.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
20.05 Perform leadership tasks associated with citizenship.			CS.01.05.02.c
20.06 Explain benefits and challenges of working in a diverse group.			CS.01.05.03.a
20.07 Engage in activities to help develop personal awareness of diversity.			CS.01.05.03.b
20.08 Plan an activity that promotes appreciation of diversity.			CS.01.05.03.c
21.0 Pursue learning and growth opportunities related to professional and personal aspirations.—The student will be able to:			CS.01.06
21.01 Explain the reasons for having a leadership/personal growth plan.			CS.01.06.01.a
21.02 Develop a plan that includes specific goals for leadership and personal growth.			CS.01.06.01.b
21.03 Explain the importance of self-concept.			
21.04 Use problem solving strategies to solve a professional or personal issue.			CS.01.06.03.c
21.05 Use various emerging technologies to enhance a program or project.			CS.01.06.04.a
21.06 Describe the value of being a life-long learner and the need for continuous development.			CS.01.06.05.a
22.0 Interact with others in a manner that respects the differences of a diverse and changing society.—The student will be able to:			CS.02.02
22.01 Discover the different cultures that exist in one's community.			CS.02.02.01.a
22.02 Compare and contrast the customs of different cultures.			CS.02.02.01.b
22.03 Engage in a project that educates others about different cultures from within the community.			CS.02.02.01.c
22.04 Demonstrate proper conduct and appearances for diverse settings.			CS.02.02.02.a
22.05 Practice personal etiquette that is respectful of your environment.			
23.0 Develop awareness and apply skills necessary for achieving career success.—The student will be able to:			CS.02.03
23.01 Implement a plan to achieve career goals and priorities.			CS.03.02.01.c
23.02 Determine the level of acceptable non-essential actions/tasks related to a balanced personal and work life.			CS.02.03.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.03 Identify employability skills for a specific career.			CS.02.03.03.a
23.04 Identify successful time management strategies.			
23.05 Develop a model for managing stress related to personal and work environments.			
24.0 Demonstrate the effective application of reasoning, thinking, and coping skills to solve problems.—The student will be able to:			
24.01 Discuss the benefits of thinking critically and creatively.			CS.02.04.01.b
24.02 Demonstrate critical and creative thinking skills while completing a task.			CS.02.04.01.c
24.03 Analyze problems that were solved well and problems that were not solved well.			CS.02.04.02.b
24.04 Implement effective problem solving strategies.			CS.02.04.02.c
24.05 Discuss the skills and techniques needed to negotiate effectively.			CS.02.04.03.a
24.06 Demonstrate the skills needed to negotiate with others.			CS.02.04.03.c
25.0 Demonstrate leadership opportunities available in FFA.—The student will be able to:			
25.01 Assess the leadership opportunities available in the leadership organization, including SAE, conferences, scholarships and travel.			
25.02 Identify key leaders in the history of the FFA organization.			
25.03 State the National FFA's mission, and structure.			
25.04 Submit a proficiency award application based on your SAE.			
25.05 Submit application for FFA degree status.			
25.06 Participate in an FFA Career Development Event.			
26.0 Prepare documents and skills for pursuing career success.—The student will be able to:			
26.01 Complete a college / job application.			
26.02 Write a resume.			CS.03.01.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.03 Participate in a mock interview.			
26.04 Write a sample college admission, scholarship, or employment essay.			
26.05 Complete financial aid or employment documents.			

**Florida Department of Education
 Student Performance Standards**

Course Title: Principles of Agribusiness
Course Number: 8009120
Course Credit: 1

Course Description:

This course 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 agribusiness sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction that prepares individuals to apply the economic and business principles involved in the organization, operation and management of farms and agricultural business. Subject matter includes finance, laws, labor, machinery, facilities, and marketing, as well as leadership, communication, employability and human relations skills.

Florida Standards		Correlation to CTE Program Standard #
27.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Principles of Agribusiness & Management	
	27.01 Key Ideas and Details	
27.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
27.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
27.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	27.02 Craft and Structure	
27.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
27.02.2	Analyze how the text structures information or ideas into categories or	

Florida Standards		Correlation to CTE Program Standard #
	hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
27.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
27.03 Integration of Knowledge and Ideas		
27.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
27.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
27.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
27.04 Range of Reading and Level of Text Complexity		
27.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
27.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
28.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Principles of Agribusiness & Management		
28.01 Text Types and Purposes		
28.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
28.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
28.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.WHST.1.3	
28.02 Production and Distribution of Writing		
28.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
28.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
28.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
28.03 Research to Build and Present Knowledge		
28.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
28.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
28.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
28.04 Range of Writing		
28.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Principles of Agribusiness & Management		
29.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
29.02	Reason abstractly and quantitatively.	

Florida Standards		Correlation to CTE Program Standard #
	MAFS.K12.MP.2.1	
29.03 Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1	
29.04 Model with mathematics.	MAFS.K12.MP.4.1	
29.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
29.06 Attend to precision.	MAFS.K12.MP.6.1	
29.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
29.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.0 Explain the components of the American business system.—The student will be able to:			
30.01 Describe the ways and different forms of American businesses are organized.			
30.02 Distinguish and identify between the characteristics of each type of market structures (monopoly, oligopoly, monopolistic competition, pure competition).			
30.03 Evaluate the advantages and disadvantages provided by each business method.			
30.04 Research the factors that contribute to the four phases of the business cycle (peak, contraction – unemployment, trough, expansion – inflation).			
30.05 Determine how changes in government legislation (spending, taxation, regulations, subsidies, etc...) can affect American businesses and the national debt.			
30.06 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.0 Analyze the basic concepts of agribusiness--The student will be able to:			
31.01 Explain the following concepts: <ul style="list-style-type: none"> • business cycle • profit / loss • competition • supply/ demand • quantity supplied – graphically illustrate situations that would cause change • quantity demanded – graphically illustrate situations that would cause change • equilibrium price 			
31.02 Identify and discuss ethical issues in agribusiness.			
32.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
32.01 Assess the agricultural impact upon the US gross national product and the total global economy.			
32.02 Discuss the impact global trade has US agribusiness industries.			
32.03 Identify and describe the primary government agencies involved with agriculture.			
32.04 Compare regulations in the US to those in other countries we import from.			
32.05 Examine the use of subsidies in American agriculture.			
32.06 Research new and emerging technologies and their impact on the economy.			
33.0 Examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:			
33.01 Define and explore agriculture and agribusinesses and their role in the economy.			
33.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
33.03 Compare how key organizational structures and processes affect organizational performance and the quality of products			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
and services.			
33.04 Calculate the total educational cost of an agricultural career.			
33.05 Compare and contrast different types of student loans available for agriculture careers.			
33.06 Construct a one year budget plan for a specific career path including expenses and construction of a credit plan for purchasing a major item.			
34.0 Compose and analyze a business plan for an enterprise. -- The student will be able to:			
34.01 Recognize quality AFNR business plan components that have been developed using the SMART (specific, measurable, attainable, realistic and timely) format.			ABS.02.01.01.a
34.02 Identify components of business plans and demonstrate how to write such components using the SMART format.			ABS.02.01.01.b
34.03 Prepare and critique AFNR business plans.			ABS.02.01.01.c
34.04 Identify and observe ethical standards in planning and operating AFNR businesses.			ABS.02.01.02.a
34.05 Utilize methods of AFNR business enterprise analysis, such as SWOT (strengths, weaknesses, opportunities and threats).			ABS.02.01.02.c
34.06 Prepare short-term, intermediate and long-term goals and objectives that are consistent with the mission statement for an AFNR business.			ABS.02.02.02.b
35.0 Prepare and maintain all files needed to accomplish effective record keeping.-- The student will be able to:			
35.01 Maintain production and agribusiness records.			ABS.03.01.01.a
35.02 Analyze records to improve efficiency and profitability of an AFNR business.			ABS.03.01.01.b
35.03 Apply management information systems in AFNR business financial analysis.			ABS.03.01.01.c
35.04 Demonstrate understanding of inventory relative to maintaining optimal levels and calculating costs.			ABS.03.02.01.a
36.0 Use accounting fundamentals to accomplish dependable bookkeeping and fiscal management. -- The student will be able to:			
36.01 Identify financial concepts associated with production and profit and compare various economic systems (traditional, market, command, mixed) in how they answer the questions 1) what to			ABS.04.01.02.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
produce, 2) how to produce, 3) for whom to produce.			
36.02 Evaluate characteristics of lines of credit, loan terms and alternatives in sources of capital such as savings and investment services.			ABS.04.01.02.c
36.03 Explain the importance of return on investment for an agribusiness enterprise.			ABS.04.01.03.a
36.04 Analyze contracts, leases and other legal documents.			
36.05 Determine the tax structure applicable to different agribusinesses.			
37.0 Maintain and interpret financial information (income statements, balance sheets, inventory, purchase orders, accounts receivable and cash-flow analyses) for businesses. -- The student will be able to:			ABS.05.01
37.01 Maintain accounting information needed to prepare an income statement, balance sheet and cash-flow analysis for an AFNR business.			ABS.05.01.01.b
37.02 Name and explain the impact of external economic factors on an AFNR business such as inflation.			ABS.05.01.02.a
37.03 Recognize how changes in prices of inputs and/or outputs influence the financial statements of an AFNR business.			ABS.05.01.02.b
37.04 Predict the consequences of delayed payment of expenses, prepayment of expenses and delayed receipts on a financial statement.			ABS.05.01.02.c
37.05 Interpret business performance data.			ABS.05.01.03.b
37.06 Conduct a breakeven analysis for an AFNR business.			ABS.05.01.03.c
37.07 Calculate percentages, ratios and related business applications.			ABS.05.01.04.a
37.08 Interpret and evaluate financial statements, including income statements, balance sheets and cash-flow analyses.			ABS.05.01.04.c
38.0 Conduct appropriate market and marketing research. -- The student will be able to:			ABS.06.01
38.01 Investigate the meaning and methods of marketing in AFNR as related to agricultural commodities, products and services and to agricultural goods in domestic and international markets including why firms engage in price and non price competition.			ABS.06.01.01.a
38.02 Apply benefit/cost analysis to marketing in AFNR businesses.			ABS.06.01.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
38.03 Implement and evaluate marketing strategies with agricultural commodities, products and services.			ABS.06.01.01.c
38.04 Describe functions in agricultural marketing.			ABS.06.01.02.a
38.05 Assess the presence of marketing infrastructure for agricultural commodities.			ABS.06.01.02.b
38.06 Evaluate alternative marketing strategies, such as valueadding, branding and niche marketing, and propose and implement appropriate modifications to achieve AFNR business goals.			ABS.06.01.02.c
38.07 Use data to compare historical rates of return on investments with investment claims to make informed decisions and identify potential fraud.			
39.0 Develop a marketing plan.-- The student will be able to:			ABS.06.02
39.01 Identify the purpose, components and developmental processes of marketing plans.			ABS.06.02.01.a
39.02 Perform a marketing analysis, including evaluation of the competitors, customers, international and domestic policy environment, regulations and rules, standards and AFNR business resources.			ABS.06.02.01.b
39.03 Establish marketing plan goals/objectives, including monitoring, measuring and analyzing goal achievement.			ABS.06.02.01.c
40.0 Develop specific tactics to market AFNR products and services. -- The student will be able to:			ABS.06.03
40.01 Explain the meaning and use of the four Ps (product, price, place, and promotion) in marketing.			ABS.06.03.01.a
40.02 Develop advertising campaigns that promote products and services.			ABS.06.03.01.b
40.03 Implement sales goals and incentive programs, and identify pricing strategies used by competitors.			ABS.06.03.01.c
41.0 Develop a production and operational plan. -- The student will be able to:			
41.01 Prepare a flowchart that shows production processes, including the resources and capital needed for each step and graphically explain how to determine prices and output through marginal cost analysis.			ABS.07.01.01.a
41.02 Identify the components of a production and operational plan and factors of production and the importance of these factors. .			ABS.07.02.01.a
41.03 Evaluate the components of a production and operational plan			ABS.07.02.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
and then revise an existing plan.			
41.04 Develop and implement a product supply and distribution plan that meets the goals and objectives of an AFNR business.			ABS.07.02.01.c
41.05 Develop a production facility plan that includes building, equipment, personnel, utilities and logistics components.			ABS.07.02.02.c
42.0 Apply appropriate management skills to organize a business. -- The student will be able to:			
42.01 Identify organizational structures and chains of command in AFNR businesses.			ABS.02.03.01.a
42.02 Identify management types in AFNR businesses.			ABS.02.03.01.b
42.03 Create an organizational chart for an AFNR business.			ABS.02.03.02.c
42.04 Determine appropriate human resources for AFNR businesses.			ABS.02.01.02.b
42.05 Identify usual employee benefits and wages in AFNR businesses.			ABS.02.04.02.a
43.0 Summarize the changes in American agricultural cooperatives from their beginning to today. – The student will be able to:			
43.01 Describe the basis for the original formation of agricultural cooperatives and how they were organized.			
43.02 Construct a timeline of important dates involved with cooperatives that includes highlights contributions of entrepreneurs, inventors, and other key individuals in the development of agriculture cooperatives.			
43.03 Explain important events that occurred during the formation of cooperatives.			
44.0 Differentiate between agricultural cooperative principles and practices.— The student will be able to:			
44.01 Identify and describe the Rochdale Principles.			
44.02 Distinguish the difference between cooperative practices and cooperative principles.			
44.03 Examine and simplify the seven traditional principles and practices of cooperatives.			
44.04 Explain the contemporary principles of a cooperative.			
45.0 Explain the responsibilities of people involved with agriculture cooperatives.—The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
45.01 Identify the key people in a cooperative system.			
45.02 Understand and explain the responsibilities of members in a cooperative.			
45.03 Understand and explain the responsibilities of the board of directors in a cooperative.			
45.04 Understand and explain the responsibilities of a manager in a cooperative.			
45.05 Understand and explain the responsibilities of an employee in a cooperative.			
46.0 Explain the benefits and limitations of agricultural cooperatives.—The student will be able to:			
46.01 Understand and evaluate the benefits of being a cooperative member.			
46.02 Compare and contrast the successes and failures of a cooperative.			
46.03 Evaluate the importance of knowing the benefits and successes/failures of a cooperative.			
47.0 Describe the various organization that serve agricultural cooperatives.—The student will be able to:			
47.01 Identify and evaluate the different cooperatives involved in communities.			
47.02 Identify and evaluate the organizations that serve cooperatives.			
48.0 Construct a plan for financing and taxation within an agricultural cooperative.—The student will be able to:			
48.01 Explain the difference between the two forms of capital debt and equity.			
48.02 Explain how equity capital is provided.			
48.03 Describe the various ways a cooperative can obtain borrowed capital.			
48.04 Explain the single-tax principle and how it works for cooperatives and differentiate between direct and indirect taxes and describe the progressivity of taxes.			
49.0 Explain the steps for starting an agricultural cooperative.—The student will be able to:			
49.01 Understand how to organize and operate a business.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
49.02 Become familiar with the basic legal and financial documents needed to operate a cooperative business.			
49.03 Learn how a cooperative business functions and operates.			
49.04 Understand the process for marketing a product.			
50.0 Validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education. -- The student will be able to:			
50.01 Acquire and demonstrate communication skills such as writing, public speaking, and listening while refining oral, written, and verbal skills.			
50.02 Recognize and explain the role of the FFA in the development of leadership, education, employability, communications and human relations skills.			
50.03 Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.			
50.04 Acquire the skills necessary to positively influence others.			
50.05 Develop a skill set to enhance the positive evolution of the whole person.			
51.0 Complete a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education. -- The student will be able to:			
51.01 Explain the nature of and become familiar with those terms related to an SAE program.			
51.02 Explore the numerous possibilities for an SAE program which a student might develop.			
51.03 Develop an individual SAE program and implement record keeping skills.			
51.04 Compose an FFA Proficiency Application or State Degree Application.			
52.0 Interpret and apply state and federal rules and regulations to enterprise-- The student will be able to:			
52.01 List agencies responsible for inspecting and regulating operation or product.			
52.02 Secure necessary inspections, certifications and registrations.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
52.03 Investigate EPA, DEP, and FDAC environmental policies.			
52.04 Determine the impact of water restriction on agribusiness operations.			
52.05 Maintain a file of current rules and regulations relative to operation.			
52.06 List reasons for the necessity of inspections, certification and regulations.			
52.07 Diagram and explain the problems that occur when government institutes wage and price controls, and explain the rational for these controls			
53.0 Perform accounting activities--The student will be able to:			
53.01 Record and post transactions in a general journal.			
53.02 Prepare a balance sheet.			
53.03 Prepare a cash flow statement.			
53.04 Demonstrate knowledge of checking account records and bank reconciliation.			
53.05 Interpret financial statements.			
53.06 Demonstrate knowledge of the accounting cycle.			
53.07 Create and interpret a budget for one year.			
53.08 Establish a plan to pay off debt.			
53.09 Demonstrate accounting operations on a computer.			
53.10 Calculate and record depreciation, net worth, and income.			
53.11 Explain cash management strategies including debit accounts, checking accounts, and savings accounts.			
53.12 Analyze credit scores and reports.			
53.13 Complete a profit and loss statement.			
53.14 Calculate the finance charges and total amount due on a credit card bill.			
54.0 Perform communication activities-- The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
54.01 Demonstrate effective telephone usage and courtesy.			
54.02 Demonstrate knowledge of e-mail etiquette and ethics.			
54.03 Compose business correspondence and related documents and demonstrate correct spelling, grammar, punctuation, and work choice.			
54.04 Research and interpret information retrieved from print and electronic resources.			
54.05 Research and compose a document containing statistical information.			
54.06 Prepare visual material, including electronic media, to support an oral presentation.			
54.07 Demonstrate ability to communicate effectively with diverse populations.			
55.0 Demonstrate an understanding of legal and ethical issues in a business environment. -- The student will be able to:			
55.01 Demonstrate understanding of contracts.			
55.02 Demonstrate understanding of human resource issues.			
55.03 Demonstrate understanding of negotiable instruments.			
55.04 Demonstrate understanding of intellectual property rights.			
55.05 Demonstrate understanding of appropriate use of employer property.			
55.06 Demonstrate understanding of confidentiality.			
55.07 Demonstrate understanding of role of ethical decision making in dealing with stakeholders.			
55.08 Demonstrate knowledge of social responsibilities.			
55.09 Demonstrate knowledge of legal and privacy issues regarding e-mail, voice mail, internet, telephone, and other communication methods.			
56.0 Develop financial literacy skills. – The student will be able to:			
56.01 Calculate the effects on the monthly payment in the change of interest rate based on an adjustable rate mortgage.	MA.912.F.3.10		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
56.02 Calculate the final pay out amount for a balloon mortgage.	MA.912.F.3.11		
56.03 Analyze diversification in investments.	MA.912.F.4.10		
56.04 Purchase stock with a set amount of money, and follow the process through gains, losses, and selling.	MA.912.F.4.11		
56.05 Compare and contrast income from purchase of common stock, preferred stock, and bonds.	MA.912.F.4.12		
56.06 Given current exchange rates be able to convert from one form of currency to another.	MA.912.F.4.13		
56.07 Compare different insurance options and fees.	MA.912.F.4.6		
56.08 Compare and contrast the role of insurance as a device to mitigate risk and calculate expenses of various options.	MA.912.F.4.7		
56.09 Collect, organize, and interpret data to determine an effective retirement savings plan to meet personal financial goals.	MA.912.F.4.8		
56.10 Calculate, compare, and contrast different types of retirement plans, including IRAs, ROTH accounts, and annuities.	MA.912.F.4.9		

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Floral Design and Marketing
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8012100
CIP Number	0201060801
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 Retailing@7 7G MKTG 1
CTSO	FFA
SOC Codes (all applicable)	41-2031- Retail Salespersons 27-1023 - Floral Designers 41-1011 - First-Line Supervisors of Retail Sales Workers
Facility Code	223 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 and preparing floral designs, selling, buying, transporting, storing, advertising, displaying, and managing the floral goods and services industry.

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 consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8012110	Introductory Floral Design	1 credit	27-1023	2
	8012120	Floral Design 2	1 credit		2
B	8012130	Floral Design and Marketing Services 3	1 credit	41-2031	2
C	8012140	Floral Design and Management 4	1 credit	41-1011	2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Floral Design 1	^^	^^	^^	1/53 2%	11/52 21%	11/56 20%	14/55 25%	13/58 22%	5/35 14%	16/42 38%	13/56 23%	11/53 21%
Floral Design 2	^^	^^	^^	2/53 4%	2/52 4%	8/56 14%	5/55 9%	6/58 10%	2/35 6%	11/42 26%	6/56 11%	3/53 6%
Floral Design and Marketing Services 3	^^	^^	^^	1/53 2%	12/52 23%	6/56 11%	13/55 24%	12/58 21%	3/35 9%	12/42 29%	12/56 21%	12/53 22%

Floral Design and Management 4	∞	∞	∞	1/53 2%	9/52 17%	4/56 7%	12/55 21%	8/58 14%	2/35 6%	8/42 19%	9/56 16%	9/53 17%
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∞ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Floral Design and Marketing.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Floral Design and Marketing
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing
- 04.0 Discuss the floral design and marketing industry.
- 05.0 Demonstrate the application of post harvest care and handling of floral products.
- 06.0 Identify procedures for creating floral designs.
- 07.0 Identify mechanical components of floral design.
- 08.0 Demonstrate knowledge in non-floral and gift packaging.
- 09.0 Identify procedures to create fresh and permanent floral designs
- 10.0 Demonstrate effective communication skills.
- 11.0 Apply techniques for post harvest care and handling of floral products.
- 12.0 Create fresh and permanent floral designs
- 13.0 Demonstrate order processing skills.
- 14.0 Perform merchandising operations unique to floral marketing.
- 15.0 Apply sales techniques and procedures to the marketing of floral products.
- 16.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Floral Design and Marketing.
- 17.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Floral Design and Marketing.
- 18.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing.
- 19.0 Create designs for live plants.
- 20.0 Identify factors for the promotion of florist store products and services
- 21.0 Demonstrate knowledge of merchandising activities
- 22.0 Apply sales promotion techniques and procedures to the marketing of floral products.
- 23.0 Create fresh and permanent special occasion floral pieces
- 24.0 Create fresh and/or permanent sympathy designs.
- 25.0 Create fresh and/or permanent wedding designs.
- 26.0 Demonstrate distribution skills involved in floral marketing.
- 27.0 Identify factors to consider when opening/managing a floral business.
- 28.0 Demonstrate an understanding of the functions of management.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Floral Design 1
Course Number: 8012110
Course Credit: 1

Course Description:

This course is designed to develop the fundamental competencies necessary for employment in the floral design industry. Topics include: introduction to the floral industry, safety regulations, mechanical components of design, history of design, and basic floral design techniques.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Floral Design and Marketing	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Floral Design and Marketing	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing,	

Florida Standards		Correlation to CTE Program Standard #
	rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	
03.05	Use appropriate tools strategically.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Discuss the floral design and marketing industry--The student will be able to:		SC.912.L.17.11, 13, 19, 20 SC.912.L.15.13 SC.912.N.1.4, 6
04.01 Identify careers in the floral design and marketing industry.		
04.02 Describe trends in the floral design and marketing industry.		
04.03 Explain floral services.		
04.04 Discuss global floral sourcing.		
05.0 Demonstrate the application of post-harvest care and handling of floral products-- The student will be able to:		SC.912.E.5.4 SC.912.E.7.4 SC.912.L.17.17
05.01 Identify safety procedures.		
05.02 Identify varieties of flowers and plants utilized in floral arrangements.		
05.03 Perform specialized care and handling of flowers and plants utilized in floral arrangements.		
05.04 Store plants, flowers, and prepared floral arrangements according to established procedures.		
05.05 Demonstrate maintenance of fresh flowers and foliage.		
06.0 Identify procedures and creating floral designs--The student will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
06.01 Identify and practice safety procedures.		
06.02 Identify fundamentals of the elements of design.		
06.03 Identify principles of design.		
06.04 Apply fundamentals of creativity.		
06.05 Identify, use, and maintain hand tools and equipment.		
06.06 Select appropriate containers based on mechanics of design.		
07.0 Identify mechanical components of floral design—The student will be able to:		
07.01 Demonstrate proper wiring techniques.		
07.02 Demonstrate appropriate use of floral oasis.		
07.03 Create different types of bows.		
07.04 Select containers for specific designs.		
07.05 Demonstrate proper use of a helium tank.		
08.0 Demonstrate knowledge in non-floral and gift packaging.—The student will be able to:		
08.01 Create balloon arrangements.		
08.02 Identify mechanics of gift baskets.		
08.03 Construct presentation of non-floral and packaging items.		
08.04 Create a non-floral product.		
09.0 Identify procedures to create fresh and permanent floral designs.—The student will be able to:		
09.01 Create geometric designs.		
09.02 Create horizontal and vertical designs.		
09.03 Create symmetrical and asymmetrical designs.		
09.04 Create personal flowers to wear.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
09.05 Apply principles of mass production skills.		
10.0 Demonstrate effective communication skills--The student will be able to:		
10.01 Discuss the role of communications in marketing.		
10.02 Demonstrate a proficiency in the effective use of speech and vocabulary.		
10.03 Demonstrate effective written communication skills.		
10.04 Demonstrate effective oral communication skills.		
10.05 Demonstrate effective listening skills.		

**Florida Department of Education
 Student Performance Standards**

Course Title: Floral Design 2
Course Number: 8012120
Course Credit: 1

Course Description:

This course prepares the student in the skills of merchandising math, pricing, and selling. In addition the course includes skills for ordering fresh and silk flowers, maintaining stock, receiving and processing wholesale and retail sales orders, pricing stock, and utilizing appropriate sales techniques and customer relations.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Floral Design and Marketing.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	01.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	01.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
01.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
01.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
01.04.2		
02.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Floral Design and Marketing		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	
	LAFS.1112.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	
	LAFS.1112.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
	LAFS.1112.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	
	LAFS.1112.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	
	LAFS.1112.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	
	LAFS.1112.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing		
03.01	Make sense of problems and persevere in solving them.	
	MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively.	
	MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others.	
	MAFS.K12.MP.3.1	
03.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
11.0 Apply techniques for post harvest care and handling of floral products--The student will be able to:		SC.912.E.7.1, 4 SC.912.L.14.2, 3, 6 SC.912.L.17.4, 11, 16, 17
11.01 Discuss operation of underwater floral cutting equipment.		
11.02 Discuss use of electric floral stem stripper.		
11.03 Apply knowledge in the use of floral preservatives and pre-hydrating solutions.		
11.04 Demonstrate knowledge and application of refrigeration, sanitation, and ethylene control.		
11.05 Identify grower-packaging quantities used for cut flowers and foliage.		
11.06 Apply knowledge of specialized techniques for conditioning post-harvest plant material.		
11.07 Discuss the benefits of chain of life.		
12.0 Create fresh and permanent floral designs--The student will be able to:		
12.01 Identify and create advanced geometric designs.		
12.02 Identify design styles.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
12.03 Apply knowledge of the color wheel.		
12.04 Apply use of color harmonies.		
12.05 Describe differences in period design.		
12.06 Create seasonal arrangements.		
13.0 Demonstrate order processing skills—The student will be able to:		
13.01 Tag floral orders.		
13.02 Package products.		
13.03 Price orders.		
14.0 Perform merchandising operations unique to floral marketing--The student will be able to:		
14.01 Demonstrate correct procedures for handling customer sales transactions.		
14.02 Explain pricing policies.		
14.03 Calculate mark-up of floral products.		
14.04 Describe opening and closing procedures for a floral operation.		
15.0 Apply sales techniques and procedures to the marketing of floral products--The student will be able to:		SC.912.L.17.1 SC.912.N.1.5
15.01 Demonstrate steps of a sale utilizing floral products.		
15.02 Perform telephone sales.		
15.03 Distinguish between a local, incoming, and outgoing order.		
15.04 Demonstrate the process of using both telephone and computer wire service.		

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing Services 3
Course Number: 8012130
Course Credit: 1

Course Description:

This course prepares the student to market floral designs. Content includes construction and use of display items, sales promotions, and inventory control. Content will also help build team building skills, and build critical thinking skills.

Florida Standards		Correlation to CTE Program Standard #
16.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Floral Design and Marketing	
16.01	Key Ideas and Details	
16.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
16.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
16.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
16.02	Craft and Structure	
16.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
16.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
16.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
16.03	Integration of Knowledge and Ideas	
16.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
16.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
16.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
16.04	Range of Reading and Level of Text Complexity	
16.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
16.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
17.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Floral Design and Marketing	
17.01	Text Types and Purposes	
17.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
17.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
17.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
17.02	Production and Distribution of Writing	
17.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
17.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
17.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
17.03	Research to Build and Present Knowledge	
17.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
17.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
17.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
17.04	Range of Writing	
17.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
18.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing	
18.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
18.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
18.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
18.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
18.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
18.06 Attend to precision.	MAFS.K12.MP.6.1
18.07 Look for and make use of structure.	MAFS.K12.MP.7.1
18.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
19.0 Create designs for live plants. The student will be able to:		
19.01 Construct dish gardens		
19.02 Decorate blooming plants.		
20.0 Identify factors for the promotion of florist store products and services--The student will be able to:		
20.01 Identify the major classifications of retail flower operations.		
20.02 Describe product presentation and importance of window and store display.		
20.03 Identify primary goals of display.		
21.0 Demonstrate knowledge of merchandising activities--The student will be able to:		
21.01 Explain the role of buying and purchasing in a retailing situation.		
21.02 Follow accepted procedures for inventory control.		
21.03 Demonstrate stock-keeping procedures.		
21.04 Operate appropriate weighing and measuring devices for floral products and materials.		
22.0 Apply sales promotion techniques and procedures to the marketing of floral products--The student will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
22.01 Discuss the purposes of advertising, display, and public relations.		
22.02 Explain the importance of sales promotion.		
22.03 Identify various forms of advertising media including the Internet		
22.04 Plan and present a sales promotion for a product.		

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Management 4
Course Number: 8012140
Course Credit: 1

Course Description:

This course prepares the student with basic skills in specialty designs, weddings, funerals, and special events. The course allows the students opportunities to use creative concepts to create floral designs and personal pieces, beginning management and business skills are also part of the course.

Florida Standards		Correlation to CTE Program Standard #
16.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Floral Design and Marketing	
	16.01 Key Ideas and Details	
	16.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	16.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	16.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	16.02 Craft and Structure	
	16.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	16.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	16.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
16.03 Integration of Knowledge and Ideas		
16.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
16.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
16.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
16.04 Range of Reading and Level of Text Complexity		
16.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
16.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
17.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Floral Design and Marketing		
17.01 Text Types and Purposes		
17.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
17.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
17.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
17.02 Production and Distribution of Writing		
17.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>17.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>17.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
17.03 Research to Build and Present Knowledge	
<p>17.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>17.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>17.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
17.04 Range of Writing	
<p>17.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
18.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing	
<p>18.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>18.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>18.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
18.04 Model with mathematics.	MAFS.K12.MP.4.1	
18.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
18.06 Attend to precision.	MAFS.K12.MP.6.1	
18.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
18.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
23.0 Create fresh and permanent special occasion floral pieces.—The student will be able to:		
23.01 Create unique corsages & boutonnieres.		
23.02 Create seasonal/holiday designs.		
23.03 Create special event pieces: conventions, parties, banquets, showers, and receptions.		
24.0 Create fresh and/or permanent sympathy designs--The student will be able to:		
24.01 Create a casket spray.		
24.02 Create funeral baskets.		
24.03 Create set pieces (using manufactured form).		
24.04 Create easel pieces.		
24.05 Create interior lid pieces.		
24.06 Create a non-traditional memorial design.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
24.07 Conduct a funeral consultation.		
25.0 Create fresh and/or permanent wedding designs--The student will be able to:		
25.01 Create designs for church/synagogue weddings.		
25.02 Create designs for theme weddings.		
25.03 Create designs for wedding receptions.		
25.04 Design a bridal bouquet.		
25.05 Create designs for wedding party members.		
25.06 Conduct a wedding consultation.		
26.0 Demonstrate distribution skills involved in floral marketing--The student will be able to:		
26.01 Route and organize deliveries according to priority, location, and time.		
26.02 Make confirmation phone calls.		
26.03 Maintain general floral shop upkeep.		
27.0 Identify factors to consider when opening/managing a floral business--The student will be able to:		
27.01 Identify primary functions of a retail flower shop.		
27.02 Explain the characteristics of store location options.		
27.03 Characterize the principle responsibilities of employees.		
27.04 Summarize the key management responsibilities required for a successful and profitable flower shop.		
28.0 Demonstrate an understanding of the functions of management--The student will be able to:		SC.912.N.1.4, 5
28.01 Identify and describe steps in the planning process.		
28.02 Define Management by Objectives (MBO).		
28.03 Develop an organizational chart to illustrate line and staff relationships.		
28.04 Describe the responsibilities for selecting, training, and appraising employees.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
28.05 Define the principles of “chain of command” and “span of control.”		
28.06 Justify the importance of accountability.		
28.07 Name and define the functions of management (planning, organizing, staffing, directing, controlling).		
28.08 Explain how motivation, leadership, and communication influence people within an organization.		

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Course Title: Introduction to Agriculture, Food, & Natural Resources
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food, & Natural Resources

Secondary – Middle School	
Program Number	8021100
CIP Number	148021100M
Grade Level	6-8
Standard Length	Semester
Teacher Certification	Agriculture 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Demonstrate an understanding of the Food Products & Processing Systems career pathway.
- 02.0 Demonstrate an understanding of the Plant Systems career pathway.
- 03.0 Demonstrate an understanding of the Animal Systems career pathway.
- 04.0 Demonstrate an understanding of the Power, Structure, and Technical Systems career pathway.
- 05.0 Demonstrate an understanding of the Natural Resource Systems career pathway.
- 06.0 Demonstrate an understanding of the Environmental Service Systems career pathway.
- 07.0 Demonstrate an understanding of the Agribusiness Systems career pathway.
- 08.0 Apply leadership and communication skills.
- 09.0 Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster.
- 10.0 Use information technology tools.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Agriculture, Food, & Natural Resources
Course Number: 8021100
Course Length: Semester

Course Description:

Beginning with a broad overview of the Agriculture, Food, & Natural Resources career cluster, students are introduced to the terminology, careers, history, required skills, and technologies associated with each pathway in the Agriculture, Food, & Natural Resources career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of the Food Products & Processing Systems career pathway. – The student will be able to:
01.01	Define and use proper terminology associated with the Food Products & Processing Systems career pathway.
01.02	Describe some of the careers available in the Food Products & Processing Systems career pathway.
01.03	Identify common characteristics of the careers in the Food Products & Processing Systems career pathway.
01.04	Research the history of the Food Products & Processing Systems career pathway and describe how the associated careers have evolved and impacted society.
01.05	Identify skills required to successfully enter any career in the Food Products & Processing Systems career pathway.
01.06	Describe technologies associated in careers within the Food Products & Processing Systems career pathway.
02.0	Demonstrate an understanding of the Plant Systems career pathway. – The student will be able to:
02.01	Define and use proper terminology associated with the Plant Systems career pathway.
02.02	Describe some of the careers available in the Plant Systems career pathway.
02.03	Identify common characteristics of the careers in the Plant Systems career pathway.
02.04	Research the history of the Plant Systems career pathway and describe how the careers have evolved and impacted society.
02.05	Identify skills required to successfully enter any career in the Plant Systems career pathway.
02.06	Describe technologies associated in careers within the Plant Systems career pathway.

CTE Standards and Benchmarks

03.0	Demonstrate an understanding of the Animal Systems career pathway. – The student will be able to:
03.01	Define and use proper terminology associated with the Animal Systems career pathway.
03.02	Describe some of the careers available in the Animal Systems career pathway.
03.03	Identify common characteristics of the careers in the Animal Systems career pathway.
03.04	Research the history of the Animal Systems career pathway and describe how the careers have evolved and impacted society.
03.05	Identify skills required to successfully enter any career in the Animal Systems career pathway.
03.06	Describe technologies associated in careers within the Animal Systems career pathway.
04.0	Demonstrate an understanding of the Power, Structural and Technological Systems career pathway. – The student will be able to:
04.01	Define and use proper terminology associated with the Power, Structural and Technological Systems career pathway.
04.02	Describe some of the careers available in the Power, Structural and Technological Systems career pathway.
04.03	Identify common characteristics of the careers in the Power, Structural and Technological Systems career pathway.
04.04	Research the history of the Power, Structural and Technological Systems career pathway and describe how the careers have evolved and impacted society.
04.05	Identify skills required to successfully enter any career in the Power, Structural and Technological Systems career pathway.
04.06	Describe technologies associated in careers within the Power, Structural, and Technological Systems career pathway.
05.0	Demonstrate an understanding of the Natural Resource Systems career pathway. – The student will be able to:
05.01	Define and use proper terminology associated with the Natural Resource Systems career pathway.
05.02	Describe some of the careers available in the Natural Resource Systems career pathway.
05.03	Identify common characteristics of the careers in the Natural Resource Systems career pathway.
05.04	Research the history of the Natural Resource Systems career pathway and describe how the careers have evolved and impacted society.
05.05	Identify skills required to successfully enter any career in the Natural Resource Systems career pathway.
05.06	Describe technologies associated in careers within the Natural Resource Systems career pathway.
06.0	Demonstrate an understanding of the Environmental Service Systems career pathway. – The student will be able to:

CTE Standards and Benchmarks

06.01	Define and use proper terminology associated with the Environmental Service Systems career pathway.
06.02	Describe some of the careers available in the Environmental Service Systems career pathway.
06.03	Identify common characteristics of the careers in Environmental Service Systems career pathway.
06.04	Research the history of the Environmental Service Systems career pathway and describe how the careers have evolved and impacted society.
06.05	Identify skills required to successfully enter any career in the Environmental Service Systems career pathway.
06.06	Describe technologies associated in careers within the Environmental Service Systems career pathway.
07.0	Demonstrate an understanding of the Agribusiness Systems career pathway. – The student will be able to:
07.01	Define and use proper terminology associated with the Agribusiness Systems career pathway.
07.02	Describe some of the careers available in the Agribusiness Systems career pathway.
07.03	Identify common characteristics of the careers in Environmental Service Systems career pathway.
07.04	Research the history of the Agribusiness Systems career pathway and describe how the careers have evolved and impacted society.
07.05	Identify skills required to successfully enter any career in the Agribusiness Systems career pathway.
07.06	Describe technologies associated in careers within the Agribusiness Systems career pathway.
08.0	Apply leadership and communication skills. – The student will be able to:
08.01	Discuss the establishment and history of the FFA organization.
08.02	Identify the characteristics and responsibilities of organizational leaders.
08.03	Demonstrate parliamentary procedure skills during a meeting.
08.04	Participate on a committee which has an assigned task and report to the class.
08.05	Demonstrate effective communication skills through delivery of a speech, a slide presentation, or conducting a demonstration.
08.06	Use a computer to assist in the completion of project related to the Agriculture, Food, & Natural Resources career cluster.
09.0	Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster. – The student will be able to:
09.01	Identify information technology (IT) careers in the Agriculture, Food & Natural Resources career cluster, including the responsibilities, tasks and skills they require.

CTE Standards and Benchmarks

09.02	Relate information technology project management concepts and terms to careers in the Agriculture, Food & Natural Resources career cluster.
09.03	Manage information technology components typically used in professions of the Agriculture, Food & Natural Resources career cluster.
09.04	Identify security-related ethical and legal IT issues faced by professionals in the Agriculture, Food & Natural Resources career cluster.
10.0	Use information technology tools. – The student will be able to:
10.01	Identify the functions of web browsers, and use them to access the World Wide Web and other computer resources typically used in the Agriculture, Food & Natural Resources career cluster.
10.02	Use e-mail clients to send simple messages and files to other Internet users.
10.03	Demonstrate ways to communicate effectively using Internet technology.
10.04	Use different types of web search engines effectively to locate information relevant to the Agriculture, Food & Natural Resources career cluster.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Course Title: Introduction to Agriculture, Food, & Natural Resources and Career Planning
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food, & Natural Resources

Secondary – Middle School

Program Number	8021110
CIP Number	148021100M
Grade Level	6-8
Standard Length	Semester
Teacher Certification	Agriculture 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Demonstrate an understanding of the Food Products & Processing Systems career pathway.
- 02.0 Demonstrate an understanding of the Plant Systems career pathway.
- 03.0 Demonstrate an understanding of the Animal Systems career pathway.
- 04.0 Demonstrate an understanding of the Power, Structure, and Technical Systems career pathway.
- 05.0 Demonstrate an understanding of the Natural Resource Systems career pathway.
- 06.0 Demonstrate an understanding of the Environmental Service Systems career pathway.
- 07.0 Demonstrate an understanding of the Agribusiness Systems career pathway.
- 08.0 Apply leadership and communication skills.
- 09.0 Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster.
- 10.0 Use information technology tools.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Agriculture, Food, & Natural Resources
Course Number: 8021100
Course Length: Semester

Course Description:

Beginning with a broad overview of the Agriculture, Food, & Natural Resources career cluster, students are introduced to the terminology, careers, history, required skills, and technologies associated with each pathway in the Agriculture, Food, & Natural Resources career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of the Food Products & Processing Systems career pathway. – The student will be able to:
01.01	Define and use proper terminology associated with the Food Products & Processing Systems career pathway.
01.02	Describe some of the careers available in the Food Products & Processing Systems career pathway.
01.03	Identify common characteristics of the careers in the Food Products & Processing Systems career pathway.
01.04	Research the history of the Food Products & Processing Systems career pathway and describe how the associated careers have evolved and impacted society.
01.05	Identify skills required to successfully enter any career in the Food Products & Processing Systems career pathway.
01.06	Describe technologies associated in careers within the Food Products & Processing Systems career pathway.
02.0	Demonstrate an understanding of the Plant Systems career pathway. – The student will be able to:
02.01	Define and use proper terminology associated with the Plant Systems career pathway.
02.02	Describe some of the careers available in the Plant Systems career pathway.
02.03	Identify common characteristics of the careers in the Plant Systems career pathway.
02.04	Research the history of the Plant Systems career pathway and describe how the careers have evolved and impacted society.
02.05	Identify skills required to successfully enter any career in the Plant Systems career pathway.
02.06	Describe technologies associated in careers within the Plant Systems career pathway.

CTE Standards and Benchmarks

03.0	Demonstrate an understanding of the Animal Systems career pathway. – The student will be able to:
03.01	Define and use proper terminology associated with the Animal Systems career pathway.
03.02	Describe some of the careers available in the Animal Systems career pathway.
03.03	Identify common characteristics of the careers in the Animal Systems career pathway.
03.04	Research the history of the Animal Systems career pathway and describe how the careers have evolved and impacted society.
03.05	Identify skills required to successfully enter any career in the Animal Systems career pathway.
03.06	Describe technologies associated in careers within the Animal Systems career pathway.
04.0	Demonstrate an understanding of the Power, Structural and Technological Systems career pathway. – The student will be able to:
04.01	Define and use proper terminology associated with the Power, Structural and Technological Systems career pathway.
04.02	Describe some of the careers available in the Power, Structural and Technological Systems career pathway.
04.03	Identify common characteristics of the careers in the Power, Structural and Technological Systems career pathway.
04.04	Research the history of the Power, Structural and Technological Systems career pathway and describe how the careers have evolved and impacted society.
04.05	Identify skills required to successfully enter any career in the Power, Structural and Technological Systems career pathway.
04.06	Describe technologies associated in careers within the Power, Structural, and Technological Systems career pathway.
05.0	Demonstrate an understanding of the Natural Resource Systems career pathway. – The student will be able to:
05.01	Define and use proper terminology associated with the Natural Resource Systems career pathway.
05.02	Describe some of the careers available in the Natural Resource Systems career pathway.
05.03	Identify common characteristics of the careers in the Natural Resource Systems career pathway.
05.04	Research the history of the Natural Resource Systems career pathway and describe how the careers have evolved and impacted society.
05.05	Identify skills required to successfully enter any career in the Natural Resource Systems career pathway.
05.06	Describe technologies associated in careers within the Natural Resource Systems career pathway.
06.0	Demonstrate an understanding of the Environmental Service Systems career pathway. – The student will be able to:

CTE Standards and Benchmarks

06.01	Define and use proper terminology associated with the Environmental Service Systems career pathway.
06.02	Describe some of the careers available in the Environmental Service Systems career pathway.
06.03	Identify common characteristics of the careers in Environmental Service Systems career pathway.
06.04	Research the history of the Environmental Service Systems career pathway and describe how the careers have evolved and impacted society.
06.05	Identify skills required to successfully enter any career in the Environmental Service Systems career pathway.
06.06	Describe technologies associated in careers within the Environmental Service Systems career pathway.
07.0	Demonstrate an understanding of the Agribusiness Systems career pathway. – The student will be able to:
07.01	Define and use proper terminology associated with the Agribusiness Systems career pathway.
07.02	Describe some of the careers available in the Agribusiness Systems career pathway.
07.03	Identify common characteristics of the careers in Environmental Service Systems career pathway.
07.04	Research the history of the Agribusiness Systems career pathway and describe how the careers have evolved and impacted society.
07.05	Identify skills required to successfully enter any career in the Agribusiness Systems career pathway.
07.06	Describe technologies associated in careers within the Agribusiness Systems career pathway.
08.0	Apply leadership and communication skills. – The student will be able to:
08.01	Discuss the establishment and history of the FFA organization.
08.02	Identify the characteristics and responsibilities of organizational leaders.
08.03	Demonstrate parliamentary procedure skills during a meeting.
08.04	Participate on a committee which has an assigned task and report to the class.
08.05	Demonstrate effective communication skills through delivery of a speech, a slide presentation, or conducting a demonstration.
08.06	Use a computer to assist in the completion of project related to the Agriculture, Food, & Natural Resources career cluster.
09.0	Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster. – The student will be able to:
09.01	Identify information technology (IT) careers in the Agriculture, Food & Natural Resources career cluster, including the responsibilities, tasks and skills they require.

CTE Standards and Benchmarks

09.02	Relate information technology project management concepts and terms to careers in the Agriculture, Food & Natural Resources career cluster.
09.03	Manage information technology components typically used in professions of the Agriculture, Food & Natural Resources career cluster.
09.04	Identify security-related ethical and legal IT issues faced by professionals in the Agriculture, Food & Natural Resources career cluster.
10.0	Use information technology tools. – The student will be able to:
10.01	Identify the functions of web browsers, and use them to access the World Wide Web and other computer resources typically used in the Agriculture, Food & Natural Resources career cluster.
10.02	Use e-mail clients to send simple messages and files to other Internet users.
10.03	Demonstrate ways to communicate effectively using Internet technology.
10.04	Use different types of web search engines effectively to locate information relevant to the Agriculture, Food & Natural Resources career cluster.
Listed below are the standards that must be met to satisfy the requirements of Section 1003.4156, Florida Statutes.	
The student will be able to:	
11.0	Describe the influences that societal, economic, and technological changes have on employment trends and future training.
12.0	Develop skills to locate, evaluate, and interpret career information.
13.0	Identify and demonstrate processes for making short and long term goals.
14.0	Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.
15.0	Understand the relationship between educational achievement and career choices/postsecondary options.
16.0	Identify a career cluster and related pathways that match career and education goals.
17.0	Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.
18.0	Demonstrate knowledge of technology and its application in career fields/clusters.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career Planning

The requirements of section 1003.4156 (1) (e), Florida Statutes, have been integrated into this course. The statute requires that students take a career and education planning course that must result in a completed personalized academic and career plan for the student; must emphasize the importance of entrepreneurship skills; must emphasize technology or the application of technology in career fields; and, beginning in the 2014-2015 academic year, must provide information from the Department of Economic Opportunity's economic security report as described in section 445.07, Florida Statutes. For additional information on the Middle School Career and Education Planning course requirements, go to <http://www.fldoe.org/workforce/ced/>.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Program Title: Fundamentals of Agriculture, Food, and Natural Resource Systems
Program Type: Orientation/Exploratory
Career Cluster: Agriculture, Food, and Natural Resources

Secondary – Middle School

Program Number	8021300
CIP Number	148021300M
Grade Level	6-8
Standard Length	year
Teacher Certification	Agriculture 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Summarize the evolution of production agriculture.
- 02.0 Differentiate between animal welfare and ethical treatment of animals
- 03.0 Explain skills and principles used in dairy production.
- 04.0 Explain skills and principles used in livestock production.
- 05.0 Explain skills and principles used in poultry production.
- 06.0 Explain skills and principles used in vegetable production.
- 07.0 Investigate and demonstrate skills and principles used in nursery production.
- 08.0 Apply scientific and technical skills in production agriculture.
- 09.0 Manage leadership and communication skills
- 10.0 Examine good work habits, and career planning in agriculture production.
- 11.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in production agriculture.
- 12.0 Identify components of network systems.
- 13.0 Describe and use communication features of information technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Agriculture, Food, & Natural Resources
Course Number: 8021100
Course Length: Semester

Course Description:

Beginning with a broad overview of the Agriculture, Food, & Natural Resources career cluster, students are introduced to the terminology, careers, history, required skills, and technologies associated with each pathway in the Agriculture, Food, & Natural Resources career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

CTE Standards and Benchmarks	
01.0	Summarize the evolution of production agriculture- The student will be able to:
01.01	Describe the importance of agriculture on a world, national, state and community scale.
01.02	Distinguish the major agricultural production areas of the United States.
01.03	Distinguish agriculture products produced in Florida.
01.04	Interpret how changes in production practices, population, and land use have influenced the agriculture economy.
01.05	Demonstrate how development of new technology has affected agriculture production.
01.06	Examine the changes in agriculture careers that reflect the changes in production methods.
02.0	Differentiate between animal welfare and ethical treatment of animals- The student will be able to:
02.01	Describe the proper handling of production animals.
02.02	Compare animal welfare and animal rights.
02.03	Explain how animal welfare and animal rights advocate groups impact production agriculture.
02.04	Summarize animal cruelty and the consequences of cruel treatment of animals.
03.0	Explain skills and principles used in dairy production. – The student will be able to:
03.01	Explain the difference between breeds of dairy cattle.

CTE Standards and Benchmarks

03.02 Demonstrate knowledge of proper health and nutrition for dairy animals.

03.03 Explain the safety procedures used for dairy products.

03.04 Compare different styles of dairies and milking parlors.

03.05 Identify the varieties of dairy products and the methods of processing.

03.06 Create a dairy product.

04.0 Explain skills and principles used in livestock production.- the student will be able to:

04.01 Compare the different breeds of livestock.

04.02 Differentiate the different cuts and grading of meat.

04.03 Evaluate proper health and nutrition for livestock animals.

04.04 Demonstrate knowledge of terminology for animals based on species and condition (eg. age, sex, bred, etc...)

04.05 Determine different reproduction methods, and the process of selective breeding.

04.06 Explain how the use of biotechnology has impacted the livestock industry.

05.0 Explain skills and principles used in poultry production. - The student will be able to:

05.01 Compare different types of poultry and their uses in production agriculture.

05.02 Differentiate proper techniques for classification and grading of poultry and poultry products.

05.03 Describe proper safe handling techniques for poultry products.

05.04 Evaluate knowledge of health and nutrition for poultry.

05.05 Explain how the use of biotechnology has impacted the poultry industry.

06.0 Explain skills and principles used in vegetable production. – The student will be able to:

06.01 Produce a vegetable crop.

06.02 Compare the components of soil.

06.03 Perform a soil test.

CTE Standards and Benchmarks

06.04	Describe how climate can affect crop production.
06.05	Compile knowledge of growing seasons for a geographic region.
06.06	Explain the use of Best Management Practices in crop production.
06.07	Investigate the impact of pests on crop yields.
06.08	Model the safety precautions on a pesticide and fertilizer label.
06.09	Assess proper irrigation methods for crops.
06.10	Analyze knowledge of harvesting techniques and equipment
06.11	Compare types of storage facilities.
06.12	Explain how the use of biotechnology has impacted vegetable crop production.
07.0	Explain skills and principles used in nursery production. – The student will be able to:
07.01	Perform plant propagation.
07.02	Develop a growing schedule for nursery plants.
07.03	Model methods for Integrated Pest Management.
07.04	Compare types of growing media.
07.05	Identify nutrients necessary for plant growth from the periodic table and their functions.
07.06	Identify plants based on common and scientific names.
07.07	Describe principles for plant growth.
07.08	Explain different methods of irrigation.
07.09	Explain how the use of biotechnology has impacted plant production.
08.0	Apply scientific and technical skills in production agriculture. – The student will be able to:
08.01	Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings.
08.02	Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications

CTE Standards and Benchmarks

09.0	Manage leadership and communication skills. – The student will be able to:
09.01	Discuss the establishment and history of the FFA organization.
09.02	Compare the characteristics and responsibilities of organizational leaders.
09.03	Demonstrate parliamentary procedure skills during a meeting.
09.04	Participate on a committee which has an assigned task and report to the class.
09.05	Demonstrate effective communication skills through delivery of a speech or conducting a demonstration.
09.06	Use a computer to assist in the completion of an agricultural project.
10.0	Demonstrate good work habits, and career planning in agriculture production. – The student will be able to:
10.01	Identify attitudes and habits necessary to achieve career success.
10.02	Describe personality aspects to consider when choosing a career.
10.03	Identify the basic steps in career planning.
10.04	Identify and research careers within a specific area of agriscience.
11.0	Integrate the use of science, mathematics, reading, geography, history, writing, and communication in production agriculture. – The student will be able to:
11.01	Apply basic mathematics operations to solve agricultural problems.
11.02	Correctly use measuring devices and utilize measurements to solve agricultural problems.
11.03	Prepare written and/or oral materials using correct English grammar.
11.04	Identify the main idea in oral presentations and/or written materials.
11.05	Locates, organizes, and interprets information from a variety of agricultural sources.
11.06	Describe the historical evolution of agriculture. Select and study a problem that can be tested under controlled conditions to establish a hypothesis or to illustrate a known law.
11.07	Apply basic mathematics operations to solve agricultural problems.
12.0	Identify components of network systems.—The student will be able to:
12.01	Identify structure to access internet, including hardware and software components.

CTE Standards and Benchmarks

12.02	Identify and configure user customization features in web browsers, including preferences, caching, and cookies.
12.03	Recognize essential database concepts.
12.04	Define and use additional networking and internet services.
13.0	Describe and use communication features of information technology.-- The student will be able to:
13.01	Define important internet communications protocols and their roles in delivering basic Internet services.
13.02	Identify basic principles of the Domain Name System (DNS).
13.03	Identify security issues related to Internet clients.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Program Title: Fundamentals of Agriculture, Food & Natural Resource Services
Program Type: Orientation/Exploratory
Career Cluster: Agriculture, Food & Natural Resources

Secondary – Middle School

Program Number	8021400
CIP Number	148021400M
Grade Level	6-8
Standard Length	year
Teacher Certification	Agriculture 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Identify components of agribusiness.
- 02.0 Recommend appropriate agriculture communications concepts
- 03.0 Summarize skills used in landscape services.
- 04.0 Incorporate knowledge and skills involved with food science.
- 05.0 Construct a floral design.
- 06.0 Communicate skills gained from small, companion animal care.
- 07.0 Recommend leadership and communication styles.
- 08.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.
- 09.0 Recognize the value of responsibility, good work habits, and planning for career opportunities in agriculture services.
- 10.0 Identify components of network systems
- 11.0 Describe and use communication features of information technology

**Florida Department of Education
Student Performance Standards**

Course Title: Fundamentals of Agriculture, Food & Natural Resource Services
Course Number: 8021400
Course Length: 1 year

Course Description:

This course is designed to develop competencies in the area of agriculture services. This includes: the global impact of agribusiness, communications, landscaping, food science, floral design, companion animal care, as well leadership skills. Laboratory-based activities are an integral part of this course. These include safe use and application of appropriate technology, scientific testing and observation equipment.

CTE Standards and Benchmarks	
01.0	Identify components of agribusiness. The student will be able to:
01.01	Describe the business cycle.
01.02	Complete a profit/ loss statement.
01.03	Distinguish between types of competition practices.
01.04	Demonstrate proper methods of recording merchandise.
01.05	Summarize proper use of customer service skills.
01.06	Explain proper management techniques.
02.0	Recommend appropriate agriculture communications concepts- the student will be able to :
02.01	Sort & classify types of communication used in Agriculture.
02.02	Create messages using various forms of communication.
02.03	Generate a speech.
02.04	Compare and contrast different types of media.
02.05	Create a photo story.
02.06	Demonstrate proper ethics in communication.

CTE Standards and Benchmarks

02.07	Identify and compare regulating agencies.
02.08	Evaluate careers in agriculture communications.
03.0	Summarize skills used in landscape services.- the student will be able to:
03.01	Distinguish plants based on common and scientific name.
03.02	Conduct a soil test.
03.03	Construct an irrigation system.
03.04	Compare and contrast landscape styles.
03.05	Select plants based on environmental factors.
03.06	Design a landscape.
03.07	Model personal safety and knowledge of equipment.
03.08	Explain proper procedures for applying pesticides and fertilizer based on Best Management practices.
03.09	Inventory an ecosystem.
03.10	Apply knowledge of invasive plants.
03.11	Apply knowledge of customer interactions
04.0	Incorporate knowledge and skills involved with food science.- the student will be able to:
04.01	Explain the process from farm to consumer
04.02	Investigate safe food handling practices, and their regulating agencies
04.03	Document changes in food preservation and how it impacted our civilization
04.04	Recognize food processing and packaging procedures.
04.05	Explain how to develop and market a food product.
04.06	Describe the components of a nutrition label
04.07	Create and market a food product.

CTE Standards and Benchmarks

05.0	Construct a floral design. – The student will be able to:
05.01	Compare and contrast historical and cultural contributions to design.
05.02	Identify types of arrangements and products.
05.03	Demonstrate knowledge of floral pricing.
05.04	Verify flowers by common and scientific name.
05.05	Assemble a floral arrangement.
05.06	Summarize knowledge of inventory skills.
05.07	Develop a marketing plan.
06.0	Communicate skills gained from small, companion animal care. – The student will be able to:
06.01	Demonstrate knowledge of proper nutrition and health in small and companion animals.
06.02	Differentiate between animal welfare and animal rights.
06.03	Describe the training process for service animals
06.04	Compare and contrast career opportunities available for companion animals based on animal type and breed.
06.05	Explain proper care for a small animal.
07.0	Recommend leadership and communication styles. – The student will be able to:
07.01	Explore the establishment and history of the FFA organization.
07.02	Analyze the characteristics and responsibilities of organizational leaders.
07.03	Demonstrate parliamentary procedure skills during a meeting.
07.04	Evaluate a committee which has an assigned task and report to the class.
07.05	Demonstrate effective communication skills through delivery of a speech or conducting a demonstration.
07.06	Use a computer to assist in the completion of an agricultural project.
08.0	Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology. – The student will be able to:

CTE Standards and Benchmarks

08.01	Apply basic mathematics operations to solve agricultural problems.
08.02	Correctly use measuring devices and utilize measurements to solve agricultural problems.
08.03	Apply the scientific method to solve an agricultural problem.
08.04	Prepare written and/or oral materials using correct English grammar.
08.05	Identify the main idea in oral presentations and/or written materials.
08.06	Locates, organizes, and interprets information from a variety of agricultural sources.
08.07	Describe the historical evolution of agriculture.
09.0	Recognize the value of responsibility, good work habits, and planning for career opportunities in agriculture services. – The student will be able to:
09.01	Identify attitudes and habits necessary to achieve career success.
09.02	Describe personality aspects to consider when choosing a career.
09.03	Identify the basic steps in career planning.
09.04	Develop basic career plan.
09.05	Identify and research careers within a specific area of agriscience.
10.0	Identify components of network systems.—The student will be able to:
10.01	Identify structure to access internet, including hardware and software components.
10.02	Identify and configure user customization features in web browsers, including preferences, caching, and cookies.
10.03	Recognize essential database concepts.
10.04	Define and use additional networking and internet services.
11.0	Describe and use communication features of information technology.-- The student will be able to:
11.01	Define important internet communications protocols and their roles in delivering basic Internet services.
11.02	Identify basic principles of the Domain Name System (DNS).
11.03	Identify security issues related to Internet clients.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Course Title: Agriculture, Food and Natural Resource Directed Study
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Course Number	8100100
CIP Number	0101999901
Grade Level	11-12, 30, 31
Standard Length	Multiple credits
Teacher Certification	AGRICULTUR 1 @2 ANY AG EDUC G
CTSO	FFA

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 purpose of this course is to provide students with learning opportunities in a prescribed program of study within the Agriculture, Food and Natural Resources cluster that will enhance opportunities for employment in the career field chosen by the student.

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

Course Structure

The content is prescribed by the instructor based upon the individual student's assessed needs for directed study.

This course may be taken only by a student who has completed or is currently completing a specific secondary job preparatory program or occupational completion point for additional study in this career cluster. A student may earn multiple credits in this course.

The selected standards and benchmarks, which the student must master to earn credit, must be outlined in an instructional plan developed by the instructor.

Florida Standardsfor Technical Subjects

Florida Standards(FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standardsfor Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standardsfor Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Demonstrate expertise in a specific occupation contained within the career cluster.
- 02.0 Conduct investigative research on a selected topic related to the career cluster using approved research methodology, interpret findings, and prepare presentation to defend results.
- 03.0 Apply enhanced leadership and professional career skills.
- 04.0 Demonstrate higher order critical thinking and reasoning skills appropriate for the selected program of study.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriculture, Food and Natural Resource Directed Study
Course Number: 8100100
Course Credit: 1

Course Description:

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
01.0 Demonstrate expertise in a specific occupation within the career cluster.— The student will be able to:		
01.01 The benchmarks will be selected from the appropriate curriculum frameworks and determined by the instructor based upon the individual students assessed needs.		
02.0 Conduct investigative research on a selected topic related to the career cluster using approved research methodology, interpret findings, and prepare presentation to defend results--The student will be able to:		
02.01 Select investigative study referencing prior research and knowledge.		
02.02 Collect, organize and analyze data accurately and precisely.		
02.03 Design procedures to test the research.		
02.04 Report, display and defend the results of investigations to audiences that may include professionals and technical experts.		
03.0 Apply enhanced leadership and professional career skills--The student will be able to:		
03.01 Develop and present a professional presentation offering potential solutions to a current issue.		
03.02 Enhance leadership and career skills through work-based learning		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
including job placement, job shadowing, entrepreneurship, internship, or a virtual experience.		
03.03 Participate in leadership development opportunities available through the appropriate student organization and/or other professional organizations.		
03.04 Enhance written and oral communications through the development of presentations, public speaking, and live and/or virtual interviews.		
04.0 Demonstrate higher order critical thinking and reasoning skills appropriate for the selected program of study--The student will be able to:		
04.01 Use mathematical and/or scientific skills to solve problems encountered in the chosen occupation.		
04.02 Read and interpret information relative to the chosen occupation.		
04.03 Locate and evaluate key elements of oral and written information.		
04.04 Analyze and apply data and/or measurements to solve problems and interpret documents.		
04.05 Construct charts/tables/graphs using functions and data.		
04.06 Enhance leadership and career skills through work-based learning including job placement, job shadowing, entrepreneurship, internship, or a virtual experience.		
04.07 Participate in leadership development opportunities available through the appropriate student organization and/or other professional organizations.		
04.08 Enhance written and oral communications through the development of presentations, public speaking, and live and/or virtual interviews.		

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Course Title: Orientation to Agriscience and Career Planning
Course Type: Orientation/Exploratory and Career Planning
Career Cluster: Agriculture Food and Natural Resources

Secondary – Middle School

Program Number	8100110
CIP Number	01019910CE
Grade Level	6-8
Standard Length	One Semester or the equivalent of one-half a school year
Teacher Certification	AGRICULTUR 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Demonstrate knowledge and skills in agriscience research.
- 02.0 Demonstrate knowledge and skills plant sciences.
- 03.0 Demonstrate knowledge and skills in animal sciences.
- 04.0 Demonstrate knowledge and skills in food science.
- 05.0 Demonstrate knowledge and skills in agriscience laboratories.
- 06.0 Demonstrate product knowledge and skills in agricultural processing and marketing.
- 07.0 Demonstrate knowledge and skills in environmental resources.
- 08.0 Demonstrate leadership and communication skills.
- 09.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Orientation to Agriscience and Career Planning
Course Number: 8100110
Course Length: Semester

Course Description:

This course is designed to provide an understanding of the agricultural food system, environmental resources, and strategies used to produce and market agricultural products, and an exploration of research through the use of the scientific method.

CTE Standards and Benchmarks	
01.0	Demonstrate knowledge and skills in agriscience research--The student will be able to:
01.01	Define agriscience.
01.02	Describe products of agriscience.
01.03	Define the scope of research in agriscience.
01.04	Discuss the impact of research on agriculture and on consumers of agricultural products.
01.05	Identify the process by which agricultural research is conducted including the scientific method.
01.06	Apply the scientific method to solve an agricultural problem.
02.0	Demonstrate knowledge and skills in plant sciences--The student will be able to:
02.01	Distinguish between nursery and landscape plants and crops for consumption.
02.02	Identify horticultural forestry and agronomic plants.
02.03	Propagate and grow an agricultural plant.
02.04	Identify supplies and services industries related to plant science.
02.05	Develop a specimen collection of local plant materials.
02.06	Demonstrate proper planting techniques.

CTE Standards and Benchmarks

02.07	Identify nursery and landscape plants and crops for consumption.
03.0	Demonstrate knowledge and skills in animal sciences--The student will be able to:
03.01	Distinguish between food, service and companion animals.
03.02	Identify breeds of food, service and companion animals.
03.03	Identify supplies and services industries related to animal science.
03.04	Demonstrate the proper care of an animal.
03.05	Identify consumer foods and products derived from animals.
04.0	Demonstrate knowledge and skills in food science--The student will be able to:
04.01	Describe the proper handling and storage of food products.
04.02	List and explain methods of food preservation.
04.03	Conduct a food taste test.
04.04	Develop a production and marketing plan for a food product.
04.05	Read and interpret a food label.
05.0	Demonstrate knowledge and skills in agriscience laboratories and workshops--The student will be able to:
05.01	Demonstrates proper laboratory safety techniques.
05.02	Complete a project demonstrating the safe use of agricultural tools, machinery and equipment.
05.03	Define the scope of agricultural mechanization and engineering.
05.04	Discuss the impact of agricultural mechanization and engineering on society.
05.05	Identify tools, machines and equipment used in agriculture.
05.06	Conduct an experiment using proper laboratory techniques.
05.07	Demonstrate proper workshop safety techniques.
06.0	Demonstrate product knowledge and skills in agricultural processing and marketing--The student will be able to:

CTE Standards and Benchmarks

06.01	Define agricultural product processing and marketing.
06.02	Describe the processing and marketing of an agriculture product from farm to consumer.
06.03	Prepare process and market an agricultural product.
07.0	Demonstrate knowledge and skills in environmental resources--The student will be able to:
07.01	Define and identify renewable and nonrenewable natural resources.
07.02	Describe agricultural management practices that conserve natural resources.
07.03	Describe effects of pollution on the environment.
07.04	Demonstrate how to Recycle or conserve a natural resource.
07.05	Define organic agriculture and traditional agriculture.
08.0	Demonstrate leadership and communication skills--The student will be able to:
08.01	Describe the aims and purposes of the FFA organization.
08.02	Identify opportunities available to FFA members.
08.03	Identify characteristics of a good leader.
08.04	Participate in a cooperative leadership development activity or FFA Career Development Event.
08.05	Identify the importance of effective communication skills.
08.06	Demonstrate effective communication skills.
09.0	Integrate the use of science, mathematics, reading, geography, history, writing and communication in agriscience and technology--The student will be able to:
09.01	Apply basic mathematic operations to solve agricultural problems.
09.02	Correctly use measuring instruments and utilize measurements to solve agricultural problems.
09.03	Apply the scientific method to solve an agricultural problem.
09.04	Prepare written and oral materials using correct English grammar.
09.05	Identify the main idea in oral presentations and written materials.

CTE Standards and Benchmarks

09.06 Locates, organizes and interprets information from a variety of agricultural sources.

09.07 Describe the historical evolution of agriculture.

09.08 Identify specific areas of commodity production in the state, nation and world.

Listed below are the standards that must be met to satisfy the requirements of Section 1003.4156, Florida Statutes.

The student will be able to:

10.0 Describe the influences that societal, economic, and technological changes have on employment trends and future training.

11.0 Develop skills to locate, evaluate, and interpret career information.

12.0 Identify and demonstrate processes for making short and long term goals.

13.0 Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.

14.0 Understand the relationship between educational achievement and career choices/postsecondary options.

15.0 Identify a career cluster and related pathways that match career and education goals.

16.0 Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.

17.0 Demonstrate knowledge of technology and its application in career fields/clusters.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career Planning

The requirements of section 1003.4156 (1) (e), Florida Statutes, have been integrated into this course. The statute requires that students take a career and education planning course that must result in a completed personalized academic and career plan for the student; must emphasize the importance of entrepreneurship skills; must emphasize technology or the application of technology in career fields; and, beginning in the 2014-2015 academic year, must provide information from the Department of Economic Opportunity's economic security report as described in section 445.07, Florida Statutes. For additional information on the Middle School Career and Education Planning course requirements, go to <http://www.fldoe.org/workforce/ced/>.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Program Title: Introduction to Agriscience
Program Type: Orientation/Exploratory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Middle School

Program Number	8100120
CIP Number	01019921EX
Grade Level	6-8
Standard Length	semester
Teacher Certification	AGRICULTUR 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Identify the importance of agriculture.
- 02.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.
- 03.0 Describe chains between producer and consumer for agricultural products.
- 04.0 Use selected techniques to produce finished products from agricultural materials.
- 05.0 Describe the importance of plants and animals in agriculture.
- 06.0 Describe leadership and communication skills.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Agriscience
Course Number: 8100120
Course Length: Semester

Course Description:

This course is designed to develop competencies in the areas of agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture.

CTE Standards and Benchmarks	
01.0	Identify the importance of agriculture--The student will be able to:
01.01	Define agriculture and explain its diversity and scope.
01.02	Describe the importance of agriculture on a world, national, state and community scale. Describe the importance of agriculture in each individual's life.
01.03	Collect and discuss information on current agricultural events.
01.04	Trace the evolution of agriculture from its begins to current applications.
01.05	Identify conditions necessary for agricultural production.
01.06	Identify the major agricultural production areas of the United States and of Florida.
01.07	Describe the diversity of career opportunities in agriscience and technology.
01.08	Describe the relationship between environmental resources and agriculture.
01.09	Describe technology used in agricultural production.
01.10	Describe technology used in processing and marketing agricultural products.
02.0	Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology--The student will be able to:
02.01	Apply basic mathematics operations to solve agricultural problems.
02.02	Correctly use measuring devices and utilize measurements to solve agricultural problems.

CTE Standards and Benchmarks

02.03	Prepare written and oral materials using correct English grammar.
02.04	Identify the main idea in oral presentations and written materials.
02.05	Locates, organizes, and interprets information from a variety of agricultural sources.
02.06	Describe the historical evolution of agriculture in Florida.
03.0	Describe chains between producer and consumer for agricultural products--The student will be able to:
03.01	Identify the agricultural source of consumer products.
03.02	Trace the development of an agricultural product from the producer to the consumer.
01.01	Evaluate proper health and nutrition for livestock animals.
04.0	Use selected techniques to produce finished products from agricultural materials--The student will be able to:
04.01	Complete a project safely using the appropriate agricultural tools, machinery or equipment.
04.02	Prepare and process an agricultural product.
04.03	Propagate horticulture plants.
05.0	Describe the importance of plants and animals in agriculture--The student will be able to:
05.01	Identify plants important to agriculture.
05.02	Identify animals important to agriculture.
05.03	Demonstrate the proper handling and ethical care of animals.
05.04	Describe animal rights and animal welfare.
05.05	Define organic farming and traditional farming.
06.0	Describe leadership and communication skills--The student will be able to:
06.01	Describe the aims and purposes of the FFA organization.
06.02	Identify opportunities available to FFA members.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Program Title: Exploration of Agriscience
Program Type: Orientation/Exploratory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Middle School

Program Number	8100210
CIP Number	01019920EX
Grade Level	6-8
Standard Length	semester
Teacher Certification	AGRICULTUR 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Apply knowledge and skills in the area of agricultural research and related professions.
- 02.0 Apply knowledge and skills in biotechnology.
- 03.0 Apply knowledge and skills in plant sciences.
- 04.0 Apply knowledge and skills in animal sciences.
- 05.0 Demonstrate knowledge and skills in food science.
- 06.0 Apply knowledge and skills in processing and marketing.
- 07.0 Apply knowledge and skills in environmental resources.
- 08.0 Demonstrate the value of responsibility, good work habits, and planning for career opportunities in agriculture.
- 09.0 Apply leadership and communication skills.
- 10.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Exploration of Agriscience
Course Number: 8100210
Course Length: semester

Course Description:

This course is designed to provide instruction that explores the tasks, training, education and physical requirements of a broad range of agriscience and natural resources careers develop competencies in the areas of agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture.

CTE Standards and Benchmarks	
01.0	Apply knowledge and skills in biotechnology--The student will be able to:
01.01	Define biotechnology.
01.02	Discuss current and future uses of genetic engineering.
01.03	Identify issues associated with biotechnology.
01.04	Explain the history of genetic engineering and biotechnology in agriculture.
02.0	Apply knowledge and skills in plant sciences--The student will be able to:
02.01	Produce an agricultural crop.
02.02	Discuss the technology involved in the development of improved crops.
02.03	Identify agribusinesses that provide supplies and services to plant science industries in the local area.
02.04	Identify the recommended uses and safety precautions from a pesticide label.
02.05	Compare landscaping methods.
02.06	Develop a landscape design.
02.07	Develop a care and maintenance program for horticultural, forestry, and/or agronomic crops.
02.08	Identify pests, pathogens, parasites, and predators of horticultural, forestry, and agronomic crops.

CTE Standards and Benchmarks

02.09	Describe the major components of soil.
02.10	Explain methods of soil conservation.
02.11	Identify the major forest regions of the United States and Florida.
02.12	Describe the importance of forests and forest products.
02.13	Describe how trees grow, reproduce, and components of forest health.
02.14	Use tools and techniques common to the forest industry.
02.15	Describe various forms of fertilizer.
02.16	Demonstrate How to read a fertilizer label.
02.17	Demonstrate proper fertilizer use.
03.0	Apply knowledge and skills in animal sciences--The student will be able to:
03.01	Describe the differences between animal welfare and animal rights.
03.02	Raise and care for an agricultural animal.
03.03	Discuss the technology involved in the development of improved animal products.
03.04	Identify agribusinesses that provide supplies and services to animal science industries in the local area.
04.0	Demonstrate knowledge and skills in food science--The student will be able to:
04.01	Demonstrate the proper handling and storage of food products.
04.02	Demonstrate at least one method of food preservation.
04.03	Conduct a food taste test.
04.04	Produce and market a food product.
04.05	Read, interpret, and develop a food label.
04.06	Describe the components of a balance diet.
05.0	Apply knowledge and skills in agricultural processing and marketing--The student will be able to:

CTE Standards and Benchmarks

05.01	Identify processing and packaging techniques used in agriculture.
05.02	Discuss the difference in marketing strategies between perishable and nonperishable commodities.
05.03	develop a merchandising plan for an agricultural product.
05.04	Identify and compare USDA standards and grades for agricultural products.
05.05	Describe how processing, packaging, and marketing affects the price of an item.
05.06	Recognize misleading advertising.
05.07	Describe how competition benefits the consumer.
05.08	Record the market price of an agricultural commodity over a period of time.
06.0	Apply knowledge and skills in environmental resources--The student will be able to:
06.01	Identify methods or practices of conserving natural resources.
06.02	Demonstrate a method or practice of conservation.
06.03	Identify major ecosystems in Florida.
06.04	Discuss the importance of the ecosystems to agriculture, society and each other.
06.05	Define Best Management Practices.
06.06	Explain the use of Best Management Practices in agriculture.
07.0	Demonstrate the value of responsibility, good work habits, and planning for career opportunities in agriculture--The student will be able to:
07.01	Identify attitudes and habits necessary to achieve career success.
07.02	Identify the basic steps in career planning.
07.03	Develop basic career plan.
07.04	Identify and research careers within a specific area of agriscience.
08.0	Apply leadership and communication skills--The student will be able to:
08.01	Discuss the establishment and history of the FFA organization.

CTE Standards and Benchmarks

08.02	Identify the characteristics and responsibilities of organizational leaders.
08.03	Demonstrate parliamentary procedure skills during a meeting.
08.04	Demonstrate effective communication skills through delivery of a speech or conducting a demonstration.
08.05	Identify state and community organizations associated with agricultural promotion.
09.0	Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology--The student will be able to:
09.01	Apply basic mathematics operations to solve agricultural problems.
09.02	Correctly use measuring devices and utilize measurements to solve agricultural problems.
09.03	Apply the scientific method to solve an agricultural problem.
09.04	Prepare written and/or oral materials using correct English grammar.
09.05	Identify the main idea in oral presentations and/or written materials.
09.06	Locates, organizes, and interprets information from a variety of agricultural sources.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Program Title: Orientation to Agriscience
Program Type: Orientation/Exploratory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Middle School

Program Number	8100310
CIP Number	01019910OR
Grade Level	6-8
Standard Length	semester
Teacher Certification	AGRICULTUR 1 @2 EXP AG @4
CTSO	FFA
Facility Code	200 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food & Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

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

Standards

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

- 01.0 Demonstrate knowledge and skills in agriscience research.
- 02.0 Demonstrate knowledge and skills plant sciences.
- 03.0 Demonstrate knowledge and skills in animal sciences.
- 04.0 Demonstrate knowledge and skills in food science.
- 05.0 Demonstrate knowledge and skills in agriscience laboratories.
- 06.0 Demonstrate product knowledge and skills in agricultural processing and marketing.
- 07.0 Demonstrate knowledge and skills in environmental resources.
- 08.0 Demonstrate leadership and communication skills.
- 09.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Orientation to Agriscience
Course Number: 8100310
Course Length: Semester

Course Description:

This course is designed to provide an understanding of the agricultural food system, environmental resources, and strategies used to produce and market agricultural products, and an exploration of research through the use of the scientific method.

CTE Standards and Benchmarks	
01.0	Demonstrate knowledge and skills in agriscience research--The student will be able to:
01.01	Define agriscience.
01.02	Describe products of agriscience.
01.03	Define the scope of research in agriscience.
01.04	Discuss the impact of research on agriculture and on consumers of agricultural products.
01.05	Identify the process by which agricultural research is conducted including the scientific method.
01.06	Apply the scientific method to solve an agricultural problem.
02.0	Demonstrate knowledge and skills in plant sciences--The student will be able to:
02.01	Distinguish between nursery and landscape plants and crops for consumption.
02.02	Identify horticultural forestry and agronomic plants.
02.03	Propagate and grow an agricultural plant.
02.04	Identify supplies and services industries related to plant science.
02.05	Develop a specimen collection of local plant materials.
02.06	Demonstrate proper planting techniques.

CTE Standards and Benchmarks

02.07	Identify nursery and landscape plants and crops for consumption.
03.0	Demonstrate knowledge and skills in animal sciences--The student will be able to:
03.01	Distinguish between food, service and companion animals.
03.02	Identify breeds of food, service and companion animals.
03.03	Identify supplies and services industries related to animal science.
03.04	Demonstrate the proper care of an animal.
03.05	Identify consumer foods and products derived from animals.
04.0	Demonstrate knowledge and skills in food science--The student will be able to:
04.01	Describe the proper handling and storage of food products.
04.02	List and explain methods of food preservation.
04.03	Conduct a food taste test.
04.04	Develop a production and marketing plan for a food product.
04.05	Read and interpret a food label.
05.0	Demonstrate knowledge and skills in agriscience laboratories and workshops--The student will be able to:
05.01	Demonstrates proper laboratory safety techniques.
05.02	Complete a project demonstrating the safe use of agricultural tools, machinery and equipment.
05.03	Define the scope of agricultural mechanization and engineering.
05.04	Discuss the impact of agricultural mechanization and engineering on society.
05.05	Identify tools, machines and equipment used in agriculture.
05.06	Conduct an experiment using proper laboratory techniques.
05.07	Demonstrate proper workshop safety techniques.
06.0	Demonstrate product knowledge and skills in agricultural processing and marketing--The student will be able to:

CTE Standards and Benchmarks

06.01	Define agricultural product processing and marketing.
06.02	Describe the processing and marketing of an agriculture product from farm to consumer.
06.03	Prepare process and market an agricultural product.
07.0	Demonstrate knowledge and skills in environmental resources--The student will be able to:
07.01	Define and identify renewable and nonrenewable natural resources.
07.02	Describe agricultural management practices that conserve natural resources.
07.03	Describe effects of pollution on the environment.
07.04	Demonstrate how to Recycle or conserve a natural resource.
07.05	Define organic agriculture and traditional agriculture.
08.0	Demonstrate leadership and communication skills--The student will be able to:
08.01	Describe the aims and purposes of the FFA organization.
08.02	Identify opportunities available to FFA members.
08.03	Identify characteristics of a good leader.
08.04	Participate in a cooperative leadership development activity or FFA Career Development Event.
08.05	Identify the importance of effective communication skills.
08.06	Demonstrate effective communication skills.
09.0	Integrate the use of science, mathematics, reading, geography, history, writing and communication in agriscience and technology--The student will be able to:
09.01	Apply basic mathematic operations to solve agricultural problems.
09.02	Correctly use measuring instruments and utilize measurements to solve agricultural problems.
09.03	Apply the scientific method to solve an agricultural problem.
09.04	Prepare written and oral materials using correct English grammar.
09.05	Identify the main idea in oral presentations and written materials.

CTE Standards and Benchmarks

09.06 Locates, organizes and interprets information from a variety of agricultural sources.

09.07 Describe the historical evolution of agriculture.

09.08 Identify specific areas of commodity production in the state, nation and world.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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.

**Florida Department of Education
Curriculum Framework**

Course Title: Fundamentals of Agriscience
Course Type: Non Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Non Career Preparatory

Program Number	8100320
CIP Number	01019931PA
Grade Level	9-12, 30, 31
Standard Length	1 credit
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
Facility Code	201 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 Agriculture, Food and Natural Resources career cluster.

The purpose of this course is to give students an opportunity to apply knowledge and skills related to the area of Agriculture, Food and Natural Resources.

The content includes but is not limited to instruction in plant science, animal science, soil science, agricultural mechanics, natural resources and conservation, communication and employability skills.

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

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Fundamentals of Agriscience	^^	^^	^^	**	**	**	**	**	**	**	**	**

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

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:

- 01.0 Describe the unique relationship between agriscience and the environment.
- 02.0 Initiate a Supervised Agricultural Experience (SAE) program based on identified career opportunities.
- 03.0 Demonstrate basic leadership skills in parliamentary procedure, public speaking, and group dynamics.
- 04.0 Demonstrate basic skills in natural resources.
- 05.0 Demonstrate basic skills in pest management.
- 06.0 Demonstrate the fundamental skills in plant science.
- 07.0 Demonstrate the aesthetic and environmental use of plants.
- 08.0 Demonstrate the basic skills in animal science.
- 09.0 Demonstrate the fundamental skills in food science and technology.
- 10.0 Demonstrate the basic skills in agricultural business management.
- 11.0 Demonstrate the basic mechanical skills.

**Florida Department of Education
Student Performance Standards**

Course Title: Fundamentals of Agriscience
Course Number: 8100320
Course Credit: 1

Course Description:

This course teaches knowledge and skills related to the area of plant science, animal science, soil science, agricultural mechanics, natural resources and conservation, communication and employability skills.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
01.0 Describe the unique relationship between agriscience and the environment--The student will be able to:		
01.01 Identify the major sciences that explain the development, existence, and improvement of living things.		
01.02 Describe the elements of a healthful environment.		
01.03 Describe the efforts made to improve the environment.		
02.0 Initiate a Supervised Agricultural Experience (SAE) program based on identified career opportunities--The student will be able to:		
02.01 Identify career opportunities in agriscience.		
02.02 Identify how careers are classified and determine preparation requirements.		
02.03 Plan a supervised agricultural experience program.		
02.04 Demonstrate employability skills.		
03.0 Demonstrate basic leadership skills in parliamentary procedure, public speaking, and group dynamics--The student will be able to:		
03.01 Explain the importance of effective leadership in agriscience.		
03.02 Prepare and present an oral report.		
03.03 Prepare and submit a written report on an agriscience topic.		
03.04 Describe the opportunities available through the FFA organization.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate basic skills in natural resources--The student will be able to:		
04.01 Determine the major sources of air pollution and identify procedures for maintaining and improving air quality.		
04.02 Determine the relationships between water and soil in our environment and determine practices for conserving these resources.		
04.03 Determine the origin and classification of soils, and identify effective procedures for soils and hydroponics management.		
04.04 Compare the relationship of forests to our environment and select practices for utilizing forest resources.		
04.05 Describe the relationship between wildlife and the environment and identify approved practices in managing wildlife enterprises.		
04.06 Identify the biological requirements necessary for the production of aquatic plants and animals.		
05.0 Demonstrate basic skills in pest management--The student will be able to:		
05.01 Identify the major pest groups and the importance of effective pest management programs.		
05.02 Classify the nature of chemicals used to control pests.		
05.03 Define terms regarding chemical safety.		
05.04 Demonstrate safety in the use of chemicals.		
06.0 Demonstrate the fundamental skills in plant science--The student will be able to:		
06.01 Identify the major parts of plants and state the important functions of each.		
06.02 State how plants make food.		
06.03 Describe the relationships among air, soil, water, and essential plant nutrients.		
06.04 Identify the methods used by plants to reproduce themselves and demonstrate propagation technology.		
06.05 Plan, plant and manage a garden.		
06.06 Identify the basic principles of fruit and nut production.		
06.07 Identify the basic principles of vegetable production.		
06.08 Identify the major crops grown for grain, oil, and special purposes.		
06.09 Identify the major crops grown for forage and pasture.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
07.0	Demonstrate the aesthetic and environmental uses of plants--The student will be able to:		
07.01	Identify and maintain indoor plants.		
07.02	State the basic cultural practices for turfgrass production and maintenance.		
07.03	Identify and maintain trees and shrubs.		
08.0	Demonstrate the basic skills in animal science--The student will be able to:		
08.01	Determine the basic nutritional requirements of animals.		
08.02	Identify the factors promoting and maintaining animal health.		
08.03	Define terms associated with animal genetics and reproduction, and describe the principles of genetics.		
08.04	Identify the types, uses, care, and management of small animals.		
08.05	Identify major types and classes of livestock and horses.		
09.0	Demonstrate the fundamental skills in food science and technology--The student will be able to:		
09.01	Compare procedures for marketing plants and animal products.		
09.02	Describe the elements, trends, and career opportunities in the food industry.		
09.03	Describe the nutrient requirements for human health.		
09.04	Identify the processes used in food science.		
10.0	Demonstrate the basic skills in agricultural business management--The student will be able to:		
10.01	Define management terms and determine how decisions are made.		
10.02	Define and describe entrepreneurship.		
10.03	Solve basic arithmetic problems associated with agribusiness management.		
11.0	Demonstrate the basic mechanical skills--The student will be able to:		
11.01	Identify basic hardware and fasteners.		
11.02	State the safety precautions and demonstrate appropriate behavior while working in the shop area.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
11.03 Identify the basic principles and use of electricity.		
11.04 Identify and correctly use hand and power tools common to the agricultural shop.		
11.05 Identify the controls and safely operate a farm tractor.		
11.06 Describe the basic operation of internal combustion engines.		
11.07 Service and operate small gasoline engines.		
11.08 Plan and construct a small woodworking project.		
11.09 Solve basic arithmetic problems associated with agriculture mechanics.		

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Course Title: **Advanced Concepts of Agriscience**
Course Type: **Career Preparatory**
Career Cluster: **Agriculture, Food and Natural Resources**

Secondary – Career Preparatory

Course Number	8100330
CIP Number	0101999902
Grade Level	11-12, 30, 31
Standard Length	1 credit
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA

Purpose

The purpose of this course is to provide students who have completed or are currently completing an OCP (occupational completion point) in an agricultural program, a capstone experience in agriscience education. This course is designed to enhance competencies in the areas of agricultural science and research; biological and physical science; environmental principles; and principles of leadership. 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

Program Structure

This course may be taken only by a student who has completed or is currently completing an occupational completion point in a job preparatory program. Standards 1-3 are required for all students. Each student will complete one or more of Standards 4-7 depending on the program the student has completed or is completing.

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:

- 01.0 Conduct a research project in agriculture using the scientific method, interpret research information, and prepare and present a research project.
- 02.0 Apply enhanced leadership and professional career skills.
- 03.0 Illustrate agricultural applications of physical science concepts and principles.

Optional Standards:

- 04.0 Investigate the concepts, principles, and theories associated with the classification, growth, function, and reproduction of plants and soils.
- 05.0 Investigate concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, ecology, and related current issues to understand animal life and animal science as it pertains to agriculture.
- 06.0 Investigate how chemistry and physics principles are applied to the composition of foods, food nutrition, and microbiology as it is associated with the food science segment of agriculture.
- 07.0 Apply enhanced agricultural communication and/or agricultural sales skills.

**Florida Department of Education
Student Performance Standards**

Course Title: **Advanced Concepts of Agriscience**
Course Number: **8100330**
Course Credit: **1**

CTE Standards and Benchmarks	
01.0	Conduct a research project in agriculture using the scientific method, interpret research information, and prepare and present a research project–The student will be able to:
01.01	Formulate hypotheses referencing prior research and knowledge.
01.02	Conduct controlled experiments or simulations to test hypotheses.
01.03	Collect, organize and analyze data accurately and precisely.
01.04	Formulate hypotheses referencing prior research and knowledge.
01.05	Design procedures to test the selected hypotheses.
01.06	Conduct systematic controlled experiments to test the selected hypotheses.
01.07	Report, display and defend the results of investigations to audiences that may include professionals and technical experts.
01.08	Estimate and suggest ways to reduce the degree of risk involved in activities in agriculture and related sciences.
02.0	Apply enhanced leadership and professional career skills–The student will be able to:
02.01	Identify and investigate a current agricultural issue.
02.02	Develop and present a professional presentation offering potential solutions to a current agricultural issue.
02.03	Enhance work-based learning through an expanded Supervised Agricultural Experience (SAE).
02.04	Identify the opportunities for enhanced leadership development available through the National FFA Organization and/or professional organizations.
02.05	Enhance written and oral communications through developing resumes and interviews.
03.0	Illustrate agricultural applications of physical science concepts and principles–The student will be able to:
03.01	Compare physical, ecological and behavioral factors that influence interactions and interdependence of organisms.

03.02	Identify a design problem that has practical applications and propose possible solutions, considering such constraints as available tools, materials, time, and costs.
03.03	Analyze the properties of materials (e.g., mass, boiling point, melting point, hardness) in relation to their physical and/or chemical structures.
03.04	Analyze factors that influence the relative motion of an object (e.g., friction, wind shear, cross currents, potential differences).
03.05	Analyze reactions (e.g., burning of fuel, decomposition of waste) in natural and man-made energy systems.
03.06	Describe the need for organization, supervision, rules, policies and procedures.
Optional Standards: Each program offering this course will provide instruction in one or more of the following standards. Selection of standard(s) will be based on the agriscience education program the student has completed or is completing.	
04.0	Investigate the concepts, principles, and theories associated with the classification, growth, function, and reproduction of plant and soils-- The student will be able to:
04.01	Describe biotechnology and genetic engineering.
04.02	Discuss the benefits and risks of biotechnology.
04.03	Describe the functions of water in plant growth.
04.04	Identify major sources of water pollution and possible measures for its control.
04.05	Contrast the biochemistry and functions of plant cell membranes and cell walls.
04.06	Describe and give functions for common plant cell types.
04.07	Identify cell types and functions associated with the vascular, dermal and ground tissue systems in woody and herbaceous plant parts.
04.08	Compare and contrast periderm and epidermis and xylem and phloem.
04.09	Explain how differential gene expression is what determines which proteins are made, and how the proteins decide the characteristics and functions of a particular cell.
04.10	Describe methods of producing transgenic plants and ways in which they are used.
05.0	Investigate concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, ecology, and related current issues to understand animal life and animal science as it pertains to agriculture--The student will be able to:
05.01	Identify the major features of chordates, identify the highlights of vertebrate evolution (development of jaws, cartilage to bone, and water to land), and identify the distinguishing characters of fish, birds, and mammals.
05.02	Compare and contrast three types of chemical bonds: hydrogen, ionic and covalent bonds.
05.03	Describe the biochemistry and functions of animal cell membranes. In doing so, describe the fluid mosaic model of the membrane and the role of the cell membrane proteins in transporting materials in and out of cells.
05.04	Using examples relevant to animal science, track the events involved in expression of individual genes and compartmentalization of the resulting proteins.

05.05	Discuss four basic tissue types: epithelial, connective, muscle, and nervous.
05.06	Describe the chemical process in the formation of bones and muscles and the process of calcification and its impact on animal growth.
05.07	Describe homeostasis and how it is controlled.
05.08	Explain the flow of genetic information, and identify the central dogma: DNA transcription-mRNA-translation-protein.
05.09	Describe the purpose, function, and production of RNA, and explain how protein synthesis works.
06.0	Investigate how chemistry and physics principles are applied to the composition of foods, food nutrition, and microbiology as it is associated with the food science segment of agriculture--The student will be able to:
06.01	Describe composition and arrangement of functional groups found in biological systems.
06.02	Discuss the chemical composition and structure of protein molecules including primary, secondary, tertiary, and quaternary structures.
06.03	Discuss the biochemical and physiological functions of proteins, carbohydrates, lipids, vitamins and minerals.
06.04	Explain thermodynamics and kinetics (e.g., reaction rates for affecting quality and destroying nutrients).
06.05	Compare and contrast the chemical reactions initiated by the effect of heat, oxygen, acid, and light during processing and storage of foods.
06.06	Identify the various food spoilage methods including microbial spoilage, chemical spoilage and their effect on food product shelf-life.
07.0	Apply enhanced agricultural communication and/or agricultural sales skills--The student will be able to:
07.01	Evaluate the effectiveness of a current communications or marketing campaign.
07.02	Develop and implement a communications or marketing campaign for an agricultural product or issue.
07.03	Apply enhanced written and oral communication skills by selecting the correct style, tone, and format appropriate for a variety of settings.
07.04	Demonstrate characteristics of a responsible/ethical agricultural communicator.
07.05	Select the proper communication medium and target audience for a current agricultural issue.

Additional Information

Laboratory Activities

A learning laboratory is provided as required to support the educational activities of the student. This laboratory may be in the traditional classroom, in an industry setting, or a virtual learning environment.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

**Florida Department of Education
Curriculum Framework**

Course Title: Agriculture, Food, and Natural Resources Cooperative Education OJT
Course Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Cooperative Education - OJT

Course Number	8100410
CIP Number	01019999CP
Grade Level	9-12, 30, 31
Standard Length	Multiple credits
Teacher Certification	AGRICULTUR 1 @2 ANY AG ED G
CTSO	FFA

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 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 cluster.

Each student job placement must be related to the job preparatory program in which the student is enrolled or has completed.

The purpose of this course is to provide the on-the-job training component when the **cooperative method of instruction** is appropriate. Whenever the cooperative method is offered, the following is required for each student: a training agreement; a training plan signed by the student, teacher and employer, including instructional objectives; a list of on-the-job and in-school learning experiences; a workstation which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal; and a site supervisor with a working knowledge of the selected occupation. The workstation may be in an industry setting or in a virtual learning environment. The student **must be compensated** for work performed.

The teacher/coordinator must meet with the site supervisor a minimum of once during each grading period for the purpose of evaluating the student's progress in attaining the competencies listed in the training plan.

Agriculture, Food, and Natural Resources Cooperative Education OJT may be taken by a student for one or more semesters. A student may earn multiple credits in this course. The specific student performance standards which the student must achieve to earn credit are specified in the Cooperative Education - OJT Training Plan.

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

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:

- 01.0 Perform designated job skills.
- 02.0 Demonstrate work ethics.

**Florida Department of Education
Student Performance Standards**

Program Title: Agriculture, Food, and Natural Resources Cooperative Education OJT
Course Number: 8100410

Standards and Benchmarks	
01.0	Perform designated job skills--The student will be able to:
01.01	Perform tasks as outlined in the training plan.
01.02	Demonstrate job performance skills.
01.03	Demonstrate safety procedures on the job.
01.04	Maintain appropriate records.
01.05	Attain an acceptable level of productivity.
01.06	Demonstrate appropriate dress and grooming habits.
02.0	Demonstrate work ethics--The student will be able to:
02.01	Follow directions.
02.02	Demonstrate good human relations skills on the job.
02.03	Demonstrate good work habits.
02.04	Demonstrate acceptable business ethics.

Additional Information

Special Notes

There is a **Cooperative Education Manual** available online that has guidelines for students, teachers, employers, parents and other administrators and sample training agreements. It can be accessed on the DOE website at <http://www.fldoe.org/workforce/dwdframe/pdf/STEPS-Manual.pdf>.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization(s) for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their postsecondary service provider. Accommodations received in postsecondary education may differ from those received in secondary education. 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 cannot be modified.

Some secondary students with disabilities may need additional time (beyond the regular school year) to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

**Florida Department of Education
Curriculum Framework**

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

NOTE: This program has been daggered for deletion with 2012-2013 being the last cohort of students permitted to enroll in the program. After 2012-2013, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8103200
CIP Number	0101020400
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 AGRI MECH #7
CTSO	FFA
SOC Codes (all applicable)	45-2091 - Agricultural Equipment Operators
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 mechanics industry within 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 consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	45-2091	3
	8103120	Agricultural Mechanics 2	1 credit		2
	8103130	Agricultural Mechanics 3	1 credit		2
B	8103210	Agricultural Machinery Operations 4	1 credit	45-2091	2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Course	Math			Science								
	ALG1	ALG2	GEO	APH	ASGH	BIO1	CHM1	ESS	GEN	MS1H	PS	PHY1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Agricultural Mechanics 2	^^	^^	^^	**	**	**	**	**	**	**	**	**
Agricultural Mechanics 3	^^	^^	^^	**	**	**	**	**	**	**	**	**

Course	Math			Science									
Agricultural Machinery Operations 4	^^	^^	^^	**	**	**	**	**	**	**	**	**	**

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review
 # Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Mechanics.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Mechanics.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Practice personal, equipment, and shop safety.
- 14.0 Select and use hand and power tools.
- 15.0 Install simple electrical circuits.
- 16.0 Demonstrate electric and gas welding.
- 17.0 Service and maintain small gasoline engines.
- 18.0 Perform preventive maintenance, checks, and services for tractors.
- 19.0 Perform minor repairs on an irrigation system.
- 20.0 Apply basic financial-management skills.
- 21.0 Demonstrate employability skills.
- 22.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Mechanics.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.
- 26.0 Keep records.
- 27.0 Practice soil conservation.
- 28.0 Operate, service, and maintain agricultural machinery and equipment.
- 29.0 Apply business-management skills and identify appropriate legal documents.
- 30.0 Demonstrate positive customer-relations skills.

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Mechanics.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Mechanics.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103120
Course Number: Agricultural Mechanics 2
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; selection and use of tools; electrical circuits; and employability skills.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Mechanics.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Mechanics.	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Practice personal, equipment, and shop safety--The student will be able to:			
13.01 Identify and eliminate hazards in agricultural mechanics settings.			
13.02 Observe color-coded warnings in work areas and on equipment and machinery.			
13.03 Describe appropriate actions in case of fire, accident, or other emergencies.			
13.04 Describe personal protective equipment (PPE) and appropriate clothing.			
13.05 Demonstrate safety procedures and workplace "housekeeping" practices.			
13.06 Safely handle and store flammable and non-restricted chemicals.			
13.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.			
13.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.			
13.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).			
14.0 Select and use hand and power tools--The student will be able to:			
14.01 Identify the capabilities and limitations of hand and power tools.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.02 Select and safely use hand and power tools.			
14.03 Select and use proper PPE for hand and power tools.			
14.04 Identify worn, damaged, or abused tools.			
14.05 Select and demonstrate the appropriate procedures for sharpening tools.			
15.0 Install simple electrical circuits--The student will be able to:			
15.01 Demonstrate the principles of AC and DC circuitry.			
15.02 Demonstrate series and parallel circuitry.			
15.03 Explain the scientific principles of electrical systems.			
15.04 Plan and install a simple wiring system.			
15.05 Test electrical circuits.			
16.0 Demonstrate employability skills--The student will be able to:			
16.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.			
16.02 Identify the documents that are required for a job application.			
16.03 Complete a job application form.			
16.04 Demonstrate competencies in job-interview techniques.			
17.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:			
17.01 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments.			
17.02 Explain emergency procedures to follow in response to workplace accidents.			
17.03 Create a disaster and/or emergency response plan.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Mechanics 3
Course Number: 8106510
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; financial management skills and employability skills.

Florida Standards		Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agriculture Mechanics.	
18.01	Key Ideas and Details	
18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02	Craft and Structure	
18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.		
20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
20.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
20.06 Attend to precision.	MAFS.K12.MP.6.1
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.0 Demonstrate electric and gas welding--The student will be able to:			
21.01 Select and use gas-welding equipment.			
21.02 Select and use electric arc-welding equipment and materials.			
22.0 Service and maintain small gasoline engines--The student will be able to:			
22.01 Explain the scientific principles of small engines.			
22.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).			
22.03 Practice appropriate safety precautions.			
22.04 Troubleshoot and perform minor repairs on small gasoline engines.			
23.0 Perform preventive maintenance, checks, and services for tractors--The student will be able to:			
23.01 Explain the scientific principles of hydraulic and transmission systems.			
23.02 Perform daily operator maintenance checks for tractors.			
23.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.			
23.04 Perform scheduled preventive-maintenance procedures.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.			
23.06 Keep records of tractor maintenance and services.			
24.0 Perform minor repair on an irrigation system--The student will be able to:			
24.01 Identify the basic components of irrigation systems.			
24.02 Differentiate various types of irrigation systems.			
24.03 Identify state and local regulatory agencies for water management.			
24.04 Perform minor repair on an irrigation system.			
25.0 Apply basic financial-management skills--The student will be able to:			
25.01 Complete basic financial records.			
25.02 Demonstrate the use of banking procedures.			
25.03 Calculate interest on loans.			
25.04 Complete selected income-tax-return forms.			
26.0 Demonstrate employability skills--The student will be able to:			
18.05 Demonstrate knowledge of how to make job changes appropriately.			
18.06 Demonstrate acceptable personal hygiene and a professional appearance.			
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.			
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.			
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103210
Course Number: Agricultural Machinery Operations 4
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of recordkeeping; soil conservation; operation, service and maintenance of machinery and equipment; business management skills; and customer relations.

Florida Standards		Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agriculture Mechanics.	
18.01	Key Ideas and Details	
18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02	Craft and Structure	
18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.	
20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
20.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
20.06 Attend to precision.	MAFS.K12.MP.6.1
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
27.0 Keep records--The student will be able to:			
27.01 Explain the purpose and importance of keeping records.			
27.02 Demonstrate procedures for keeping records of equipment maintenance and services.			
27.03 Keep records on each job or project assignment.			
28.0 Practice soil conservation--The student will be able to:			
23.01 Determine soil conditions such as texture, moisture, and structure.			
23.02 Identify the proper conditions of soil for machine operations.			
23.03 Practice soil conservation according to a farm plan.			
29.0 Operate, service, test, and maintain agricultural machinery and equipment--The student will be able to:			
29.01 Operate and adjust agricultural machinery and equipment that are used in the local area, according to the operator's manuals, such as the following: <ul style="list-style-type: none"> • agricultural wheel-type tractors • planting equipment • primary and secondary tillage equipment • pesticide-application equipment • harvesting equipment • fertilization equipment 			
29.02 Service machinery, using service manuals.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
29.03 Follow safety precautions when operating, servicing, and maintaining machines and equipment.			
30.0 Apply business-management skills and identify appropriate legal documents--The student will be able to:			
30.01 Identify personal/business liability and the use of liability insurance.			
30.02 Identify applicable insurance requirements.			
30.03 Identify and complete basic business-tax liability forms.			
30.04 Identify the requirements of eligibility for greenbelt, bluebelt, and homestead tax exemptions.			
30.05 Interpret enterprise budgets and amortization tables.			
30.06 Identify characteristics of legal documents (such as contracts, deeds, and leases).			
30.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.			
31.0 Demonstrate positive customer-relations skills--The student will be able to:			
31.01 Exercise self-control.			
31.02 Identify and demonstrate appropriate responses to criticism.			
31.03 Explain the effects of positive human-relations skills on success in the business.			
31.04 Demonstrate respect for people and property.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

Because of the production and marketing cycle of the agricultural industries, 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

- Agriscience Foundations

**Florida Department of Education
Curriculum Framework**

Program Title: Diversified Agricultural Mechanics
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2012-2013 being the last cohort of students permitted to enroll in the program. After 2012-2013, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8103300
CIP Number	0101020510
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 AGRI MECH #7
CTSO	FFA
SOC Codes (all applicable)	49-3041 - Farm Equipment Mechanics and Service Technicians 45-2091 - Agricultural Equipment Operators
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 mechanics industry within 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 consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	45-2091	3
	8103120	Agricultural Mechanics 2	1 credit		2
	8103130	Agricultural Mechanics 3	1 credit		2
B	8103310	Diversified Agricultural Mechanics 4	1 credit	45-3041	2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Course	Math			Science								
	ALG1	ALG2	GEO	APH	ASGH	BIO1	CHM1	ESS	GEN	MS1H	PS	PHY1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Agricultural Mechanics 2	^^	^^	^^	**	**	**	**	**	**	**	**	**

Course	Math			Science								
Agricultural Mechanics 3	^^	^^	^^	**	**	**	**	**	**	**	**	**
Diversified Agricultural Mechanics 4	^^	^^	^^	**	**	**	**	**	**	**	**	**

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Mechanics.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Mechanics.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Practice personal, equipment, and shop safety.
- 14.0 Select and use hand and power tools.
- 15.0 Install simple electrical circuits.
- 16.0 Demonstrate electric and gas welding.
- 17.0 Service and maintain small gasoline engines.
- 18.0 Perform preventive maintenance, checks, and services for tractors.
- 19.0 Perform minor repairs on an irrigation system.
- 20.0 Apply basic financial-management skills.
- 21.0 Demonstrate employability skills.
- 22.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Mechanics.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.
- 26.0 Operate and maintain agricultural tools and equipment.
- 27.0 Plan, draw, and construct a project.
- 28.0 Prepare and finish surfaces.
- 29.0 Replace simple electric motors, controls, and sensing devices.
- 30.0 Plan, repair, and maintain a basic irrigation system.

- 31.0 Perform basic plumbing procedures.
- 32.0 Mix and pour concrete and use masonry materials.
- 33.0 Weld, braze, and cut, using appropriate equipment.
- 34.0 Construct and maintain agricultural structures.
- 35.0 Apply business-management skills and identify appropriate legal documents.
- 36.0 Demonstrate positive customer-relations skills.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Mechanics.	
	01.01 Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Mechanics.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103120
Course Number: Agricultural Mechanics 2
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; selection and use of tools; electrical circuits; and employability skills.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Mechanics.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Mechanics.	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Practice personal, equipment, and shop safety--The student will be able to:			
13.01 Identify and eliminate hazards in agricultural mechanics settings.			
13.02 Observe color-coded warnings in work areas and on equipment and machinery.			
13.03 Describe appropriate actions in case of fire, accident, or other emergencies.			
13.04 Describe personal protective equipment (PPE) and appropriate clothing.			
13.05 Demonstrate safety procedures and workplace "housekeeping" practices.			
13.06 Safely handle and store flammable and non-restricted chemicals.			
13.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.			
13.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.			
13.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).			
14.0 Select and use hand and power tools--The student will be able to:			
14.01 Identify the capabilities and limitations of hand and power tools.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.02 Select and safely use hand and power tools.			
14.03 Select and use proper PPE for hand and power tools.			
14.04 Identify worn, damaged, or abused tools.			
14.05 Select and demonstrate the appropriate procedures for sharpening tools.			
15.0 Install simple electrical circuits--The student will be able to:			
15.01 Demonstrate the principles of AC and DC circuitry.			
15.02 Demonstrate series and parallel circuitry.			
15.03 Explain the scientific principles of electrical systems.			
15.04 Plan and install a simple wiring system.			
15.05 Test electrical circuits.			
16.0 Demonstrate employability skills--The student will be able to:			
16.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.			
16.02 Identify the documents that are required for a job application.			
16.03 Complete a job application form.			
16.04 Demonstrate competencies in job-interview techniques.			
17.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:			
17.01 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments.			
17.02 Explain emergency procedures to follow in response to workplace accidents.			
17.03 Create a disaster and/or emergency response plan.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Mechanics 3
Course Number: 8106510
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; financial management skills and employability skills.

Florida Standards		Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agriculture Mechanics.	
18.01	Key Ideas and Details	
18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02	Craft and Structure	
18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.		
20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
20.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
20.06 Attend to precision.	MAFS.K12.MP.6.1
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.0 Demonstrate electric and gas welding--The student will be able to:			
21.01 Select and use gas-welding equipment.			
21.02 Select and use electric arc-welding equipment and materials.			
22.0 Service and maintain small gasoline engines--The student will be able to:			
22.01 Explain the scientific principles of small engines.			
22.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).			
22.03 Practice appropriate safety precautions.			
22.04 Troubleshoot and perform minor repairs on small gasoline engines.			
23.0 Perform preventive maintenance, checks, and services for tractors--The student will be able to:			
23.01 Explain the scientific principles of hydraulic and transmission systems.			
23.02 Perform daily operator maintenance checks for tractors.			
23.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.			
23.04 Perform scheduled preventive-maintenance procedures.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.			
23.06 Keep records of tractor maintenance and services.			
24.0 Perform minor repair on an irrigation system--The student will be able to:			
24.01 Identify the basic components of irrigation systems.			
24.02 Differentiate various types of irrigation systems.			
24.03 Identify state and local regulatory agencies for water management.			
24.04 Perform minor repair on an irrigation system.			
25.0 Apply basic financial-management skills--The student will be able to:			
25.01 Complete basic financial records.			
25.02 Demonstrate the use of banking procedures.			
25.03 Calculate interest on loans.			
25.04 Complete selected income-tax-return forms.			
26.0 Demonstrate employability skills--The student will be able to:			
26.01 Demonstrate knowledge of how to make job changes appropriately.			
26.02 Demonstrate acceptable personal hygiene and a professional appearance.			
26.03 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.			
26.04 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.			
26.05 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103310
Course Number: Diversified Agricultural Mechanics 4
Course Credit: 1

Course Description:

This course is designed to develop competency in the areas of operation and maintenance of tools and equipment; project construction; electric motors replacement; irrigation systems repair and maintenance; plumbing procedures; masonry; and welding.

Florida Standards		Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agriculture Mechanics.	
18.01	Key Ideas and Details	
18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02	Craft and Structure	
18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.		
20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
20.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
20.06 Attend to precision.	MAFS.K12.MP.6.1
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
27.0 Operate and maintain agricultural tools and equipment--The student will be able to:			
27.01 Set up, adjust, and operate selected agricultural equipment according to the operator's manual.			
27.02 Maintain and repair selected agricultural tools and equipment, using repair manuals.			
27.03 Prepare equipment for storage.			
27.04 Keep records of equipment maintenance and services using computers to process information.			
28.0 Plan, draw, and construct a project--The student will be able to:			
28.01 Plan and sketch a project.			
28.02 Design and draw a project using drawing instruments and/or computer-assisted design (CAD) software.			
28.03 Calculate a bill of materials.			
28.04 Construct a project.			
29.0 Prepare and finish surfaces--The student will be able to:			
29.01 Identify and select appropriate finishes (such as paint, varnish, and stain).			
29.02 Repair worn or damaged surfaces using fillers, caulking, and sealers.			
29.03 Prepare surfaces and apply finishes.			
30.0 Replace simple electric motors, controls, and sensing devices--The			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
student will be able to:			
30.01 Identify different types of electric motors.			
30.02 Differentiate various types of controls.			
30.03 Replace electric motors, controls, and sensing devices.			
31.0 Plan, repair, and maintain a basic irrigation system--The student will be able to:			
31.01 Determine irrigation requirements.			
31.02 Plan and lay out an irrigation system, using computer applications.			
31.03 Repair and maintain an irrigation system.			
32.0 Perform basic plumbing procedures--The student will be able to:			
32.01 Identify and select plumbing materials and tools.			
32.02 Plan and construct a simple water-delivery system.			
32.03 Troubleshoot and perform minor plumbing repairs.			
32.04 Locate the state and local codes and standards and describe the importance of complying with them.			
33.0 Mix and pour concrete and use masonry materials--The student will be able to:			
33.01 Calculate concrete and other materials for a masonry project.			
33.02 Prepare forms; mix and pour concrete.			
33.03 Lay concrete blocks and/or bricks.			
34.0 Weld, braze, and cut, using appropriate equipment--The student will be able to:			
34.01 Set up, adjust, operate, and maintain MIG (middle inert gas) and TIG (tungsten inert gas) welding equipment.			
34.02 Set up, adjust, and operate plasma cutting equipment.			
34.03 Select recommended operational procedures and supplies for specific jobs.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
34.04 Practice all recommended safety precautions.			
34.05 Demonstrate the different welding positions.			
34.06 Cut and pierce metals, using oxyacetylene and plasma.			
34.07 Braze metals.			
34.08 Apply hard-surface alloys.			
34.09 Store welding equipment and supplies according to the recommended storage procedures.			
34.10 Locate the state and local codes and standards and describe the importance of complying with them.			
35.0 Construct and maintain agricultural structures--The student will be able to:			
35.01 Read and interpret basic construction plans.			
35.02 Lay out an agricultural structure for construction with the use of a transit.			
35.03 Demonstrate basic carpentry construction and procedures.			
35.04 Construct a fence.			
35.05 Maintain and repair agricultural structures.			
36.0 Apply business-management skills and identify appropriate legal documents--The student will be able to:			
36.01 Identify personal/business liability and the use of liability insurance.			
36.02 Identify applicable insurance requirements.			
36.03 Identify and complete basic business-tax-liability forms.			
36.04 Identify requirements of eligibility for greenbelt, bluebelt, and homestead tax exemptions.			
36.05 Interpret enterprise budgets and amortization tables.			
36.06 Identify characteristics of legal documents (such as contracts, deeds, legal land descriptions, and leases).			
36.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
37.0 Demonstrate positive customer-relations skills--The student will be able to:			
37.01 Exercise self-control.			
37.02 Identify and demonstrate appropriate responses to criticism.			
37.03 Explain the effects of positive human-relations skills on success in the business.			
37.04 Demonstrate respect for people and property.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

Because of the production and marketing cycle of the agricultural industries, 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

- Agriscience Foundations

**Florida Department of Education
Curriculum Framework**

Program Title: Agricultural Machinery Mechanics
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2012-2013 being the last cohort of students permitted to enroll in the program. After 2012-2013, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8103400
CIP Number	0101020410
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	AGRICULTUR 1 @2 AGRI MECH #7
CTSO	FFA
SOC Codes (all applicable)	49-3041 - Farm Equipment Mechanics and Service Technicians 45-2091 - Agricultural Equipment Operators
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 Agricultural Mechanics industry within 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 consisting of an agricultural mechanics core with three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	45-2091	3
	8103120	Agricultural Mechanics 2	1 credit		2
	8103130	Agricultural Mechanics 3	1 credit		2
B	8103410	Agricultural Machinery Mechanics 4	1 credit	45-2091	2
C	8103420	Agricultural Machinery Mechanics 5	1 credit	49-3041	2
	8103430	Agricultural Machinery Mechanics 6	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Course	Math			Science								
	ALG1	ALG2	GEO	APH	ASGH	BIO1	CHM1	ESS	GEN	MS1H	PS	PHY1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Agricultural Mechanics 2	^^	^^	^^	**	**	**	**	**	**	**	**	**

Course	Math			Science								
Agricultural Mechanics 3	^^	^^	^^	**	**	**	**	**	**	**	**	**
Agricultural Machinery Mechanics 4	^^	^^	^^	**	**	**	**	**	**	**	**	**
Agricultural Machinery Mechanics 5	^^	^^	^^	**	**	**	**	**	**	**	**	**
Agricultural Machinery Mechanics 6	^^	^^	^^	**	**	**	**	**	**	**	**	**

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Machinery Mechanics.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Machinery Mechanics.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Machinery Mechanics.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Practice personal, equipment, and shop safety.
- 14.0 Select and use hand and power tools.
- 15.0 Install simple electrical circuits.
- 16.0 Demonstrate electric and gas welding.
- 17.0 Service and maintain small gasoline engines.
- 18.0 Perform preventive maintenance, checks, and services for tractors.
- 19.0 Perform minor repairs on an irrigation system.
- 20.0 Apply basic financial-management skills.
- 21.0 Demonstrate employability skills.
- 22.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Machinery Mechanics.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Machinery Mechanics.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Machinery Mechanics.
- 26.0 Keep records.
- 27.0 Weld, braze, and cut, using appropriate equipment.
- 28.0 Operate, service, test, and maintain agricultural machinery and equipment.
- 29.0 Demonstrate positive customer-relations skills.
- 30.0 Diagnose, service, and repair the lubrication system.

- 31.0 Test, repair and/or replace, and maintain the cooling system.
- 32.0 Test, repair and/or replace the intake, exhaust, and turbo-charged systems.
- 33.0 Test, repair and/or replace the fuel-delivery system.
- 34.0 Test, repair and/or replace, and maintain the brake system.
- 35.0 Test, repair and/or replace internal-combustion engines.
- 36.0 Test, repair and/or replace the electrical system, using service manuals.
- 37.0 Diagnose, service, and repair transmission systems.
- 38.0 Service and repair transfer case.
- 39.0 Diagnose, service, repair, and maintain the hydraulic system.
- 40.0 Diagnose, service, and repair the final drive systems.
- 41.0 Apply business-management skills and identify appropriate legal documents.

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Machinery Mechanics.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
01.04.2		
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Machinery Mechanics.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Machinery Mechanics.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103120
Course Number: Agricultural Mechanics 2
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; selection and use of tools; electrical circuits; and employability skills.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Mechanics.	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Mechanics.	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Practice personal, equipment, and shop safety--The student will be able to:			
13.01 Identify and eliminate hazards in agricultural mechanics settings.			
13.02 Observe color-coded warnings in work areas and on equipment and machinery.			
13.03 Describe appropriate actions in case of fire, accident, or other emergencies.			
13.04 Describe personal protective equipment (PPE) and appropriate clothing.			
13.05 Demonstrate safety procedures and workplace "housekeeping" practices.			
13.06 Safely handle and store flammable and non-restricted chemicals.			
13.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.			
13.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.			
13.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).			
14.0 Select and use hand and power tools--The student will be able to:			
14.01 Identify the capabilities and limitations of hand and power tools.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.02 Select and safely use hand and power tools.			
14.03 Select and use proper PPE for hand and power tools.			
14.04 Identify worn, damaged, or abused tools.			
14.05 Select and demonstrate the appropriate procedures for sharpening tools.			
15.0 Install simple electrical circuits--The student will be able to:			
15.01 Demonstrate the principles of AC and DC circuitry.			
15.02 Demonstrate series and parallel circuitry.			
15.03 Explain the scientific principles of electrical systems.			
15.04 Plan and install a simple wiring system.			
15.05 Test electrical circuits.			
16.0 Demonstrate employability skills--The student will be able to:			
16.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.			
16.02 Identify the documents that are required for a job application.			
16.03 Complete a job application form.			
16.04 Demonstrate competencies in job-interview techniques.			
17.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:			
17.01 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments.			
17.02 Explain emergency procedures to follow in response to workplace accidents.			
17.03 Create a disaster and/or emergency response plan.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Machinery Mechanics 3
Course Number: 8106510
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; financial management skills and employability skills.

Florida Standards		Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agriculture Mechanics.	
18.01	Key Ideas and Details	
18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02	Craft and Structure	
18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.		
20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
20.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
20.06 Attend to precision.	MAFS.K12.MP.6.1
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.0 Demonstrate electric and gas welding--The student will be able to:			
21.01 Select and use gas-welding equipment.			
21.02 Select and use electric arc-welding equipment and materials.			
22.0 Service and maintain small gasoline engines--The student will be able to:			
22.01 Explain the scientific principles of small engines.			
22.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).			
22.03 Practice appropriate safety precautions.			
22.04 Troubleshoot and perform minor repairs on small gasoline engines.			
23.0 Perform preventive maintenance, checks, and services for tractors--The student will be able to:			
23.01 Explain the scientific principles of hydraulic and transmission systems.			
23.02 Perform daily operator maintenance checks for tractors.			
23.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.			
23.04 Perform scheduled preventive-maintenance procedures.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.			
23.06 Keep records of tractor maintenance and services.			
24.0 Perform minor repair on an irrigation system--The student will be able to:			
24.01 Identify the basic components of irrigation systems.			
24.02 Differentiate various types of irrigation systems.			
24.03 Identify state and local regulatory agencies for water management.			
24.04 Perform minor repair on an irrigation system.			
25.0 Apply basic financial-management skills--The student will be able to:			
25.01 Complete basic financial records.			
25.02 Demonstrate the use of banking procedures.			
25.03 Calculate interest on loans.			
25.04 Complete selected income-tax-return forms.			
26.0 Demonstrate employability skills--The student will be able to:			
18.05 Demonstrate knowledge of how to make job changes appropriately.			
18.06 Demonstrate acceptable personal hygiene and a professional appearance.			
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.			
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.			
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103410
Course Number: Agricultural Machinery Mechanics 4
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of recordkeeping; welding; equipment operation, service, testing and maintenance; and customer-relations skills.

Florida Standards	Correlation to CTE Program Standard #
18.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agriculture Mechanics.	
18.01 Key Ideas and Details	
18.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02 Craft and Structure	
18.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Mechanics.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Mechanics.		
20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
20.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #	
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
20.06 Attend to precision.	MAFS.K12.MP.6.1	
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
27.0 Keep records--The student will be able to:			
27.01 Explain the purpose and importance of keeping records.			
27.02 Demonstrate procedures for keeping records of equipment maintenance and services.			
27.03 Keep records on each job or project assignment.			
27.04 Complete work orders, service invoices, and requisitions.			
27.05 Prepare a written cost estimate of repair work.			
28.0 Weld, braze, and cut, using appropriate equipment--The student will be able to:			
28.01 Set up, adjust, operate, and maintain MIG (middle inert gas) and TIG (tungsten inert gas) welding equipment.			
28.02 Set up, adjust, and operate plasma cutting equipment.			
28.03 Select recommended operational procedures and supplies for specific jobs.			
28.04 Practice all recommended safety precautions.			
28.05 Demonstrate the different welding positions.			
28.06 Cut and pierce metals, using oxyacetylene and plasma.			
28.07 Braze metals.			
28.08 Apply hard-surface alloys.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
28.09 Store welding equipment and supplies according to the recommended storage procedures.			
29.0 Operate, service, test, and maintain agricultural machinery and equipment--The student will be able to:			
29.01 Operate and adjust agricultural machinery and equipment that are used in the local area, according to the operator's manuals, such as the following: <ul style="list-style-type: none"> • agricultural wheel-type tractors • planting equipment • primary and secondary tillage equipment • pesticide-application equipment • harvesting equipment • fertilization equipment 			
29.02 Remove, clean, test, repair, and reinstall parts of machinery and equipment, using repair manuals.			
29.03 Service machinery, using service manuals.			
29.04 Follow safety precautions when operating, servicing, and maintaining machines and equipment.			
30.0 Demonstrate positive customer-relations skills--The student will be able to:			
30.01 Exercise self-control.			
30.02 Identify and demonstrate appropriate responses to criticism.			
30.03 Explain the effects of positive human-relations skills on success in the business.			
30.04 Demonstrate respect for people and property.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103420
Course Number: Agricultural Machinery Mechanics 5
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of service, repair and maintenance of the following: the lubrication system; the cooling system; the intake, exhaust, and turbo-charged systems; the fuel-delivery system; and the brake system.

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
31.0 Diagnose, service, and repair the lubrication system--The student will be able to:			
31.01 Change oil filters.			
31.02 Check and change oils and other lubricants in engines.			
31.03 Diagnose and replace damaged or worn components of the system.			
32.0 Test, repair and/or replace, and maintain the cooling system--The student will be able to:			
32.01 Test coolant.			
32.02 Flush and clean the system.			
32.03 Test, repair and/or replace parts of the system.			
32.04 Adjust parts of the system for proper operation.			
33.0 Test, repair and/or replace the intake, exhaust, and turbo-charged systems--The student will be able to:			
33.01 Troubleshoot the intake, exhaust, and turbo-charged systems, using recommended diagnostic equipment.			
33.02 Repair and replace parts of the systems.			
33.03 Service and adjust the systems for proper operation.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
34.0 Test, repair and/or replace the fuel-delivery system, using service manuals--The student will be able to:			
34.01 Remove, clean, rebuild, and reinstall carburetors.			
34.02 Bleed the diesel-fuel system.			
34.03 Remove and reinstall a diesel-fuel-injection pump, according to the manufacturer's specifications.			
34.04 Replace components of the fuel system.			
34.05 Service and adjust parts of the fuel system for proper operation.			
35.0 Test, repair and/or replace, and maintain the brake system--The student will be able to:			
35.01 Drain, refill, and adjust the brake system.			
35.02 Test brake-system components, using recommended diagnostic equipment.			
35.03 Repair and replace parts of the system.			
35.04 Service and adjust the system for proper operation.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8103430
Course Number: Agricultural Machinery Mechanics 6
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of service, repair and maintenance of the following: internal-combustion engines; electrical system; transmission system; hydraulic system; and final-drive system; and business management skills.

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
36.0 Test, repair and/or replace internal-combustion engines--The student will be able to:			
36.01 Troubleshoot components of the engine, using recommended diagnostic equipment.			
36.02 Repair and replace components of the basic engine, using repair manuals.			
36.03 Service and adjust all parts of the engine for proper operation.			
37.0 Test, repair and/or replace the electrical system, using service manuals--The student will be able to:			
37.01 Troubleshoot the electrical system, using recommended diagnostic equipment.			
37.02 Repair and replace components of the electrical system.			
37.03 Service and adjust all parts of the system for proper operation.			
38.0 Diagnose, service, and repair transmission systems--The student will be able to:			
38.01 Troubleshoot transmission components, using recommended diagnostic equipment.			
38.02 Repair and replace parts of transmission systems.			
38.03 Service and adjust parts of different transmission systems for proper operation.			
39.0 Service and repair transfer case--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
39.01 Troubleshoot transfer case components.			
39.02 Service and adjust system components.			
39.03 Repair and replace system components.			
39.04 Change filters and drain, flush, and refill the transfer case system.			
40.0 Diagnose, service, repair, and maintain the hydraulic system--The student will be able to:			
40.01 Change filters and drain, flush, and refill the hydraulic system.			
40.02 Troubleshoot hydraulic-system components, using recommended diagnostic equipment.			
40.03 Repair and replace parts of the system.			
40.04 Service and adjust the system for proper operation.			
41.0 Diagnose, service, and repair the final-drive systems--The student will be able to:			
41.01 Diagnose the final-drive systems, using recommended diagnostic equipment.			
41.02 Repair and replace parts of the systems.			
41.03 Service and adjust the systems for proper operation.			
42.0 Apply business-management skills and identify appropriate legal documents--The student will be able to:			
42.01 Identify personal/business liability and the use of liability insurance.			
42.02 Identify applicable insurance requirements.			
42.03 Identify and complete basic business-tax-liability forms.			
42.04 Identify the requirements of greenbelt, bluebelt, and homestead tax exemptions.			
42.05 Interpret enterprise budgets and amortization tables.			
42.06 Identify characteristics of legal documents (such as contracts, deeds, and leases).			
42.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

Because of the production and marketing cycle of the agricultural industries, 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

- Agriscience Foundations

**Florida Department of Education
Curriculum Framework**

Program Title: Animal Biotechnology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2013-2014 being the last cohort of students permitted to enroll in the program. After 2013-2014, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8106100
CIP Number	0101090100
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4021 - Biological Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 agricultural biotechnology industry within 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 consisting of three courses with one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	19-4021	3
	8106850	Agricultural Biotechnology 2	1 credit		3
	8106120	Animal Biotechnology 3	1 credit		3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Ag Biotechnology 2	^^	^^	^^	12/53 23%	6/52 12%	33/56 59%	13/55 24%	8/58 14%	19/35 54%	11/42 26%	12/56 21%	8/53 15%
Animal Biotechnology 3	^^	^^	^^	8/53 15%	8/52 15%	21/56 38%	13/55 24%	8/58 14%	13/35 37%	7/42 17%	12/56 21%	9/53 17%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Identify the historical, social, cultural and potential applications of biotechnology.
- 14.0 Conduct scientific investigation and apply results.
- 15.0 Practice agricultural laboratory safety.
- 16.0 Demonstrate laboratory skills as applied to biotechnology.
- 17.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).
- 18.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 19.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 21.0 Apply genetic principles to animal science.
- 22.0 Interpret the relationship between total digestible nutrients (TDN) in feeds and its utilization.
- 23.0 Examine the developmental processes that determine animal growth.
- 24.0 Investigate the reproduction system of animals.
- 25.0 Describe animal science and the role of animals in society.

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Animal Biotechnology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
01.04.2		
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Animal Biotechnology.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Animal Biotechnology.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 2
Course Number: 8106850
Course Credit: 1

Course Description:

This course was developed as a core and is designed to develop competencies in the areas of agricultural biotechnology in agriculture, scientific investigation, laboratory safety, scientific and technological concepts; and the fundamentals of biotechnology.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
		LAFS.910.WHST.2.4
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.910.WHST.2.5
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	LAFS.910.WHST.2.6
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.910.WHST.3.7
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	LAFS.910.WHST.3.8
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.910.WHST.3.9
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.910.WHST.4.10
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
03.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
03.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
03.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
03.04	Model with mathematics.	

Florida Standards		Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Identify the historical, social, cultural and potential applications of biotechnology--The student will be able to:			
13.01 Define biotechnology and explore the historical impact on agriculture.			
13.02 Explain the developmental progression of biotechnology.			
13.03 Investigate current applications of biotechnology in agriculture.			
13.04 Investigate current research in agricultural biotechnology.			
13.05 Examine potential applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.			
13.06 Research emerging problems and issues associated with agricultural biotechnology.			
13.07 Describe the role of agencies that regulate biotechnology.			
13.08 Interpret the major regulatory issues related to biotechnology.			
13.09 Explore ethical, legal and social biotechnology issues.			
13.10 Evaluate the benefits and risks associated with biotechnology.			
13.11 Investigate the emergence and evolution of biological organisms			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
and their use in biotechnology.			
13.12 Examine intellectual properties associated with biotechnology by defining their components.			
13.13 Examine an ethical dilemma associated with biotechnology by identifying its components.			
14.0 Conduct scientific investigation and apply results--The student will be able to:			
14.01 Discuss the differences between scientific laws and scientific theories.			
14.02 Explain the process of scientific inquiry.			
14.03 Analyze research being conducted in agricultural biotechnology.			
14.04 Design an agricultural experiment using appropriate control measures.			
14.05 Devise a system for recording data.			
14.06 Collect and record data using SI units.			
14.07 Summarize data and draw defensible conclusions.			
14.08 Prepare a report on the experiment conducted.			
14.09 Plan and conduct follow-up experiments using the scientific method.			
15.0 Practice agricultural laboratory safety--The student will be able to:			
15.01 Identify first aid supplies, personnel and emergency protection areas.			
15.02 Monitor, use, store and dispose of hazardous materials properly.			
15.03 Document safety training and practices using Material Safety Data Sheets (MSDS) and Occupational Safety and Health Administration (OSHA) standards.			
15.04 Demonstrate and utilize safety equipment.			
15.05 Identify safety symbols and signs.			
15.06 Demonstrate appropriate safety procedures and guidelines, and discuss implications of safety violations.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.0 Demonstrate laboratory skills as applied to biotechnology--The student will be able to:			
16.01 Maintain and interpret biotechnology laboratory records.			
16.02 Operate laboratory equipment and measurement devices.			
16.03 Demonstrate aseptic techniques in the biotechnology laboratory.			
16.04 Select an appropriate standard operating procedure for working with biological materials.			
16.05 Prepare buffers, reagents, solutions and media.			
16.06 Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.			
16.07 Isolate, maintain, quantify and store cell cultures.			
16.08 Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations.			
16.09 Extract and purify DNA.			
16.10 Perform protein separation techniques and interpret the results.			
16.11 Describe how antibodies are formed and how they can be used in biotechnology applications.			
16.12 Research and describe the use of biotechnology to detect microbes.			
17.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:			
17.01 Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.			
17.02 Differentiate the roles of carbohydrates, fats, and proteins in biotechnology applications.			
17.03 Diagram the processes used to produce transgenic eukaryotes.			
17.04 Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions.			
17.05 Describe processes by which enzymes are produced through biotechnology.			
17.06 Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.07 Diagram the process by which organisms are genetically engineered for waste treatment.			
17.08 Describe the benefits and risks associated with the use of biotechnology to increase productivity and improve quality of agricultural products.			
17.09 Investigate and report on genetic engineering procedures used in the production of agricultural products.			
17.10 Explain the functions of hormones in animals.			
17.11 Describe the processes used to produce animal hormones from transgenic organisms.			
17.12 Identify foods produced through fermentation.			
17.13 Compare and contrast bioengineering and conventional pathways used in food processing.			
17.14 Explain biomass and sources of biomass.			
17.15 Assess the characteristics of biomass that make it useful for biofuels production.			
17.16 Describe the process used in producing alcohol from biomass.			
17.17 Diagram the process used in producing biodiesel from biomass.			
17.18 Illustrate the process used in producing methane from biomass.			
17.19 Describe the selective plant breeding process.			
17.20 Assess the benefits, risks and opportunities associated with using biotechnology to promote animal health.			
17.21 Describe the use of biotechnology in bioremediation.			
17.22 Describe the processes involved in biotreatment of biological and chemical wastes.			
17.23 Explain the global importance of biodiversity.			
17.24 Explain the positive and negative impacts of agricultural practices on wild populations.			
17.25 Explain how biotechnology tools can be used to monitor the effects of agricultural practices on wild populations.			
17.26 Describe the processes used in the production of molecules for use in industrial applications.			

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Biotechnology 3
Course Number: 8106120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of biotechnology in animal science, animal growth and reproduction, and the role of animals in society.

Florida Standards		Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology.	
18.01 Key Ideas and Details		
18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02 Craft and Structure		
18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved.	LAFS.1112.RST.2.6
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.	LAFS.1112.RST.3.7
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	LAFS.1112.RST.3.8
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	LAFS.1112.RST.3.9
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.	LAFS.1112.RST.4.10
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content.	LAFS.1112.WHST.1.1
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	LAFS.1112.WHST.1.2
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	LAFS.1112.WHST.1.3
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
		LAFS.1112.WHST.2.4
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.1112.WHST.2.5
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	LAFS.1112.WHST.2.6
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.1112.WHST.3.7
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	LAFS.1112.WHST.3.8
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.1112.WHST.3.9
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.1112.WHST.4.10
20.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
20.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
20.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
20.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
20.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
20.06 Attend to precision.	MAFS.K12.MP.6.1
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.0 Apply genetic principles to animal science--The student will be able to:			
21.01 Describe how the concept of heritability is used in the selection of livestock.			
21.02 Chart the difference between phenotypic and genotypic characteristics and determine probabilities.			
21.03 Analyze performance data used in the selection process of livestock.			
21.04 Use computer data to assist in the selection process of livestock.			
21.05 Differentiate between dominant and recessive traits.			
21.06 Describe the chemical and physical properties of DNA.			
21.07 Extract a visible mass of DNA from animal or plant tissue.			
21.08 Develop a hypothetical species using genetic engineering.			
21.09 Debate the safeguards used in research in genetic engineering.			
22.0 Interpret the relationship between total digestible nutrients (TDN) in feeds and its utilization--The student will be able to:			
22.01 Determine nutritional requirements of selected animals.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.02 Select appropriate feed samples for analysis of nutritional values and develop a balanced ration.			
22.03 Conduct experiments comparing growth rates using selected rations.			
22.04 Obtain information from a feed label and determine which nutrients are derived from which component.			
22.05 Demonstrate the effects digestive agents have in the digestive process.			
22.06 Compare how the body's cells metabolize fats, carbohydrates and proteins.			
22.07 Analyze the effect of diseases on nutritional utilization.			
23.0 Examine the developmental processes that determine animal growth--The student will be able to:			
23.01 Develop a growth curve using selected animal species.			
23.02 Differentiate between muscle, fat, and bone development.			
23.03 Evaluate the effects of hormones in animal production.			
23.04 Compare morphology of developing embryos.			
23.05 Analyze the diseases that affect development growth.			
24.0 Investigate the reproduction system of animals--The student will be able to:			
24.01 Analyze the quality of semen of selected animals.			
24.02 Compare and contrast sperm anatomy of selected animal species.			
24.03 Analyze the factors that affect sperm mobility and development.			
24.04 Compare and contrast the reproductive cycles of selected animal species.			
24.05 Compare and contrast the breeding time and conception rates of selected animal species.			
24.06 Describe the functions of hormones that control reproduction.			
24.07 Discuss the use of hormone therapy to manipulate ovarian activity.			
24.08 Describe and compare the different pathogens that cause animal diseases.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
24.09 Analyze the mating process of selected animal species.			
25.0 Describe animal science and the role of animals in society--The student will be able to:			
25.01 Differentiate between animal welfare and animal rights.			
25.02 Debate current events concerning animal welfare and animal rights.			
25.03 Demonstrate safe procedures when working with animal related equipment in laboratory settings.			
25.04 Practice safety precautions around animals.			
25.05 Analyze the mating process of selected animal species.			
25.06 Develop a research project related to biotechnology and animal science.			
25.07 Discuss the benefits of biotechnology in producing and marketing animals and animal products.			
25.08 Research how biotechnology affects the consumer.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

Because of the production and marketing cycle of the agricultural industries, 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

- Agriscience Foundations

**Florida Department of Education
Curriculum Framework**

Program Title: Animal Science and Services
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8106200
CIP Number	0101030210
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	45-2093 Farmworkers, Farm, Ranch, and Aquacultural Animals 45-1011 First-Line Supervisors of Farming, Fishing, and Forestry Workers
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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, health, safety and environmental issues, and the use and care of animal health-care instruments, animal grooming equipment, animal restraining equipment, and laboratory equipment.

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 consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	45-2093	3
	8106210	Animal Science and Services 2	1 credit		2
	8106220	Animal Science and Services 3	1 credit		2
B	8106230	Animal Science and Services 4	1 credit	45-1011	2
	8106240	Animal Science and Services 5	1 credit		2
C	8106250	Animal Science and Services 6	1 credit	45-1011	2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	∞	∞	∞	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Animal Science and Services 2	∞	∞	∞	**	**	**	**	**	**	**	**	**
Animal Science and Services 3	∞	∞	∞	**	**	**	**	**	**	**	**	**
Animal Science and Services 4	∞	∞	∞	**	**	**	**	**	**	**	**	**

Animal Science and Services 5	∞	∞	∞	**	**	**	**	**	**	**	**	**
Animal Science and Services 6	∞	∞	∞	**	**	**	**	**	**	**	**	**

∞ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Animal Science and Services
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Animal Science and Services.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student Animal Science and Services.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Describe animal science and the role of animals in society.
- 14.0 Classify animals according to hierarchical taxonomy and agricultural use.
- 15.0 Identify careers in the animal industry.
- 16.0 Describe animal and human first aid and laboratory safety.
- 17.0 Recognize normal and abnormal animal behaviors.
- 18.0 Apply principles of comparative anatomy and physiology to uses within various animal systems.
- 19.0 Evaluate the male and female reproductive systems.
- 20.0 Demonstrate safe animal handling and management techniques.
- 21.0 Analyze the communities responsibility in options for caring for unwanted /neglected livestock.
- 22.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.
- 23.0 Examine the scope of career opportunities in and the importance of agriculture to the economy.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Animal Science and Services.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Animal Science and Services.
- 26.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Animal Science and Services.
- 27.0 Apply principles of animal nutrition to ensure the proper growth, development, and reproduction and economic production of animals.
- 28.0 Evaluate animals for breeding readiness and soundness.
- 29.0 Explain the reproductive system and breeding of selected animals.
- 30.0 Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.
- 31.0 Demonstrate knowledge of preventive medicine and disease control.

- 32.0 Select animals for specific purposes and maximum performance based on anatomy and physiology.
- 33.0 Prepare, groom, exhibit, and market animals
- 34.0 Maintain and analyze records.
- 35.0 Provide for the biosecurity of agricultural animals and production facilities.
- 36.0 Explain the components of the American business system.
- 37.0 Investigate agricultural cooperatives structure and function.
- 38.0 Apply animal health practices.
- 39.0 Maintain equipment and facilities.
- 40.0 Operate, maintain, and repair machinery and equipment.
- 41.0 Investigate emerging technologies in Animal Science.
- 42.0 Apply scientific principles in the selection and breeding of animals.
- 43.0 Manage pasture and forage crops.
- 44.0 Discuss animal marketing techniques.
- 45.0 Apply advanced animal health practices.
- 46.0 Perform emergency first aid on animals.
- 47.0 Implement procedures to ensure that animal products are safe.
- 48.0 Identify, select, and breed food-producing animals.
- 49.0 Analyze county, state and federal agencies that support the animal industry.
- 50.0 Apply principles of comparative anatomy and physiology to uses within various animal systems.
- 51.0 Plan routine management of food-producing animals and facilities.
- 52.0 Maintain and analyze records.
- 53.0 Design animal housing, equipment and handling facilities for animal production.
- 54.0 Comply with government regulations and safety standards for facilities used in animal production.
- 55.0 Identify and interpret rules, policy, and regulations affecting the livestock industry.
- 56.0 Understand the relationship of animal production and the environment.
- 57.0 Evaluate the effects of environmental conditions on animals.
- 58.0 Identify and interpret environmental issues and regulations pertaining to animal industry.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Animal Science and Services.	
01.01 Key Ideas and Details		
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure		
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Animal Science and Services.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
02.03 Research to Build and Present Knowledge	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
02.04 Range of Writing	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Animal Science and Services.	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 2
Course Number: 8106210
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; animal behavior; animal welfare; animal control; and employability skills.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Animal Science and Services	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Animal Science and Services	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Animal Science and Services	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Describe animal science and the role of animals in society–The student will be able to:			
13.01 Describe animal science and the role of animals in society.			
13.02 Analyze perceptions of public opinion of animal related issues.			
13.03 Identify the origin, significance, distribution and domestication of animal species.			AS.01.01.01.a
13.04 Evaluate and describe characteristics of animals that developed in response to the animals' environment and led to their domestication.			AS.01.01.01.b
13.05 Predict adaptations of animals to production practices and environments.			AS.01.01.01.c
13.06 Define major components of the animal industry.			AS.01.01.02.a
13.07 Outline the development of the animal industry and the resulting products, services and careers.			AS.01.01.02.b
13.08 Predict trends and implications of future development of the animal systems industry.			AS.01.01.02.c
14.0 Classify animals according to hierarchical taxonomy and agricultural use. – The student will be able to:			
14.01 Explain the importance of the binomial system of nomenclature.			AS.02.01.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.02 Explain how animals are classified using Linnaeus's taxonomical classification system.			AS.02.01.01.b
14.03 Classify animals according to the taxonomical classification system.			AS.02.01.01.c
14.04 Identify major animal species by common and scientific names.			AS.02.01.02.a
14.05 Compare and contrast the hierarchical classification of the major agricultural animal species.			AS.02.01.02.b
14.06 Appraise and evaluate the economic value of animals for various applications in the agriculture industry.			AS.02.01.02.c
15.0 Identify careers in the animal industry–The student will be able to:			
15.01 Locate and obtain information on animal-industry careers and career opportunities.			
15.02 Compare and contrast various careers in the animal industry including training requirements for entry and advancement in animal-industry careers.			
15.03 Examine professional organizations and commodity groups in the animal industry and supporting organizations.			
16.0 Describe animal and human first aid and laboratory safety–The student will be able to:		SC.912.L.14.6, 36, 52 SC.912.L.15.13	
16.01 Practice safe procedures when working with animal-related equipment and in laboratory settings.			
16.02 Understand animal behaviors as they relate to practicing safety precautions around animal restraint.			
16.03 Discuss the impact of unsafe procedures.			
16.04 Define zoonosis and investigate selected zoonotic diseases.			
16.05 Discuss OSHA as it relates to the animal industry.			
16.06 Explain how to use a first aid kit and its key components.			
16.07 Recognize allergic reactions.			
16.08 Describe proper use of eye wash solution.			
16.09 Understand how to control minor hemorrhage and/or trauma.			
16.10 Explain emergency procedures.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.0 Recognize normal and abnormal animal behaviors—The student will be able to:		SC.912.L.15.1, 2, 14 SC.912.L.17.8 SC.912.N.1.6	
17.01 Distinguish between instinctive and learned behaviors.			
17.02 Recognize normal and abnormal behavioral characteristics of animals through observations.			
17.03 Identify behavioral problems.			
18.0 Apply principles of comparative anatomy and physiology to uses within various animal systems.—The student will be able to:			
18.01 Identify basic characteristics of animal cells, tissues, organs and body systems.			AS.02.02.01.a
18.02 Compare and contrast animal cells, tissues, organs and body systems.			AS.02.02.01.b
18.03 Explain how the components and systems of animal anatomy and physiology relate to the production and use of animals.			AS.02.02.01.c
18.04 Diagram a typical animal cell and identify the organelles.			AS.02.02.02.a
18.05 Describe the functions of animal cell structures.			AS.02.02.02.b
18.06 Describe the properties, locations, functions and types of animal organs.			AS.02.02.02.c
18.07 Compare and contrast body systems and system adaptations between animal species.			AS.02.02.06.b
19.0 Evaluate the male and female reproductive systems.—the student will be able to:			
19.01 Explain the male and female reproductive organs of the major animal species.			AS.05.01.01.a
19.02 Describe the functions of major organs in the male and female reproductive systems.			AS.05.01.01.b
20.0 Demonstrate safe animal handling and management techniques. – the student will be able to:			
20.01 Discuss the dangers involved in working with animals.			AS.06.01.01.a
20.02 Outline safety procedures for working with animals by species.			AS.06.01.01.b
20.03 Interpret animal behaviors and execute protocols for safe handling of animals.			AS.06.01.01.c
20.04 Explain the implications of animal welfare and animal rights for animal agriculture.			AS.06.01.02.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
20.05 Design programs that assure the proper care and use of animals and prevent abuse or mistreatment.			AS.06.01.02.b
20.06 Implement quality-assurance programs and procedures for animal production.			AS.06.01.02.c
21.0 Analyze the communities responsibility in options for caring for unwanted /neglected livestock.—The student will be able to:		SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2 SC.912.N.4.2	
21.01 Differentiate between animal control agencies and humane societies.			
21.02 Explain the laws governing animal care and use.			
21.03 Identify and locate local animal control agencies and humane societies.			
22.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
22.01 Assess the agricultural impact upon the US gross national product and the total global economy.			
22.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.			
22.03 Identify and describe the primary government agencies involved with agriculture.			
22.04 Research new and emerging technologies and their impact on the economy.			
22.05 Recognize the value of the food and agribusiness industry.			
23.0 Examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:			
23.01 Define and explore agriculture and agribusinesses and their role in the economy.			
23.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
23.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.			
23.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.			

**Florida Department of Education
 Student Performance Standards**

Course Title: Animal Science and Services 3
Course Number: 8106220
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of animal digestive systems; animal breeding; preventive medicine and disease control; control of parasites; animal marketing; and analyzing records

Florida Standards	Correlation to CTE Program Standard #
24.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Animal Science and Services.	
24.01 Key Ideas and Details	
24.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
24.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
24.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
24.02 Craft and Structure	
24.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
24.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
24.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	

Florida Standards	Correlation to CTE Program Standard #
24.03 Integration of Knowledge and Ideas	
24.03.1 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
24.03.2 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
24.03.3 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
24.04 Range of Reading and Level of Text Complexity	
24.04.1 By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. 24.04.2 By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
25.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Animal Science and Services.	
25.01 Text Types and Purposes	
25.01.1 Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
25.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
25.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
25.02 Production and Distribution of Writing	
25.02.1 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
25.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most	

Florida Standards	Correlation to CTE Program Standard #
<p>significant for a specific purpose and audience.</p> <p style="text-align: right;">LAFS.1112.WHST.2.5</p>	
<p>25.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p> <p style="text-align: right;">LAFS.1112.WHST.2.6</p>	
<p>25.03 Research to Build and Present Knowledge</p>	
<p>25.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p style="text-align: right;">LAFS.1112.WHST.3.7</p>	
<p>25.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p> <p style="text-align: right;">LAFS.1112.WHST.3.8</p>	
<p>25.03.3 Draw evidence from informational texts to support analysis, reflection, and research.</p> <p style="text-align: right;">LAFS.1112.WHST.3.9</p>	
<p>25.04 Range of Writing</p>	
<p>25.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p> <p style="text-align: right;">LAFS.1112.WHST.4.10</p>	
<p>26.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Animal Science and Services.</p>	
<p>26.01 Make sense of problems and persevere in solving them.</p> <p style="text-align: right;">MAFS.K12.MP.1.1</p>	
<p>26.02 Reason abstractly and quantitatively.</p> <p style="text-align: right;">MAFS.K12.MP.2.1</p>	
<p>26.03 Construct viable arguments and critique the reasoning of others.</p> <p style="text-align: right;">MAFS.K12.MP.3.1</p>	
<p>26.04 Model with mathematics.</p> <p style="text-align: right;">MAFS.K12.MP.4.1</p>	
<p>26.05 Use appropriate tools strategically.</p> <p style="text-align: right;">MAFS.K12.MP.5.1</p>	
<p>26.06 Attend to precision.</p>	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.6.1
26.07 Look for and make use of structure.	MAFS.K12.MP.7.1
26.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
27.0 Apply principles of animal nutrition to ensure the proper growth, development, and reproduction and economic production of animals.—The student will be able to:			
27.01 Compare and contrast common types of feedstuffs and the roles they play in the diets of animals.			AS.04.01.01.a
27.02 Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition.			AS.04.01.01.b
27.03 Select appropriate feedstuffs for animals based on factors such as economics, digestive system and nutritional needs.			AS.04.01.01.c
27.04 Explain the importance of a balanced ration for animals.			AS.04.01.02.a
27.05 Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements and performance.			AS.04.01.02.b
27.06 Formulate animal feeds based on nutritional requirements, using feed ingredients for maximum nutrition and optimal economic production.			AS.04.01.02.c
27.07 Explain the purpose and benefits of feed additives and growth promotants in animal production.			AS.04.02.01.a
27.08 Discuss how feed additives and growth promotants are administered and the precautions that should be taken.			AS.04.02.01.b
27.09 Prescribe and administer feed additives and growth promotants.			AS.04.02.01.c
27.10 Analyze different feed labels and apply feed label regulations.			
28.0 Evaluate animals for breeding readiness and soundness.—The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
28.01 Explain how age, size, life cycle, maturity level and health status affect the reproductive efficiency of male and female animals.			AS.05.02.01.a
28.02 Summarize factors that lead to reproductive maturity.			AS.05.02.01.b
28.03 Evaluate and select animals for reproductive readiness.			AS.05.02.01.c
28.04 Discuss the importance of efficient and economic reproduction in animals.			AS.05.02.02.a
28.05 Evaluate reproductive problems that occur in animals.			AS.05.02.02.b
28.06 Treat or cull animals with reproductive problems.			AS.05.02.02.c
28.07 Select breeding animals based on characteristics of the reproductive organs.			AS.05.03.01.c
29.0 Explain the reproductive system and breeding of selected animals—The student will be able to:		SC.912.L.14.31, 33, 41 SC.912.L.15.9, 14, 15 SC.912.L.16.1, 13, 21 SC.912.L.17.13	
29.01 Describe estrous cycle.			
29.02 Describe breeding techniques.			
29.03 Describe the proper care for breeding stock.			
29.04 Describe the proper care for newborn.			
29.05 Compare and Contrast between reproduction in animal species.			
30.0 Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.—the student will be able to:			
30.01 Explain methods of determining animal health and disorders.			AS.03.01.01.a
30.02 Perform simple health-check evaluations on animals.			AS.03.01.01.b
30.03 Describe diagnostic tests to detect health problems in animals.			AS.03.01.01.c
30.04 Identify common diseases, parasites and physiological disorders that affect animals.			AS.03.01.02.a
30.05 Assess illnesses and disorders of animals based on symptoms and problems caused by diseases, parasites and physiological disorders.			AS.03.01.02.c
30.06 Identify common diseases, parasites and physiological disorders of			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
animals.			
30.07 Explain characteristics of causative agents and vectors of diseases and disorders in animals.			AS.03.01.03.a
30.08 Evaluate preventive measures for controlling and limiting the spread of diseases, parasites and disorders among animals.			AS.03.01.03.b
30.09 Design and implement a health maintenance and disease and disorder prevention plan for animals in their natural and/or confined environments.			AS.03.01.03.c
30.10 Explain the clinical significance of common considerations in veterinary treatments, such as aseptic techniques.			AS.03.01.04.a
30.11 Prepare animals, facilities and equipment for surgical and nonsurgical treatments and procedures.			AS.03.01.04.b
30.12 Describe surgical and nonsurgical treatments and procedures in animal health care.			AS.03.01.04.c
30.13 Identify and describe zoonotic diseases.			AS.03.01.05.a
30.14 Explain the health risk of zoonotic diseases to humans and their historical significance and future implications.			AS.03.01.05.b
30.15 Implement zoonotic disease prevention methods and procedures for the safe handling and treatment of animals.			AS.03.01.05.c
31.0 Demonstrate knowledge of preventive medicine and disease control.—The student will be able to:		SC.912.L.14.6, 52	
31.01 Describe procedures for prescribed oral medications.			
31.02 Describe the process for administering medications by injection.			
31.03 Describe the procedure for safe disposal of biologicals.			
31.04 Discuss the term immunology and active and passive immunity.			
31.05 Describe the process for fecal sample collection, slide preparation, and examination.			
32.0 Select animals for specific purposes and maximum performance based on anatomy and physiology.—the student will be able to:			
32.01 Identify ways an animal's health can be affected by anatomical and physiological disorders.			AS.02.03.01.a
32.02 Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.			AS.02.03.01.b
32.03 Evaluate and select animals to maximize performance based on			AS.02.03.01.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
anatomical and physiological characteristics that affect health, growth and reproduction.			
32.04 Create a program to develop an animal to its highest potential performance.			AS.02.03.02.a
32.05 Assess an animal to determine if it has reached its optimal performance level based on anatomical and physiological characteristics.			AS.02.03.02.b
32.06 Develop efficient procedures to produce consistently high quality animals, well suited for their intended purposes.			AS.02.03.02.c
33.0 Prepare, groom, exhibit, and market animals—The student will be able to:			
33.01 Groom selected animals for exhibition.			
33.02 Train animals for show and/or exhibition.			
33.03 Demonstrate proper techniques for exhibiting and animals.			
33.04 Demonstrate knowledge required to train selected animals to halter.			
33.05 Measure animal growth using a scale.			
33.06 Identify market outlets.			
33.07 Describe methods of restraining, loading, handling, and transporting animals safely.			
33.08 Determine market grades of animals and animal products.			
33.09 Identify components of shipping and health certificates.			
34.0 Maintain and analyze records--The student will be able to:			
34.01 Maintain and analyze animal records.			
34.02 Discuss the legal requirements of maintaining animal health records, and maintain and analyze animal health records.			
34.03 Maintain and analyze basic business records (inventory, depreciation, receipts, and expenses) using computer applications.			
34.04 Prepare and maintain Supervised Agricultural Experience (SAE) records.			
35.0 Provide for the biosecurity of agricultural animals and production facilities.—the student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
35.01 Explain the importance of biosecurity to the animal industry.			AS.03.02.01.a
35.02 Discuss procedures at the local, state and national levels to ensure biosecurity of the animal industry.			AS.03.02.01.b
35.03 Implement a biosecurity plan for an animal production operation.			AS.03.02.01.c
36.0 Explain the components of the American business system.—The student will be able to:			
36.01 Describe the five basic ways American business is organized.			
36.02 Distinguish and identify between the characteristics of each method of doing business.			
36.03 Evaluate the advantages and disadvantages provided by each business method.			
36.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			
37.0 Investigate agricultural cooperatives structure and function.—The student will be able to:			
37.01 Explain the definition of a cooperative.			
37.02 Understand the history of cooperative principles and practices.			
37.03 Describe the five areas that classify cooperative structure.			
37.04 Distinguish and identify between the five types of cooperative structure and their functions.			

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 4
Course Number: 8106230
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nutrition; grooming, exhibiting and marketing animals; operation, maintenance and repair of equipment.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Animal Science and Services	
23.01	Key Ideas and Details	
23.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
23.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
23.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
23.02	Craft and Structure	
23.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
23.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
23.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	

Florida Standards		Correlation to CTE Program Standard #
23.03	Integration of Knowledge and Ideas	
23.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
23.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
23.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
23.04	Range of Reading and Level of Text Complexity	
23.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
23.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Animal Science and Services	
24.01	Text Types and Purposes	
24.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
24.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
24.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
24.02	Production and Distribution of Writing	
24.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
24.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
24.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
24.03	Research to Build and Present Knowledge	
24.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
24.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
24.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
24.04	Range of Writing	
24.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
25.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Animal Science and Services	
25.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
25.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
25.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
25.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
25.06 Attend to precision.	MAFS.K12.MP.6.1
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
38.0 Apply animal health practices–The student will be able to:			
38.01 Administer prescribed oral medications.			
38.02 Locate injection points of selected animals.			
38.03 Sterilize instruments and supplies.			
38.04 Interpret and follow directions on medications and animal health aids, including withdrawal periods.			
38.05 Dip, spray, or dust animals for external parasites (under supervision).			
38.06 Dispose of empty chemical and medical containers as prescribed.			
38.07 Store medications and chemicals safely and securely.			
38.08 Dispose of biomedical waste and by products (needles, scalpel blades, medicines, etc.)			
39.0 Maintain equipment and facilities–The student will be able to:		SC.912.L.17.14	
39.01 Clean and disinfect pens, cages, feeders, waterers, trailers and other equipment according to Best Management Practices.			
39.02 Dispose of animal residue and waste according to Best Management Practices.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
39.03 Prepare and maintain equipment and instruments.			
39.04 Repair and maintain pens, cages and other facilities and structures.			
39.05 Perform maintenance and minor repair of electrical and plumbing fixtures and equipment.			
39.06 Create a clean, sanitary and healthy environment for animals.			
40.0 Operate, maintain, and repair machinery and equipment–The student will be able to:			
40.01 Use equipment-operator and repair manuals.			
40.02 Operate, service, and maintain equipment.			
40.03 Maintain records of equipment maintenance and repair.			
40.04 Prepare equipment for storage.			
40.05 Demonstrate safety practices in operating machinery and equipment.			
41.0 Investigate emerging technologies in Animal Science.–The student will be able to:		SC.912.L.15.14 SC.912.L.16.3, 4, 5, 8, 9, 10 SC.912.L.17.15, 17	
41.01 Investigate genetic advancements and their effect on animal industry.			
41.02 Identify new technologies in animal science.			
41.03 Research emerging technologies and determine their impact on animal industry and society.			
42.0 Apply scientific principles in the selection and breeding of animals. – The student will be able to:			
42.01 Explain genetic inheritance in agricultural animals.			AS.05.03.01.a
42.02 Explain the advantages of using genetically superior animals in the production of animals and animal products.			AS.05.03.01.b
42.03 Select a breeding system based on the principles of genetics.			AS.05.03.01.c
42.04 Define natural and artificial breeding methods.			AS.05.03.02.a
42.05 Explain the processes of natural and artificial breeding methods.			AS.05.03.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.06 Select animal breeding methods based on reproductive and economic efficiency.			AS.05.03.02.c
42.07 Explain the use of quantitative breeding values (e.g., EPDs) in the selection of genetically superior breeding stock.			AS.05.03.03.a
42.08 Compare and contrast quantitative breeding value differences between genetically superior animals and animals of average genetic value.			AS.05.03.03.b
42.09 Select animals based on quantitative breeding values for specific characteristics.			AS.05.03.03.c
42.10 Explain the advantages of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer.			AS.05.03.04.a
42.11 Explain the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer.			AS.05.03.04.b
42.12 Perform procedures for estrous synchronization, superovulation, flushing, embryo transfer and other reproductive management practices.			AS.05.03.04.c
42.13 Discuss the uses and advantages and disadvantages of natural breeding and artificial insemination.			AS.05.03.05.a
42.14 Explain the materials, methods and processes of artificial insemination.			AS.05.03.05.b
42.15 Demonstrate artificial insemination techniques.			AS.05.03.05.c
43.0 Manage pasture and forage crops–The student will be able to:		SC.912.L.14.2 SC.912.L.16.10 SC.912.L.17.4, 5, 9, 11, 13, 14, 15, 16, 17, 19 SC.912.P.8.11 SC.912.N.1.4	
43.01 Compare pasture, forage and feed crop production and harvesting systems.			
43.02 Assist in determining pasture and forage needs.			
43.03 Take a soil sample and interpret results.			
43.04 Take a forage sample and interpret results.			
43.05 Describe soil and water conservation practices.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
43.06 Determine range and pasture quality.			
43.07 Prepare soil for planting feed, pasture and forage crops.			
43.08 Plant and grow feed, pasture and forage crops.			
43.09 Fertilize pasture, forage, and feed crops.			
43.10 Control weeds and pests in crops.			
43.11 Harvest forage and feed crops.			
43.12 Store harvested feed and forage crops.			
43.13 Assist in the development of a plan for the rotation of fields, pens and pastures.			

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 5
Course Number: 8106240
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nutrition; grooming, exhibiting and marketing animals; operation, maintenance and repair of equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
44.0	Discuss animal marketing techniques–The student will be able to:			
44.01	Collect and interpret market reports and identify market outlets for companion and food-producing animals.			
44.02	Determine market grades of animal and animal products.			
44.03	Examine the impacts of industry promotion campaigns.			
45.0	Apply advanced animal health practices–The student will be able to:		SC.912.L.17.14 SC.912.N.4.1, 2	
45.01	Administer prescribed injections (under supervision).			
45.02	Discuss proper disposal of deceased animals.			
45.03	Determine when euthanasia is appropriate.			
45.04	Discuss AVMA approved methods of euthanasia.			
45.05	Discuss BMPs (Best Management Practices) associated with castration, dehorning, docking, and debeaking.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
46.0 Perform emergency first aid on animals—The student will be able to:		SC.912.L.14.36	
46.01 Evaluate the health status of the animals.			
46.02 Isolate injured animals.			
46.03 Demonstrate how to properly cleanse wounds and apply antiseptic.			
46.04 Immobilize fractured limbs.			
46.05 Identify and stop external bleeding.			
46.06 Know when to seek additional medical attention for animals.			
47.0 Implement procedures to ensure that animal products are safe.—The student will be able to:			
47.01 Identify animal production practices that could pose health risks or are considered to pose risks by some.			AS.06.02.01.a
47.02 Discuss consumer concerns with animal production practices relative to human health.			AS.06.02.01.b
47.03 Implement a program to assure the safety of animal products.			AS.06.02.01.c
47.04 Describe how animal identification systems can track an animal's location, nutrition requirements, production progress and changes in health.			AS.06.02.02.a
47.05 Explain why animal trace-back capability, using individual animal and farm identification systems, is important to producers and consumers.			AS.06.02.02.b
47.06 Implement an animal and/or premises identification program.			AS.06.02.02.c
48.0 Identify, select, and breed food-producing animals—The student will be able to:		SC.912.L.14.31, 33 SC.912.L.15.4, 5, 6, 14 SC.912.L.16.1, 2, 3, 4, 5, 8, 9, 10	
48.01 Appraise animal conformation and desirable characteristics and breeds.			
48.02 Describe estrous cycle of food-producing animals.			
48.03 Describe breeding techniques, including artificial insemination.			
48.04 Justify offspring that should be culled.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
48.05 Identify signs of parturition.			
48.06 Identify common disorders of parturition.			
48.07 Prepare animals and facilities for parturition.			
48.08 Assist in the delivery of newborn animals.			
49.0 Analyze county, state and federal agencies that support the animal industry–The student will be able to:		SC.912.L.17.18	
49.01 Identify the agencies that support the animal industry.			
49.02 Research the technical assistance, disaster relief, grants and other programs available.			
49.03 Inquire about career opportunities within these agencies.			

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 6
Course Number: 8106250
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nutrition; grooming, exhibiting and marketing animals; operation, maintenance and repair of equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
50.0 Apply principles of comparative anatomy and physiology to uses within various animal systems.—The student will be able to:			AS.02.02.06.b
50.01 Compare and contrast body systems and system adaptations between animal species.			AS.02.02.06.c
50.02 Explain the impact of animal body systems on performance, health, growth, and reproduction.			
51.0 Plan routine management of food-producing animals and facilities—The student will be able to:			
51.01 Schedule feeding and care of animals.			
51.02 Order supplies and animal feeds.			
51.03 Develop training and exercise schedule for animal.			
51.04 Develop a plan for routine maintenance of equipment and facilities.			
51.05 Assist in the planning of a routine animal health and preventative medication program.			
51.06 Implement and maintain sanitary conditions for animals, including young.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
51.07 Separate non-compatible animals.			
51.08 Observe animals on a regular basis for problems or stress.			
51.09 Develop a calendar of operations for a selected animal operation.			
52.0 Maintain and analyze records—The student will be able to:			
52.01 Analyze and utilize production, performance and breeding records, using computer applications.			
52.02 Identify major sources of credit.			
52.03 Evaluate leasing and renting agreements.			
52.04 Evaluate need for liability and other insurance.			
52.05 Analyze records to determine efficiency of operation.			
52.06 Maintain machinery, equipment and facilities inventory records.			
52.07 Maintain breeding records.			
52.08 Prepare an annual budget.			
52.09 Maintain and analyze basic business records (inventory, depreciation, receipts, and expenses) using computer applications.			
52.10 Plan a work schedule.			
52.11 Maintain personnel and labor records.			
52.12 Maintain supervised agricultural experience records.			
52.13 Discuss the legal requirements of maintaining animal health records, and maintain and analyze health records.			
52.14 Maintain chemical-use and water-use records, etc			
53.0 Design animal housing, equipment and handling facilities for animal production.—The student will be able to:			
53.01 Identify facilities needed to house and produce each animal species safely and efficiently.			AS.07.01.01.a
53.02 Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe and efficient use of the facility.			AS.07.01.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
53.03 Design an animal facility, focusing on animal requirements, efficiency, safety and ease of handling.			AS.07.01.01.c
53.04 Identify equipment and handling facilities used in modern animal production.			AS.07.01.02.a
53.05 Explain how modern equipment and handling facilities enhance the safe and economic production of animals.			AS.07.01.02.b
53.06 Select equipment and implement animal handling procedures and improvements to enhance production efficiency.			AS.07.01.02.c
54.0 Comply with government regulations and safety standards for facilities used in animal production.—The student will be able to:			
54.01 List the general standards (e.g., environmental, zoning, construction) that must be met in facilities for animal production.			AS.07.02.01.a
54.02 Evaluate an animal facility to determine if standards have been met.			AS.07.02.01.b
54.03 Design a facility that meets standards for the legal, safe, ethical and efficient production of animals.			AS.07.02.01.c
55.0 Identify and interpret rules, policy, and regulations affecting the animal industry—The student will be able to:			
55.01 Maintain a file of current animal rules and regulations.			
55.02 Secure professional services and information.			
55.03 Observe EPA pesticide use regulations.			
55.04 Identify the procedures and requirements for obtaining a restricted use pesticide applicator's license.			
55.05 Observe regulations regarding the use of medications and growth stimulants.			
55.06 Observe state and federal regulations regarding disease testing/eradication programs and other programs.			
55.07 Identify applicable land-use and zoning regulations.			
55.08 Identify agencies affecting natural resource utilization (e.g., DNR, DEP, EPA).			
55.09 Identify agencies regulating employee/employer relations (e.g., OSHA).			
55.10 Investigate opportunities to impact policy making at the local, state, and national level.			
56.0 Understand the relationship of animal production and the environment.—The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
56.01 Evaluate the relationship between animal agriculture on the environment.			AS.08.01.01.a
56.02 Outline methods of balancing the effects of animal agriculture on the environment.			AS.08.01.01.b
56.03 Implement BMPs (Best Management Practices) to balance the impact of animal agriculture on the environment.			AS.08.01.01.c
56.04 Determine positive effects of animal agriculture on the environment.			
57.0 Evaluate the effects of environmental conditions on animals.—The student will be able to:			
57.01 Identify optimal environmental conditions for animals.			AS.08.02.01.a
57.02 Describe the effects of environmental conditions on animal populations and performance.			AS.08.02.01.b
57.03 Establish and maintain favorable environmental conditions for animal growth and performance.			AS.08.02.01.c
58.0 Identify and interpret environmental issues and regulations pertaining to animal industry—The student will be able to :			
58.01 Determine environmental issues pertinent to your area.			
58.02 Calculate the economic impact of environmental regulations on the industry.			
58.03 Discuss emerging technologies and determine their effectiveness as related to environmental quality.			
58.04 Evaluate an animal facility to determine if standards have been met.			
58.05 Design a facility that meets standards for the legal, safe, ethical and efficient production of animals.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the animal 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Plant Biotechnology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2013-2014 being the last cohort of students permitted to enroll in the program. After 2013-2014, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8106500
CIP Number	0101110100
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4021 - Biological Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 agricultural biotechnology industry within 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 consisting of three courses with one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	19-4021	3
	8106850	Agricultural Biotechnology 2	1 credit		3
	8106510	Plant Biotechnology 3	1 credit		3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Ag Biotechnology 2	^^	^^	^^	12/53 23%	6/52 12%	33/56 59%	13/55 24%	8/58 14%	19/35 54%	11/42 26%	12/56 21%	8/53 15%
Plant Biotechnology 3	^^	^^	^^	7/53 13%	9/52 17%	22/56 40%	13/55 24%	9/58 16%	12/35 34%	10/42 24%	12/56 21%	10/53 19%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Identify the historical, social, cultural and potential applications of biotechnology.
- 14.0 Conduct scientific investigation and apply results.
- 15.0 Practice agricultural laboratory safety.
- 16.0 Demonstrate laboratory skills as applied to biotechnology.
- 17.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).
- 18.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 19.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 21.0 Describe plant classifications and the economic impact to your region.
- 22.0 Apply genetic principles to plant production.
- 23.0 Perform propagation.
- 24.0 Use plants to show nutrient absorption and the translocation process in plants.
- 25.0 Demonstrate alternate methods of plant production.
- 26.0 Identify the historical, social, cultural and potential applications of plant biotechnology.
- 27.0 Demonstrate the application of plant biotechnology to Agriculture, Food and Natural Resources (AFNR).

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Plant Biotechnology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Plant Biotechnology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
<p>02.03 Research to Build and Present Knowledge</p>	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
<p>02.04 Range of Writing</p>	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
<p>03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Plant Biotechnology.</p>	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 2
Course Number: 8106850
Course Credit: 1

Course Description:

This course was developed as a core and is designed to develop competencies in the areas of agricultural biotechnology in agriculture, scientific investigation, laboratory safety, scientific and technological concepts; and the fundamentals of biotechnology.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
		LAFS.910.WHST.2.4
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.910.WHST.2.5
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	LAFS.910.WHST.2.6
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.910.WHST.3.7
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	LAFS.910.WHST.3.8
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.910.WHST.3.9
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.910.WHST.4.10
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
03.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
03.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
03.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
03.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Identify the historical, social, cultural and potential applications of biotechnology--The student will be able to:			
13.01 Define biotechnology and explore the historical impact on agriculture.			
13.02 Explain the developmental progression of biotechnology.			
13.03 Investigate current applications of biotechnology in agriculture.			
13.04 Investigate current research in agricultural biotechnology.			
13.05 Examine potential applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.			
13.06 Research emerging problems and issues associated with agricultural biotechnology.			
13.07 Describe the role of agencies that regulate biotechnology.			
13.08 Interpret the major regulatory issues related to biotechnology.			
13.09 Explore ethical, legal and social biotechnology issues.			
13.10 Evaluate the benefits and risks associated with biotechnology.			
13.11 Investigate the emergence and evolution of biological organisms			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
and their use in biotechnology.			
13.12 Examine intellectual properties associated with biotechnology by defining their components.			
13.13 Examine an ethical dilemma associated with biotechnology by identifying its components.			
14.0 Conduct scientific investigation and apply results--The student will be able to:			
14.01 Discuss the differences between scientific laws and scientific theories.			
14.02 Explain the process of scientific inquiry.			
14.03 Analyze research being conducted in agricultural biotechnology.			
14.04 Design an agricultural experiment using appropriate control measures.			
14.05 Devise a system for recording data.			
14.06 Collect and record data using SI units.			
14.07 Summarize data and draw defensible conclusions.			
14.08 Prepare a report on the experiment conducted.			
14.09 Plan and conduct follow-up experiments using the scientific method.			
15.0 Practice agricultural laboratory safety--The student will be able to:			
15.01 Identify first aid supplies, personnel and emergency protection areas.			
15.02 Monitor, use, store and dispose of hazardous materials properly.			
15.03 Document safety training and practices using Material Safety Data Sheets (MSDS) and Occupational Safety and Health Administration (OSHA) standards.			
15.04 Demonstrate and utilize safety equipment.			
15.05 Identify safety symbols and signs.			
15.06 Demonstrate appropriate safety procedures and guidelines, and discuss implications of safety violations.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.0 Demonstrate laboratory skills as applied to biotechnology--The student will be able to:			
16.01 Maintain and interpret biotechnology laboratory records.			
16.02 Operate laboratory equipment and measurement devices.			
16.03 Demonstrate aseptic techniques in the biotechnology laboratory.			
16.04 Select an appropriate standard operating procedure for working with biological materials.			
16.05 Prepare buffers, reagents, solutions and media.			
16.06 Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.			
16.07 Isolate, maintain, quantify and store cell cultures.			
16.08 Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations.			
16.09 Extract and purify DNA.			
16.10 Perform protein separation techniques and interpret the results.			
16.11 Describe how antibodies are formed and how they can be used in biotechnology applications.			
16.12 Research and describe the use of biotechnology to detect microbes.			
17.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:			
17.01 Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.			
17.02 Differentiate the roles of carbohydrates, fats, and proteins in biotechnology applications.			
17.03 Diagram the processes used to produce transgenic eukaryotes.			
17.04 Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions.			
17.05 Describe processes by which enzymes are produced through biotechnology.			
17.06 Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.07 Diagram the process by which organisms are genetically engineered for waste treatment.			
17.08 Describe the benefits and risks associated with the use of biotechnology to increase productivity and improve quality of agricultural products.			
17.09 Investigate and report on genetic engineering procedures used in the production of agricultural products.			
17.10 Explain the functions of hormones in animals.			
17.11 Describe the processes used to produce animal hormones from transgenic organisms.			
17.12 Identify foods produced through fermentation.			
17.13 Compare and contrast bioengineering and conventional pathways used in food processing.			
17.14 Explain biomass and sources of biomass.			
17.15 Assess the characteristics of biomass that make it useful for biofuels production.			
17.16 Describe the process used in producing alcohol from biomass.			
17.17 Diagram the process used in producing biodiesel from biomass.			
17.18 Illustrate the process used in producing methane from biomass.			
17.19 Describe the selective plant breeding process.			
17.20 Assess the benefits, risks and opportunities associated with using biotechnology to promote animal health.			
17.21 Describe the use of biotechnology in bioremediation.			
17.22 Describe the processes involved in biotreatment of biological and chemical wastes.			
17.23 Explain the global importance of biodiversity.			
17.24 Explain the positive and negative impacts of agricultural practices on wild populations.			
17.25 Explain how biotechnology tools can be used to monitor the effects of agricultural practices on wild populations.			
17.26 Describe the processes used in the production of molecules for use in industrial applications.			

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Course Title: Plant Biotechnology 3
Course Number: 8106510
Course Credit: 1

Course Description:

Standards included in this course of instruction have been aligned to the academic courses shown below. This table shows the number of aligned benchmarks, the total number of academic benchmarks, and the percentage of alignment.

Florida Standards	Correlation to CTE Program Standard #
18.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology.	
18.01 Key Ideas and Details	
18.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02 Craft and Structure	
18.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved.	LAFS.1112.RST.2.6
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.	LAFS.1112.RST.3.7
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	LAFS.1112.RST.3.8
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	LAFS.1112.RST.3.9
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.	LAFS.1112.RST.4.10
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content.	LAFS.1112.WHST.1.1
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	LAFS.1112.WHST.1.2
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	LAFS.1112.WHST.1.3
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
		LAFS.1112.WHST.2.4
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.1112.WHST.2.5
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	LAFS.1112.WHST.2.6
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.1112.WHST.3.7
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	LAFS.1112.WHST.3.8
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.1112.WHST.3.9
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.1112.WHST.4.10
20.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
20.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
20.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
20.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
20.04	Model with mathematics.	

Florida Standards		Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1	
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
20.06 Attend to precision.	MAFS.K12.MP.6.1	
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.0 Describe plant classifications and the economic impact to your region--The student will be able to:			
21.01 Classify plants based upon their regional use and importance.			
21.02 Describe the economic impact of regionally produced products.			
21.03 Describe the regional growing conditions that impact the feasibility of producing particular plant products.			
21.04 Identify economically significant plant families.			
21.05 Identify at least thirty plants by common and scientific names.			
22.0 Apply genetic principles to plant improvement--The student will be able to:			
22.01 Describe the relationship between reproduction and plant improvement.			
22.02 Demonstrate the reproductive cycle in seed plants.			
22.03 Describe how genetic processes and structures control inheritance in plants.			
22.04 Explain polyploidy in both natural settings and in commercial plant production.			
22.05 Differentiate phenotypic versus genotypic expression in plant crosses.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.06 Describe the processes used for mutation induction.			
23.0 Demonstrate methods of micropropagating plants--The student will be able to:			
23.01 Evaluate the advantages and disadvantages of using micropropagation techniques.			
23.02 Describe the factors (light, temperature, plant growth regulators) affecting growth in plant tissue culture.			
23.03 Prepare a lab for use as a plant tissue culture facility.			
23.04 Demonstrate aseptic/sterile technique.			
23.05 Produce a crop using tissue culture methods and prepare a written report of results.			
24.0 Demonstrate methods of plant production--The student will be able to:			
24.01 Evaluate the advantages and disadvantages of non-traditional crop production techniques (hydroponic/substrate, greenhouse, tunnel/hoop, etc.).			
24.02 Demonstrate different means of hydroponics production.			
24.03 Determine the cultural needs in hydroponics production.			
24.04 Describe crops grown commercially by non-traditional techniques in your region.			
25.0 Use plants to demonstrate growth disorders (nutrients, pathogens, pests--The student will be able to:			
25.01 Identify plant nutrient-related disorders.			
25.02 Identify pathogen-related disorders in plants.			
25.03 Identify pest-related disorders in plants.			
25.04 Discuss how IPM and biotechnology are used to solve plant disorders.			
25.05 Prepare plant tissue samples for submission to determine nutrient levels.			
25.06 Demonstrate factors that affect the nutrient levels in plant tissue.			
26.0 Identify the historical, social, cultural and potential applications of plant biotechnology--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.01 Research and report on the major innovators and milestones in the development of biotechnology.			
26.02 Analyze the scope and impact of plant biotechnology in today's global society.			
26.03 Assess the future impact plant biotechnology could have on world populations.			
26.04 Research, evaluate, and articulate a major regulatory issue pertaining to plant biotechnology.			
26.05 Research, evaluate, and articulate the implications of an ethical, legal, social, or cultural biotechnology issue in plant production.			
26.06 Research and debate an ethical issue associated with plant biotechnology.			
26.07 Analyze an intellectual/genetic property issue associated with bioethics in plant production.			
27.0 Demonstrate the application of plant biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:			
27.01 Utilize external reviews and compare them to research conducted in plant production.			
27.02 Develop a standard operating procedure for a biological process in plant production.			
27.03 Verify the physical properties of buffers, reagents, solutions and media.			
27.04 Simulate ordering, stocking, and maintaining supplies of biological and chemical materials.			
27.05 Devise a management plan to reduce laboratory waste.			
27.06 Analyze factors that influence gene expression.			
27.07 Perform DNA manipulations, such as cloning/subcloning, blotting, sequencing and amplification.			
27.08 Characterize the biochemical properties of proteins.			
27.09 Use antibodies to detect and quantify antigens.			
27.10 Conduct an Enzyme-Linked Immunosorbent Assay (ELISA).			
27.11 Produce alcohol and co-products from biomass.			
27.12 Produce biodiesel and co-products from biomass.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
27.13 Produce methane and co-products from biomass.			
27.14 Evaluate the technologies used to create biofuels from biomass.			
27.15 Design and conduct an experiment using biotechnology tools to evaluate selectively bred plants.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

Because of the production and marketing cycle of the agricultural industries, 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

- Agriscience Foundations

**Florida Department of Education
Curriculum Framework**

Program Title: Agricultural Biotechnology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2013-2014 being the last cohort of students permitted to enroll in the program. After 2013-2014, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8106600
CIP Number	0126120100
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4021 - Biological Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 agricultural biotechnology industry within 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 consisting of three courses with one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	19-4021	3
	8106850	Agricultural Biotechnology 2	1 credit		3
	8106860	Agricultural Biotechnology 3	1 credit		3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Ag Biotechnology 2	^^	^^	^^	12/53 23%	6/52 12%	33/56 59%	13/55 24%	8/58 14%	19/35 54%	11/42 26%	12/56 21%	8/53 15%
Ag Biotechnology 3	^^	^^	^^	10/53 19%	13/52 25%	31/56 55%	34/55 62%	14/58 24%	27/35 77%	18/42 43%	25/56 45%	19/53 36%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and

technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Identify the historical, social, cultural and potential applications of biotechnology.
- 14.0 Conduct scientific investigation and apply results.
- 15.0 Practice agricultural laboratory safety.
- 16.0 Demonstrate laboratory skills as applied to biotechnology.
- 17.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).
- 18.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology.
- 19.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology.
- 20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.
- 21.0 Identify the historical, social, cultural and potential applications of plant biotechnology.
- 22.0 Apply genetic principles to agricultural production.
- 23.0 Demonstrate proper tissue/cell culture techniques.
- 24.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agritechnology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agritechnology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
<p>02.03 Research to Build and Present Knowledge</p>	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
<p>02.04 Range of Writing</p>	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
<p>03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agritechnology.</p>	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 2
Course Number: 8106850
Course Credit: 1

Course Description:

This course was developed as a core and is designed to develop competencies in the areas of agricultural biotechnology in agriculture, scientific investigation, laboratory safety, scientific and technological concepts; and the fundamentals of biotechnology.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Biotechnology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Biotechnology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
		LAFS.910.WHST.2.4
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.910.WHST.2.5
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	LAFS.910.WHST.2.6
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.910.WHST.3.7
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	LAFS.910.WHST.3.8
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.910.WHST.3.9
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.910.WHST.4.10
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
03.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
03.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
03.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
03.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Identify the historical, social, cultural and potential applications of biotechnology--The student will be able to:			
13.01 Define biotechnology and explore the historical impact on agriculture.			
13.02 Explain the developmental progression of biotechnology.			
13.03 Investigate current applications of biotechnology in agriculture.			
13.04 Investigate current research in agricultural biotechnology.			
13.05 Examine potential applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.			
13.06 Research emerging problems and issues associated with agricultural biotechnology.			
13.07 Describe the role of agencies that regulate biotechnology.			
13.08 Interpret the major regulatory issues related to biotechnology.			
13.09 Explore ethical, legal and social biotechnology issues.			
13.10 Evaluate the benefits and risks associated with biotechnology.			
13.11 Investigate the emergence and evolution of biological organisms			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
and their use in biotechnology.			
13.12 Examine intellectual properties associated with biotechnology by defining their components.			
13.13 Examine an ethical dilemma associated with biotechnology by identifying its components.			
14.0 Conduct scientific investigation and apply results--The student will be able to:			
14.01 Discuss the differences between scientific laws and scientific theories.			
14.02 Explain the process of scientific inquiry.			
14.03 Analyze research being conducted in agricultural biotechnology.			
14.04 Design an agricultural experiment using appropriate control measures.			
14.05 Devise a system for recording data.			
14.06 Collect and record data using SI units.			
14.07 Summarize data and draw defensible conclusions.			
14.08 Prepare a report on the experiment conducted.			
14.09 Plan and conduct follow-up experiments using the scientific method.			
15.0 Practice agricultural laboratory safety--The student will be able to:			
15.01 Identify first aid supplies, personnel and emergency protection areas.			
15.02 Monitor, use, store and dispose of hazardous materials properly.			
15.03 Document safety training and practices using Material Safety Data Sheets (MSDS) and Occupational Safety and Health Administration (OSHA) standards.			
15.04 Demonstrate and utilize safety equipment.			
15.05 Identify safety symbols and signs.			
15.06 Demonstrate appropriate safety procedures and guidelines, and discuss implications of safety violations.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.0 Demonstrate laboratory skills as applied to biotechnology--The student will be able to:			
16.01 Maintain and interpret biotechnology laboratory records.			
16.02 Operate laboratory equipment and measurement devices.			
16.03 Demonstrate aseptic techniques in the biotechnology laboratory.			
16.04 Select an appropriate standard operating procedure for working with biological materials.			
16.05 Prepare buffers, reagents, solutions and media.			
16.06 Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.			
16.07 Isolate, maintain, quantify and store cell cultures.			
16.08 Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations.			
16.09 Extract and purify DNA.			
16.10 Perform protein separation techniques and interpret the results.			
16.11 Describe how antibodies are formed and how they can be used in biotechnology applications.			
16.12 Research and describe the use of biotechnology to detect microbes.			
17.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:			
17.01 Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.			
17.02 Differentiate the roles of carbohydrates, fats, and proteins in biotechnology applications.			
17.03 Diagram the processes used to produce transgenic eukaryotes.			
17.04 Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions.			
17.05 Describe processes by which enzymes are produced through biotechnology.			
17.06 Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.07 Diagram the process by which organisms are genetically engineered for waste treatment.			
17.08 Describe the benefits and risks associated with the use of biotechnology to increase productivity and improve quality of agricultural products.			
17.09 Investigate and report on genetic engineering procedures used in the production of agricultural products.			
17.10 Explain the functions of hormones in animals.			
17.11 Describe the processes used to produce animal hormones from transgenic organisms.			
17.12 Identify foods produced through fermentation.			
17.13 Compare and contrast bioengineering and conventional pathways used in food processing.			
17.14 Explain biomass and sources of biomass.			
17.15 Assess the characteristics of biomass that make it useful for biofuels production.			
17.16 Describe the process used in producing alcohol from biomass.			
17.17 Diagram the process used in producing biodiesel from biomass.			
17.18 Illustrate the process used in producing methane from biomass.			
17.19 Describe the selective plant breeding process.			
17.20 Assess the benefits, risks and opportunities associated with using biotechnology to promote animal health.			
17.21 Describe the use of biotechnology in bioremediation.			
17.22 Describe the processes involved in biotreatment of biological and chemical wastes.			
17.23 Explain the global importance of biodiversity.			
17.24 Explain the positive and negative impacts of agricultural practices on wild populations.			
17.25 Explain how biotechnology tools can be used to monitor the effects of agricultural practices on wild populations.			
17.26 Describe the processes used in the production of molecules for use in industrial applications.			

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 3
Course Number: 8106860
Course Credit: 1

Course Description:

This course is designed to enhance competencies in the areas of current agricultural biotechnology applications, genetic principles, tissue/cell culture, and the potential for biotechnology in the area of agriculture.

Florida Standards	Correlation to CTE Program Standard #
18.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Biotechnology.	
18.01 Key Ideas and Details	
18.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
18.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
18.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
18.02 Craft and Structure	
18.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
18.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
18.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved.	LAFS.1112.RST.2.6
18.03	Integration of Knowledge and Ideas	
18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.	LAFS.1112.RST.3.7
18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	LAFS.1112.RST.3.8
18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	LAFS.1112.RST.3.9
18.04	Range of Reading and Level of Text Complexity	
18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.	LAFS.1112.RST.4.10
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Biotechnology.	
19.01	Text Types and Purposes	
19.01.1	Write arguments focused on discipline-specific content.	LAFS.1112.WHST.1.1
19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	LAFS.1112.WHST.1.2
19.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	LAFS.1112.WHST.1.3
19.02	Production and Distribution of Writing	
19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
		LAFS.1112.WHST.2.4
19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.1112.WHST.2.5
19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	LAFS.1112.WHST.2.6
19.03 Research to Build and Present Knowledge		
19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.1112.WHST.3.7
19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	LAFS.1112.WHST.3.8
19.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.1112.WHST.3.9
19.04 Range of Writing		
19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.1112.WHST.4.10
20.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Biotechnology.	
20.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
20.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
20.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
20.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
20.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
20.06 Attend to precision.	MAFS.K12.MP.6.1
20.07 Look for and make use of structure.	MAFS.K12.MP.7.1
20.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
18.0 Identify the historical, social, cultural and potential applications of agricultural biotechnology--The student will be able to:			
18.01 Research and report on the major innovators and milestones in the development of biotechnology.			
18.02 Identify animal, plant, and environmental applications of biotechnology and the economic impact.			
18.03 Assess the future impact biotechnology could have on world populations.			
18.04 Research, evaluate and articulate a major regulatory issue pertaining to biotechnology.			
18.05 Research, evaluate and articulate the implications of an ethical, legal, social or cultural biotechnology issue in agricultural production.			
18.06 Debate an ethical issue associated with biotechnology.			
18.07 Analyze an intellectual property issue associated with bioethics in agricultural production.			
18.08 Identify and discuss emerging technologies in agriculture production (transgenics, biologics, biosecurity, food safety, sustainability, etc.).			
19.0 Apply genetic principles to agricultural production--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.01 Describe the relationship between reproduction and genetic improvement.			
19.02 Demonstrate how traits are inherited.			
19.03 Describe how genetic processes and structures control inheritance.			
19.04 Predict probable results of single or multiple trait crosses.			
19.05 Differentiate between dominant and recessive traits.			
19.06 Describe the chemical and physical properties of DNA.			
19.07 Develop a hypothetical species using genetic engineering.			
19.08 Debate the safeguards used in research in genetic engineering.			
19.09 Describe the process of genetic marker assisted selection.			
19.10 Analyze factors that influence gene expression.			
20.0 Demonstrate proper tissue/cell culture techniques--The student will be able to:			
20.01 Prepare a lab for use as a tissue culture facility.			
20.02 Describe the effects of growth hormones on tissue/cell culture.			
20.03 Demonstrate the use of sterile instruments and materials.			
20.04 Produce plants using tissue culture methods and prepare a written report of results.			
21.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:			
21.01 Develop a standard operating procedure for a biological process in agriculture.			
21.02 Calibrate laboratory equipment and conduct instrument qualification tests.			
21.03 Verify the physical properties of buffers, reagents, solutions and media.			
21.04 Simulate the process needed to order, stock, and maintain supplies of biological and chemical materials.			
21.05 Devise a management plan to reduce laboratory waste.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.06 Perform DNA manipulations, such as cloning/subcloning, blotting, sequencing and amplification.			
21.07 Characterize the biochemical properties of proteins.			
21.08 Use antibodies to detect and quantify antigens			
21.09 Conduct an Enzyme-Linked Immunosorbent Assay (ELISA).			
21.10 Produce alcohol and co-products from biomass.			
21.11 Produce biodiesel and co-products from biomass.			
21.12 Produce methane and co-products from biomass.			
21.13 Evaluate the technologies used to create biofuels from biomass.			
21.14 Design and conduct an experiment using biotechnology tools to evaluate selectively bred organisms.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

Because of the production and marketing cycle of the agricultural industries, 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

- Agriscience Foundations

**Florida Department of Education
Curriculum Framework**

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

Secondary – Career Preparatory

Program Number	8106800
CIP Number	0101039901
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4011 - Agricultural and Food Science Technicians
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction in animal and plant production and processing; agriculture marketing; agricultural mechanics; employability skills; mathematics; basic science; biological sciences; communications; and human-relations skills.

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 consisting of one occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	19-4011	3
	8106820	Agritechnology 1	1 credit		2
	8106830	Agritechnology 2	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Agritechnology 1	^^	^^	^^	12/53 23%	11/52 21%	21/56 28%	19/55 35%	11/58 19%	13/35 37%	22/42 52%	22/56 39%	16/53 30%
Agritechnology 2	^^	^^	^^	10/53 19%	11/52 21%	18/56 32%	13/55 24%	15/58 26%	9/35 26%	23/42 55%	19/56 34%	15/53 28%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and

language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agritechnology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agritechnology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agritechnology.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Explore the scope of the agriscience industry.
- 14.0 Provide for proper animal health and nutrition.
- 15.0 Identify procedures in animal production and reproduction.
- 16.0 Develop procedures for exhibiting animals.
- 17.0 Compare, select, and use plant production systems.
- 18.0 Investigate proper methods to fertilize plants and crops
- 19.0 Operate, maintain, and service facilities, tools, and equipment.
- 20.0 Apply principles of agribusiness finance.
- 21.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy
- 22.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agritechnology.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agritechnology.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agritechnology.
- 26.0 Analyze the scope of the Agriscience industry.
- 27.0 Recommend steps for proper animal health and nutrition.
- 28.0 Select, and use plant production systems.
- 29.0 Fertilize plants and crops.
- 30.0 Irrigate plants and crops.
- 31.0 Control plant pests.
- 32.0 Maintain, and service facilities, tools, and equipment.
- 33.0 Describe procedures for harvesting and marketing agricultural products.
- 34.0 Compare principles of agribusiness finance.
- 35.0 Explain the components of the American business system

36.0 Investigate agricultural cooperatives structure and function.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agritechnology.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agritechnology.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agritechnology.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agritechnology 1
Course Number: 8106820
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agriscience industry careers; prevention and treatment of livestock diseases; livestock anatomy; wholesale cuts of meat; animal reproduction and identification; animal safety; animal-health certification; plant growth; plant fertilization; safe use of pesticides; maintenance of tools and equipment; record keeping; and employability skills.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agritechnology	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards	Correlation to CTE Program Standard #
<p>procedure, or discussing an experiment in a text, defining the question the author seeks to address.</p> <p style="text-align: right;">LAFS.910.RST.2.6</p>	
01.03 Integration of Knowledge and Ideas	
<p>01.03.1 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p style="text-align: right;">LAFS.910.RST.3.7</p>	
<p>01.03.2 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.</p> <p style="text-align: right;">LAFS.910.RST.3.8</p>	
<p>01.03.3 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p style="text-align: right;">LAFS.910.RST.3.9</p>	
01.04 Range of Reading and Level of Text Complexity	
<p>01.04.1 By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> <p>01.04.2 By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.</p> <p style="text-align: right;">LAFS.910.RST.4.10</p>	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agritechology	
02.01 Text Types and Purposes	
<p>02.01.1 Write arguments focused on discipline-specific content.</p> <p style="text-align: right;">LAFS.910.WHST.1.1</p>	
<p>02.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p style="text-align: right;">LAFS.910.WHST.1.2</p>	
<p>02.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.</p> <p style="text-align: right;">LAFS.910.WHST.1.3</p>	
02.02 Production and Distribution of Writing	
<p>02.02.1 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agritechology		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #	
	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Explore the scope of the agriscience industry--The student will be able to:		SC.912.N.1.1, 4, 5 SC.912.N.4.1;	
13.01 Investigate career opportunities in agriscience industries.			
13.02 Describe training requirements for entry and advancement in agriscience careers.			
14.0 Provide for proper animal health and nutrition--The student will be able to:		SC.912.L.14.6, 31, 52 SC.912.L.16.7 SC.912.L.17.1, 2, 6, 8, 11, 14, 15, 16, 17, 18, 20 SC.912.L.18.2, 3, 4 SC.912.N.1.1, 2, 4, 5. 6	
14.01 Demonstrate proper methods to clean and disinfect animal equipment and facilities.			
14.02 Explain proper disposal of animal waste with regards to sanitation, economics, and environmental implications			
15.0 Identify procedures in animal production and reproduction--The student will be able to:		SC.912.L.14.31, 32, 33 SC.912.L.15.2, 5, 6	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.L.16.1, 2, 10, 13 SC.912.N.3.5	
15.01 Examine livestock and poultry anatomy.			
15.02 Identify commercially important breeds of animals.			
15.03 Assemble desirable characteristics of breeding and market animals.			
15.04 Evaluate wholesale cuts of beef, pork, lamb, and poultry.			
15.05 Compare and select appropriate breeding methods for different agricultural enterprises.			
15.06 Explain the reproductive cycles of commercially important animals.			
15.07 Identify signs of animal pregnancy, parturition, and infertility.			
15.08 Describe approved care for newborn animals.			
15.09 Describe methods of animal identification.			
15.10 Describe methods of restraining, loading, handling, and transporting animals safely.			
16.0 Develop procedures for exhibiting animals--The student will be able to:		SC.912.L.16.10	
16.01 Demonstrate the procedures for preparing, maintaining, and handling commercially important animals.			
16.02 Compare and contrast appropriate evaluation criteria for animals.			
16.03 Prepare appropriate shipping and health certificates required for exhibiting or marketing animals.			
17.0 Compare, select, and use plant production systems--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.7, 53 SC.912.L.15.5, 6 SC.912.L.16.17 SC.912.L.17.4 SC.912.L.18.7	
17.01 Compare different plant production systems.			
17.02 Propagate, transplant and grow plants.			
17.03 Select and prepare a site and/or a seedbed for planting.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.04 Identify methods of pruning plants to achieve desired growth and to maintain health.			
18.0 Investigate proper methods to fertilize plants and crops--The student will be able to:	MAFS.912.N-Q.1.3	SC.912.L.17.10, 16 SC.912.P.8.8, 11	
18.01 Interpret information on a fertilizer label.			
18.02 Compare sources and forms of nutrients.			
18.03 Determine methods of applying fertilizer materials.			
19.0 Operate, maintain, and service facilities, tools, and equipment--The student will be able to:		SC.912.P.10.3, 14, 15, 16, 18	
19.01 Use and maintain hand tools and power equipment (e.g., power saws, welders).			
19.02 Maintain and service small gasoline engines.			
20.0 Apply principles of agribusiness finance--The student will be able to:	MAFS.912.S-IC.2	SC.912.N.4.2	
20.01 Identify major sources of credit for agribusiness.			
20.02 Complete a business loan application.			
20.03 Maintain and interpret agribusiness financial records including depreciation, inventory, and budgets.			
21.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
21.01 Assess the agricultural impact upon the US gross national product and the total global economy.			
21.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.			
21.03 Identify and describe the primary government agencies involved with agriculture.			
21.04 Research new and emerging technologies and their impact on the economy.			
21.05 Recognize the value of the food and agribusiness industry.			
22.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.01 Define and explore agriculture and agribusinesses and their role in the economy.			
22.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
22.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.			
22.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.			

**Florida Department of Education
 Student Performance Standards**

Course Title: Agritechnology 2
Course Number: 8106830
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; refrigeration; new and emerging technologies; financial management skills; and employability skills.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agritechnology	
	23.01 Key Ideas and Details	
	23.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	23.01.2 Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	23.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	23.02 Craft and Structure	
	23.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	23.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	23.02.3 Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.6	
23.03 Integration of Knowledge and Ideas		
23.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
23.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
23.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
23.04 Range of Reading and Level of Text Complexity		
23.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
23.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agritechnology		
24.01 Text Types and Purposes		
24.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
24.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
24.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
24.02 Production and Distribution of Writing		
24.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
24.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
24.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
24.03 Research to Build and Present Knowledge		
24.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
24.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
24.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
24.04 Range of Writing		
24.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agritechology		
25.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
25.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
25.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
25.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
25.06 Attend to precision.	MAFS.K12.MP.6.1	
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.0 Analyze the scope of the agriscience industry--The student will be able to:		SC.912.N.1.1, 4, 5 SC.912.N.4.1	
26.01 Identify and describe the importance of professional and trade organizations.			
26.02 Examine and interpret trade journals, and academic research in the agriscience industry.			
26.03 Complete a job application			
27.0 Recommend steps for proper animal health and nutrition--The student will be able to:	MAFS.912.N-Q.1.3	SC.912.L.14.6, 31, 52 SC.912.L.16.7; SC.912.L.17.1, 2, 6, 8, 11, 14, 15, 16, 17, 18, 20 SC.912.L.18.2, 3, 4 SC.912.N.1.1, 2, 4, 5. 6	
27.01 Recognize, describe and demonstrate prevention and treatment of common animal diseases, disorders, and pests.			
27.02 Read, interpret, and demonstrate correct uses of pesticides, medication, and other additives according to their labels.			
27.03 Describe nutritional requirements of animals.			
27.04 Formulate and compute least-cost feed rations.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
27.05 Select and apply growth stimulators and implants.			
27.06 Determine feeding rates and methods of feeding animals.			
28.0 Select, and use plant production systems--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.7, 53 SC.912.L.15.5, 6 SC.912.L.16.17 SC.912.L.17.4 SC.912.L.18.7	
28.01 Recommend varieties of local commercial plants and field crops.			
28.02 Calculate planting rate and spacing.			
28.03 Operate and adjust planting equipment.			
29.0 Fertilize plants and crops--The student will be able to:	MAFS.912.S-IC.2 MAFS.912.N-Q.1.3	SC.912.L.17.10, 16 SC.912.P.8.8, 11	
29.01 Access why the resources soil provides supports life.			
29.02 Demonstrate how the importance of soil characteristics affects agriculture.			
29.03 Develop fertilization schedules and calculate fertilizer rates for plants; solve time, distance, area, and volume problems in agriscience.			
29.04 Identify common nutrient-deficiency symptoms in plants.			
29.05 Calibrate fertilization equipment and fertilize plants.			
30.0 Irrigate plants and crops--The student will be able to:	MAFS.912.N-Q.1.3	SC.912.E.7.5, 6, 7, 8, 9 SC.912.L.17.10;	
30.01 Recognize soil and plant conditions indicating irrigation needs and develop an irrigation schedule.			
30.02 Compare and select irrigation equipment and methods.			
30.03 Install, operate, maintain, and repair irrigation equipment.			
31.0 Control plant pests--The student will be able to:	MAFS.912.N-Q.1.3	SC.912.L.17.6, 8, 9, 13, 17	
31.01 Compare and contrast common plant pests and their damages.			
31.02 Diagram life cycles of insects, pests, and diseases.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.03 Interpret the procedures and requirements for obtaining a restricted-use-pesticide operator's license.			
31.04 Select, mix, and apply a no restricted chemical according to the label and local, state, federal and EPA regulations.			
31.05 Describe biological, chemical and cultural methods of controlling plant pests.			
32.0 Maintain, and service facilities, tools, and equipment--The student will be able to:		SC.912.P.10.3,14,15,16,18	
32.01 Demonstrate basic facility maintenance, installation, or repair. (e.g., welding, electricity, plumbing, fencing, construction)			
32.02 Safely operate, maintain, service, and repair equipment.			
33.0 Describe procedures for harvesting and marketing agricultural products--The student will be able to	MAFS.912.S-IC.2	SC.912.P.8.10	
33.01 Determine maturity, condition, quality, and volume of products to be harvested.			
33.02 Describe procedures for harvesting products.			
33.03 Collect and interpret market reports and identify market outlets for agricultural products.			
33.04 Organize a marketing program for agricultural products.			
33.05 Assess kinds and types of storage facilities for agricultural products.			
33.06 Grade, treat, pack, and/or store harvested products.			
34.0 Compare principles of agribusiness finance--The student will be able to:		SC.912.N.4.2	
34.01 Explain the purposes and structures of contracts, leases, deeds, and insurance policies.			
34.02 Maintain and interpret agribusiness financial records including depreciation, inventory, and budgets.			
35.0 Explain the components of the American business system.—The student will be able to:			
35.01 Describe the five basic ways American business is organized.			
35.02 Distinguish and identify between the characteristics of each method of doing business.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
35.03 Evaluate the advantages and disadvantages provided by each business method.			
35.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			
35.05 Describe the five basic ways American business is organized.			
36.0 Investigate agricultural cooperatives structure and function.—The student will be able to:			
36.01 Explain the definition of a cooperative.			
36.02 Understand the history of cooperative principles and practices.			
36.03 Describe the five areas that classify cooperative structure.			
36.04 Distinguish and identify between the five types of cooperative structure and their functions.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the animal 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Course Title: Agriscience Foundations
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Course Number	8106810
Grade Level	9-12, 30, 31
Standard Length	1 credit
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4011 - Agricultural and Food Science Technicians
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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.

**Florida Department of Education
Student Performance Standards**

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

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agriculture.	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a	

Florida Standards		Correlation to CTE Program Standard #
	text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agriculture.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	

Florida Standards		Correlation to CTE Program Standard #
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agriculture.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	
03.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06	Attend to precision. MAFS.K12.MP.6.1	

Florida Standards	Correlation to CTE Program Standard #
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 <u>Describe the history of agriculture and its influence on the global economy--</u> The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 <u>Practice agriscience safety skills and procedures--</u> The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the			FPP.01.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
food supply chain.			FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 <u>Apply scientific and technological principles to agriscience issues--The student will be able to:</u>		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.			CS.11.01.01 CS.11.02.01
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 <u>Apply environmental principles to the agricultural industry--The student will</u>		SC.912.E.6.1, 4;	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
be able to:		SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 <u>Investigate and utilize basic scientific skills and principles in plant science-</u> -The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-			FPP01.01.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
products from plants.			
08.09 Explore career opportunities in plant science.			
09.0 <u>Investigate and utilize basic scientific skills and principles in animal science</u> --The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 <u>Demonstrate the use of agriscience tools, equipment, and instruments</u> -- <u>The student will be able to</u>	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 <u>Demonstrate agribusiness, employability and human relation skills</u> --The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 <u>Apply leadership and citizenship skills</u> --The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Curriculum Framework**

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

Secondary – Career Preparatory

Program Number	8112000
CIP Number	0101030300
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	45-2093 - Farmworkers, Farm, Ranch, and Aquacultural Animals
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction in the planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues in the aquaculture industry.

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 consisting of one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations	1 credit	45-2093	3
	8112010	Aquaculture 2	1 credit		3
	8112020	Aquaculture 3	1 credit		3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Aquaculture 2	^^	^^	^^	38/53 72%	27/52 52%	50/56 89%	30/55 55%	21/58 36%	24/35 66%	36/42 86%	35/56 63%	30/53 57%
Aquaculture 3	^^	^^	^^	22/53 42%	28/52 54%	35/56 63%	35/55 67%	30/58 52%	20/35 57%	36/42 86%	40/56 71%	34/53 64%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and

language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Aquaculture.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aquaculture.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aquaculture.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Describe the nature and origin of and career opportunities in aquaculture.
- 14.0 Demonstrate the management and environmentally sound use of water and land resources.
- 15.0 Apply biological principles to the reproduction, identification and growth of aquaculture species.
- 16.0 Safely operate, maintain and repair machinery, equipment and facilities used in aquaculture.
- 17.0 Assist in the propagation and culture of an aquaculture organism.
- 18.0 Describe procedures used in locating markets and marketing aquaculture products.
- 19.0 Apply business management skills in managing an aquaculture operation.
- 20.0 Identify applicable local, state, and federal rules and regulations and assistance programs.
- 21.0 Assist in producing aquaculture species in one or more of the following: ponds, cages, tanks, raceways, net pens.
- 22.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 23.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 24.0 Describe the nature and origin of and career opportunities in aquaculture.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aquaculture.
- 26.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aquaculture.
- 27.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aquaculture.
- 28.0 Exhibit management and environmentally sound use of water and land resources.
- 29.0 Complete the propagation and culture of an aquaculture organism.
- 30.0 Demonstrate procedures used in locating markets and marketing aquaculture products.
- 31.0 Incorporate business management skills in managing an aquaculture operation.
- 32.0 Demonstrate leadership, employability, communication, and human relations skills.
- 33.0 Produce an aquaculture species in one or more of the following: pond, cage, tank, raceway, net pen.
- 34.0 Control disease, pest and water quality problems.
- 35.0 Assist in harvesting and processing aquaculture species.

- 36.0 Explain the components of the American business system.
- 37.0 Investigate agricultural cooperatives structure and function.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Aquaculture.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aquaculture.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aquaculture.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02. b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02. b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b AS.02.02.03.b
06.05 Implement the scientific method and science process skills			CS.11.01.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
through the design and completion of an agriscience research project.			CS.11.02.01
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic			PS.02.03.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
table and explain their functions.			
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01. a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	.
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02. b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01. b PST.03.03.02. a.
10.03 Solve time			PST.04.04.03. a PST.04.04.06. a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03. c. PST.01.03.01. a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a .
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b .
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.02 Identify opportunities to apply acquired leadership skills.			. CS.02.02.02.b .
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c .
12.04 Participate in community based learning activities.			CS.01.05.01.c .
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b .
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Aquaculture 2
Course Number: 8112010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nature and origin, career opportunities, biological principles, safety, water quality, seed production, market outlets, rules and regulations, technological advances, problem solving and leadership employability communication and human relations skills.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Aquaculture.	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aquaculture.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aquaculture.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
13.0 Describe the nature and origin of and career opportunities in aquaculture--The students will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.E.6.4, 5, 6 SC.912.L.14.2, 3, 6, 33 SC.912.L.15.3, 6, 7, 9, 13 SC.912.L.16.9, 14, 15, 16 SC.912.L.17.7, 9 10, 12, 13, 14, 15, 16, 17, 18 SC.912.N.1.2, 3, 4, 5, 6 SC.912.N.2.5;
13.01 List the definition of aquaculture as defined by the Florida Division of Aquaculture.		
13.02 Compare and contrast aquaculture and fisheries.		
13.03 List and describe major global aquatic crops and animals.		
13.04 Explain the history of aquaculture.		
13.05 List and describe aquaculture related occupations.		
13.06 Determine the educational requirements and experience needed to enter and advance in aquaculture occupations.		
14.0 Demonstrate the management and environmentally sound use of water and land resources-- The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.E.5.6 SC.912.E.6.2, 4, 5, SC.912.E.7.1, 2, 3, 4, 5, 6, 7, 8 9

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
		SC.912.L.17. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 18, 20 SC.912.L.18.6, 12 SC.912.P.8.2, 6, 10, 11, 12 SC.912.P.12.9, 12
14.01 Identify and describe the physical and chemical characteristics of water for use in aquaculture.		
14.02 Explain how changes in water affect aquatic life.		
14.03 Be able to measure the dissolved oxygen, pH, total ammonia nitrogen (TAN), unionized ammonia, nitrite, nitrate, salinity, hardness, alkalinity, turbidity, chlorine/chloramine and carbon dioxide in a water system		
14.04 Explain how the nitrogen cycle is related to maintaining healthy fish.		
15.0 Apply biological principles to the reproduction, identification and growth of aquaculture species--The students will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.14.1, 3, 4, 6, 11, 12, 13, 14, 16, 17, 18, 19, 21, 28, 29, 30, 31, 32, 33, 36, 42, 43, 44, 46, 48, 49, 50, 51, 52, 53 SC.912.L.15.4, 5, 6, 7 SC.912.L.15.7, 9 SC.912.L.17.13 SC.912.L.18.1, 2, 3, 4, 7, 8, 9, 10, 11, 12 SC.912.N.3.1, 2, 5 SC.912.N.4.1, 2 SC.912.P.8.7, 8, 11, 12, 13
15.01 Define morphology, anatomy, and physiology.		
15.02 Identify and describe the anatomy and physiology of crustaceans.		
15.03 Identify and describe the anatomy and physiology of mollusks.		
15.04 Identify and describe the anatomy and physiology of fish.		
15.05 Identify and describe the basic morphology of aquatic macroalgae and microalgae.		
15.06 List and describe important characteristics in choosing a production species.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
15.07	Identify and describe common aquaculture organism by family, genus and species.		
15.08	List and describe the chemical and physical factors which influence the growth of aquatic fauna and flora.		
15.09	Identify aquaculture species of commercial importance in your area.		
15.10	Describe necessary biosecurity measures for various aquaculture facilities.		
16.0	Safely operate, maintain and repair machinery, equipment and facilities used in aquaculture - -The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.17.7 SC.912.P.8.2 SC.912.P.10.2, 3, 4, 5, 7, 8, 14, 15 SC.912.P.12.2, 3, 5, 5, 9, 13
16.01	Recognize and observe safety practices necessary in carrying out aquaculture activities.		
16.02	Inspect, maintain and perform basic repairs on aquaculture machinery, equipment and facilities.		
16.03	Safely operate aquaculture machinery and equipment.		
16.04	Discuss the safety and maintenance of a re-circulating aquaculture system (RAS) including biological, chemical, and mechanical filtration, degassing, sterilization, and foam fractionation.		
17.0	Assist in the propagation and culture of an aquaculture organism. --The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.15.12, 13, 15 SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17 SC.912.L.17.4, 5, 6, 7, 8, 9, 11, 14, 15, 17 SC.912.N.1.7 SC.912.P.12.13
17.01	Identify/describe facilities used in a grow-out operation.		
17.02	List sources of aquaculture organisms and how they are produced.		
17.03	Determine the purpose and functions of a hatchery.		
17.04	Describe and contrast the reproductive anatomy of aquaculture organisms.		
17.05	Describe and contrast types of spawning exhibited by aquaculture organisms.		
17.06	Discuss proper broodstock conditioning and spawning techniques for aquaculture organisms.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
17.07 Discuss proper grow-out techniques for aquaculture organisms.		
18.0 Describe procedures used in locating markets and marketing aquaculture products--The student will be able to:		SC.912.E.5.10 SC.912.N.1.1, 5, 7 SC.912.N.2.2, 3, 4, 5 SC.912.P.8.1, 2, 7, 10, 11, 12
18.01 Identify possible market outlets for aquaculture products.		
18.02 Identify the steps in securing a specific market outlet for a given species.		
18.03 Describe the product characteristics of a marketable product.		
19.0 Apply business management skills in managing an aquaculture operation--The student will be able to:	MAFS.912.S-IC.2	
19.01 Identify and list functions in the management process.		
19.02 Demonstrate basic bookkeeping skills.		
19.03 Complete Supervised Agricultural Experience (SAE) records.		
20.0 Identify applicable local, state and federal rules, regulations and assistance programs--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.N.4.1, 2
20.01 Identify and observe laws and regulations affecting the industry in the local area.		
20.02 Describe process to obtain required permits, licenses, leases, etc. for production and marketing.		
20.03 Identify and list agencies regulating the industry and their functions.		
20.04 Identify and list government assistance programs available to the industry.		
21.0 Demonstrate leadership, employability, communication, and human relations skills--The student will be able to:		SC.912.N.1.7
21.01 Conduct group meetings, using parliamentary procedure and public-speaking skills.		
21.02 Identify acceptable work habits (ethics) and desired personal characteristics.		
21.03 Demonstrate acceptable employee-hygiene habits.		
21.04 Secure information about a job.		
21.05 Complete a job application.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
22.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:		
22.01 Assess the agricultural impact upon the US gross national product and the total global economy.		
22.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.		
22.03 Identify and describe the primary government agencies involved with agriculture.		
22.04 Research new and emerging technologies and their impact on the economy.		
22.05 Recognize the value of the food and agribusiness industry.		
23.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:		
23.01 Define and explore agriculture and agribusinesses and their role in the economy.		
23.02 Evaluate and explore the agribusiness career opportunities in agriculture.		
23.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.		
23.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society		
24.0 Describe the nature and origin of and career opportunities in aquaculture--The students will be able to:		
24.01 List the definition of aquaculture as defined by the Florida Division of Aquaculture.		
24.02 Compare and contrast aquaculture and fisheries.		
24.03 List and describe major global aquatic crops and animals.		

**Florida Department of Education
Student Performance Standards**

Course Title: Aquaculture 3
Course Number: 8112020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of management and use of water, the propagation and rearing of seed, producing aquaculture species, control of diseases, pests and water quality problems, harvesting and processing, marketing and transportation, management skills and leadership, employability, communication and human relation skills.

Florida Standards		Correlation to CTE Program Standard #
25.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aquaculture.	
	25.01 Key Ideas and Details	
	25.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	25.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	25.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	25.02 Craft and Structure	
	25.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	25.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	25.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards	Correlation to CTE Program Standard #
<p>procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p> <p style="text-align: right;">LAFS.1112.RST.2.6</p>	
<p>25.03 Integration of Knowledge and Ideas</p>	
<p>25.03.1 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.</p> <p style="text-align: right;">LAFS.1112.RST.3.7</p>	
<p>25.03.2 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p style="text-align: right;">LAFS.1112.RST.3.8</p>	
<p>25.03.3 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p style="text-align: right;">LAFS.1112.RST.3.9</p>	
<p>25.04 Range of Reading and Level of Text Complexity</p>	
<p>25.04.1 By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> <p>25.04.2 By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.</p> <p style="text-align: right;">LAFS.1112.RST.4.10</p>	
<p>26.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aquaculture.</p>	
<p>26.01 Text Types and Purposes</p>	
<p>26.01.1 Write arguments focused on discipline-specific content.</p> <p style="text-align: right;">LAFS.1112.WHST.1.1</p>	
<p>26.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p style="text-align: right;">LAFS.1112.WHST.1.2</p>	
<p>26.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.</p> <p style="text-align: right;">LAFS.1112.WHST.1.3</p>	
<p>26.02 Production and Distribution of Writing</p>	
<p>26.02.1 Produce clear and coherent writing in which the development,</p>	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>26.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>26.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
26.03 Research to Build and Present Knowledge	
<p>26.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>26.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>26.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
26.04 Range of Writing	
<p>26.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
27.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aquaculture.	
<p>27.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>27.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>27.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
27.04 Model with mathematics.	MAFS.K12.MP.4.1	
27.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
27.06 Attend to precision.	MAFS.K12.MP.6.1	
27.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
27.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
28.0 Exhibit the management and environmentally sound use of water and land resources--The student will be able to:		SC.912.L.17.5, 7, 8, 13, 14, 15, 16, 17, 20 SC.912.L.18.12 SC.912.N.4.1, 2, 6 SC.912.P.8.1, 10, 11, 12, 13 SC.912.P.10.2, 3, 9; SC.912.P.12.2, 5, 6, 9, 12
28.01 Calculate volume in circular, rectangular and irregular shaped water structures.		
28.02 Identify and explain point and non-point pollution management associated with aquaculture.		
28.03 Determine soil types, land slope and other factors to consider in choosing a location for an aquaculture operation.		
28.04 Discuss Florida Department of Agriculture and Consumer Services (FDACS) Best Management Practices (BMP) for managing water usage and aquaculture affluent.		
28.05 Discuss different stages of construction of ponds and/or other aquaculture production facilities.		
28.06 Discuss the advantages and disadvantages of hydroponics and aquaponics.		
29.0 Complete the propagation and culture of an aquaculture organism.--The student will be able to:		SC.912.E.5.8 SC.912.E.6.4, 5, 6

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
		SC.912.E.7.1, 6, 8 SC.912.L.14.4, 6, 31, 33, 41, 43, 44, 46, 52 SC.912.L.15.6, 7, 9 SC.912.L.16.1, 2, 3, 7, 9, 12, 14 SC.912.L.17.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20 SC.912.L.18.1, 2, 3, 4 SC.912.N.1.1 SC.912.N.2.4, 5
29.01 Identify and describe the methods of reproducing aquaculture organisms.		
29.02 Identify and describe the hatchery facilities used in aquaculture.		
29.03 Select a method of producing seed for a selected species.		
29.04 List and explain the process for hatching eggs in different aquaculture organisms.		
29.05 Determine the types and sizes of feeds to grow different life stages of aquaculture organisms.		
29.06 Discuss the proper methods for harvesting, grading and transporting seed, fry and juvenile aquaculture organisms.		
30.0 Demonstrate procedures used in locating markets and marketing aquaculture products--The student will be able to:		SC.912.N.1.1, 3, 4, 5, 6 SC.912.N.2.2, 4, 5 SC.912.N.3.5 SC.912.N.4.1, 2
30.01 Develop a marketing plan for an aquaculture product.		
30.02 Determine laws and regulations involved in transporting and marketing aquaculture organisms.		
30.03 Market aquaculture products.		
31.0 Incorporate business management skills in managing an aquaculture operation--The student will be able to:	MAFS.912.S-IC.2	SC.912.N.2.5 SC.912.N.3.5 SC.912.N.4.1, 2 SC.912.P.8.2, 6, 9, 11, 12, 13 SC.912.P.10.2, 13, 14, 15
31.01 Determine cost of production/harvesting and profitability of different systems.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
31.02	Determine procedures and costs for acquiring the land/water, machinery, equipment structures, etc., needed for an operation specified by the instructor.		
31.03	Complete forms related to (a) land purchase, (b) water leases, (c) permits, (d) licenses, (e) financial loans, (f) insurance, (g) others specified by the instructor.		
31.04	Keep records related to: (a) property ownership, (b) equipment acquired, (c) equipment repair and maintenance, (d) income and expense, (e) employee time and days, (f) income tax and social security, (g) insurance, (h) others specified by instructor.		
31.05	Manage a production/harvesting system.		
31.06	Complete Supervised Occupational Experienced (SAE) records.		
32.0	Demonstrate leadership, employability, communication, and human relations skills--The student will be able to:		SC.912.N.1.1, 3, 5, 7 SC.912.N.2.2, 5 SC.912.N.4.1, 2
32.01	Demonstrate competence in job-interview techniques.		
32.02	Demonstrate proper office procedures.		
32.03	Demonstrate appropriate response to criticism from employer, supervisor, or other persons in the workplace.		
32.04	Demonstrate knowledge of how to appropriately make a career change, including resigning from a job.		
32.05	Write a resume.		
33.0	Produce an aquaculture species in one or more of the following: pond, cage, tank, raceway, net pen--The student will be able to:		SC.912.E.5.8 SC.912.E.6.4, 5 SC.912.E.7.1, 2, 3, 4, 5, 6, 8, 9 SC.912.L.14.4, 6, 7, 16, 19, 46, 53 SC.912.L.17.2, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 SC.912.L.18.1, 2, 3, 4 SC.912.N.1.3, 4, 5, 6, 7 SC.912.N.2.4, 5 SC.912.N.3.5 SC.912.N.4.1, 2 SC.912.P.8.1, 6, 7, 8, 9, 10, 11, 12 SC.912.P.10.2, 3, 4,

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
		5, 6, 7, 8, 9, 10, 11, 18 SC.912.P.12.2, 3, 4, 5, 6, 7, 8, 9
33.01 Identify the types of growing systems and important factors in their selection, design and use.		
33.02 Determine economic factors to consider in choosing a system for commercial production.		
33.03 Identify and describe facility construction and site requirements.		
33.04 Select species for a specific culture facility.		
33.05 Determine feeding methods and calculate feeding rates for an aquaculture organism.		
33.06 Assist in managing water quality in one or more production systems.		
34.0 Control disease, pest and water quality problems--The student will be able to:		SC.912.E.5.8 SC.912.E.6.5, 6 SC.912.L.14.2, 3, 4, 6, 11, 12, 16, 19, 29, 42, 43, 44, 45, 46, 47, 52, 53 SC.912.L.15.15 SC.912.L.16. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 SC.912.L.17.1, 2, 3, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18 SC.912.L.18.5, 7, 8, 9, 11, 12 SC.912.N.2.4, 5 SC.912.N.3.5 SC.912.P.8.9
34.01 Identify major diseases of several locally important commercial species and list different methods of prevention and treatment.		
34.02 Identify major pests of several locally important commercial species and list recommended control methods.		
34.03 Describe methods of prevention, treatment and control of the major diseases and pests previously identified.		
34.04 Identify water quality problems.		
34.05 Determine water quality parameters and describe corrective action where needed.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
35.0 Assist in harvesting and processing aquaculture species--The student will be able to:		SC.912.E.5.8 SC.912.E.6.5, 6 SC.912.L.14.2, 3, 4, 6, 11, 12, 16, 19, 29, 42, 43, 44, 45, 46, 47, 52, 53 SC.912.L.15.15 SC.912.L.16. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 SC.912.L.17.1, 2, 3, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18 SC.912.L.18.5, 7, 8, 9, 11, 12 SC.912.N.2.4, 5 SC.912.N.3.5 SC.912.P.8.9
35.01 Recognize and observe safety and sanitary practices including biosecurity in harvesting and processing aquaculture organisms.		
35.02 Determine harvesting practices recommended for aquaculture organisms.		
35.03 Determine equipment, labor, financial and legal requirements for harvesting aquaculture organisms.		
35.04 Harvest aquaculture organisms using recommended practices.		
35.05 Determine processing and packaging practices recommended for aquaculture organisms.		
35.06 Determine equipment, labor, financial and legal requirements for processing and packaging aquaculture organisms.		
35.07 Process and/or package aquaculture organisms using recommended practices.		
35.08 Compare and contrast methods for shipping aquaculture organisms.		
36.0 Explain the components of the American business system.—The student will be able to:		
36.01 Describe the five basic ways American business is organized.		
36.02 Distinguish and identify between the characteristics of each method of doing business.		
36.03 Evaluate the advantages and disadvantages provided by each business method.		
36.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
37.0 Investigate agricultural cooperatives structure and function.—The student will be able to:		
37.01 Explain the definition of a cooperative.		
37.02 Understand the history of cooperative principles and practices.		
37.03 Describe the five areas that classify cooperative structure.		
37.04 Distinguish and identify between the five types of cooperative structure and their functions.		

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)
- Aquaculture 2 (8112010)
- Aquaculture 3 (8112020)

**Florida Department of Education
Curriculum Framework**

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

Secondary – Career Preparatory

Program Number	8113000
CIP Number	0103010301
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4091 - Environmental Science and Protection Technicians, Including Health
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 consisting of four courses with one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	19-4091	3
	8106850	Agriculture Biotechnology 2	1 credit		3
	8113010	Environmental Resources 3	1 credit		3
	8113020	Environmental Resources 4	1 credit		3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Ag Biotechnology 2	^^	^^	^^	12/53 23%	6/52 12%	33/56 59%	13/55 24%	8/58 14%	19/35 54%	11/42 26%	12/56 21%	8/53 15%
Environmental Resources 3	^^	^^	^^	4/53 8%	9/52 17%	10/56 18%	12/55 22%	9/58 16%	6/35 17%	17/42 40%	12/56 21%	11/53 21%

Environmental Resources 4	^^	^^	^^	1/53 2%	1/52 2%	4/56 7%	2/55 4%	1/58 2%	2/35 6%	3/42 7%	2/56 4%	1/53 2%
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^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Resources.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Resources.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Resources.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Identify the historical, social, cultural and potential applications of biotechnology.
- 14.0 Conduct scientific investigation and apply results.
- 15.0 Practice agricultural laboratory safety.
- 16.0 Apply genetic principles to agricultural production.
- 17.0 Demonstrate laboratory skills as applied to biotechnology.
- 18.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).
- 19.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Environmental Resources.
- 20.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Environmental Resources.
- 21.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Environmental Resources.
- 22.0 Collect and test samples used to determine soil characteristics.
- 23.0 Determine the quality and quantity of water resources.
- 24.0 Identify, classify and preserve samples and specimens of native flora and fauna.
- 25.0 Identify major ecosystems in Florida.
- 26.0 Collect record and analyze data.
- 27.0 Demonstrate orienteering and map reading skills.
- 28.0 Research environmental issues.
- 29.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.
- 30.0 Examine the scope of career opportunities in and the importance of agriculture to the economy.
- 31.0 Understand the management of lands.

- 32.0 Investigate the application of weather systems in the agricultural industry.
- 33.0 Practice sustainable agriculture.
- 34.0 Explain the relationship between agriculture and regulatory processes.
- 35.0 Identify environmental detriments to agriculture.
- 36.0 Explain the components of the American business system.
- 37.0 Investigate agricultural cooperatives structure and function.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Resources.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Resources.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
<p>02.03 Research to Build and Present Knowledge</p>	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
<p>02.04 Range of Writing</p>	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
<p>03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Resources.</p>	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agriculture Biotechnology 2
Course Number: 8106850
Course Credit: 1

Course Description:

This course was developed as a core and is designed to develop competencies in the areas of Environmental Resources in agriculture, scientific investigation, laboratory safety, scientific and technological concepts; and the fundamentals of biotechnology.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Environmental Resources	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Environmental Resources	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Environmental Resources	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Identify the historical, social, cultural and potential applications of biotechnology--The student will be able to:		SC.912.L.15.1, 2, 3, 5, 8, 14; SC.912.L.16.10; SC.912.L17.13; SC.912.N.2.1, 2	
13.01 Define biotechnology and explore the historical impact on agriculture.			BS.01.01.01.a. BS.01.01.01.b.
13.02 Explain the developmental progression of biotechnology.			
13.03 Examine current research and applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.			BS.01.01.01.c. BS.01.01.02.a. BS.01.01.02.b BS.01.01.03.a.
13.04 Describe the role of agencies that regulate biotechnology.			
13.05 Interpret the major regulatory issues related to biotechnology.			
13.06 Explore ethical, legal and social biotechnology issues.			
13.07 Research emerging problems and issues and evaluate the benefits and risks associated with biotechnology.			BS.01.01.03.b. BS.01.01.03.c.
13.08 Investigate the emergence and evolution of biological organisms and their use in biotechnology.			BS.01.03.02.a
13.09 Examine intellectual properties associated with biotechnology by defining their components.			BS.01.03.03.a.

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
13.10 Examine an ethical dilemma associated with biotechnology by identifying its components.			BS.01.03.01.a.
14.0 Conduct scientific investigation and apply results--The student will be able to:	MAFS.912.S-IC.2; MAFS.912.N-Q.1.3	SC.912.N.3.1, 4	
14.01 Discuss the differences between scientific laws and scientific theories.			
14.02 Design an agricultural experiment using appropriate control measures.			
14.03 Collect and record data using SI units.			
14.04 Using the scientific method summarize data, draw conclusions, and plan follow-up experiments.			
15.0 Practice agricultural laboratory safety--The student will be able to:			
15.01 Identify first aid supplies, personnel and emergency protection areas.			
15.02 Monitor, use, store and dispose of hazardous materials and disposal of biological pathogens according to industry practices.			
15.03 Document safety training and practices (reading and interpreting) using Material Safety Data Sheets (MSDS) and Occupational Safety and Health Administration (OSHA) standards.			
15.04 Demonstrate and utilize safety equipment.			
15.05 Identify safety symbols and signs.			
15.06 Demonstrate appropriate safety procedures and guidelines, and discuss implications of safety violations.			
16.0 Apply genetic principles to agricultural production--The student will be able to:	MAFS.912.S-IC.2 MAFS.912.N-Q.1.3	SC.912.L.15.5, 9, 13, 15 SC.912.L.16.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17 SC.912.L.17.13, 20 SC.912.N.1.2, 4, 6 SC.912.P.8.3, 4, 5, 6, 7, 12, 13	
16.01 Describe the relationship between reproduction and genetic improvement.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
16.02 Demonstrate how traits are inherited.			
16.03 Describe how genetic processes and structures control inheritance.			
16.04 Predict probable results of single or multiple trait crosses.			
16.05 Differentiate between dominant and recessive traits.			
16.06 Describe the chemical and physical properties of DNA.			
16.07 Develop a hypothetical species using genetic engineering.			
16.08 Debate the safeguards used in research in genetic engineering.			
16.09 Perform DNA manipulations, such as cloning/subcloning, blotting, sequencing and amplification.			
16.10 Analyze factors that influence gene expression.			
16.11 Describe the process of genetic marker assisted selection.			
17.0 Demonstrate laboratory skills as applied to biotechnology--The student will be able to:	MAFS.912.N-Q.1.3	SC.912.L.14.4, 6, 52 SC.912.L.16.1, 2, 3, 5, 9, 15, 16 SC.912.L.18. 4, 12 SC.912.P.8.7	
17.01 Maintain and interpret biotechnology laboratory and production records.			
17.02 Operate laboratory equipment and measurement devices.			
17.03 Demonstrate aseptic techniques in the biotechnology laboratory.			
17.04 Select an appropriate standard operating procedure for working with biological materials and equipment.			
17.05 Prepare buffers, reagents, solutions and media.			BS.02.04.01.b.
17.06 Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.			BS.02.04.02.b.
17.07 Isolate, maintain, quantify and store cell cultures.			BS.02.05.01.b.
17.08 Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations.			BS.02.05.02.b.
17.09 Extract and purify DNA.			BS.02.05.03.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.10 Perform protein separation techniques and interpret the results.			
17.11 Describe how antibodies are formed and how they can be used in biotechnology applications.			BS.02.05.05.a
17.12 Research and describe the use of biotechnology to detect microbes.			BS.02.05.06.b.
18.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.14.2; SC.912.L.15.13, 14, 15; SC.912.L.16.10; SC.912.L.17.2, 8, 11, 20; SC.912.L.18.1, 2, 3, 4, 6, 7, 8, 11; SC.912.P.8.12	
18.01 Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.			BS.03.01.01.a
18.02 Differentiate the roles of carbohydrates, fats, and proteins in biotechnology applications.			
18.03 Describe the role of fermentation in biotechnology applications.			
18.04 Diagram the processes used to produce transgenic eukaryotes.			
18.05 Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions.			BS.03.01.02.a
18.06 Describe processes by which enzymes are produced through biotechnology.			BS.03.01.02.b.
18.07 Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.			BS.03.01.03.a
18.08 Diagram the process by which organisms are genetically engineered for waste treatment.			BS.03.01.03.b.
18.09 Investigate-and report on-genetic engineering procedures used in the production of agricultural products.			
18.10 Explain the functions of hormones in animals.			BS.03.02.01.a.
18.11 Describe the processes used to produce animal hormones from transgenic organisms.			BS.03.02.01.b.
18.12 Identify foods produced through fermentation.			BS.03.02.02.a.
18.13 Compare and contrast bioengineering and conventional pathways used in food processing.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
18.14 Explain biomass and sources of biomass.			BS.03.03.08.a
18.15 Assess the characteristics of biomass that make it useful for biofuels production.			
18.16 Describe the process used in producing alcohol from biomass.			BS.03.02.03.b.
18.17 Diagram the process used in producing biodiesel from biomass.			BS.03.02.04.b
18.18 Illustrate the process used in producing methane from biomass.			BS.03.02.05.b
18.19 Describe the selective plant breeding process.			BS.03.03.01.a.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Course Title: Environmental Resources 3
Course Number: 8113010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of water resources, native flora and fauna, Florida ecosystems, soil characteristics, and collecting, recording and analyzing data.

Florida Standards		Correlation to CTE Program Standard #
19.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Environmental Resources	
	19.01 Key Ideas and Details	
	19.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	19.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	19.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	19.02 Craft and Structure	
	19.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	19.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	19.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
19.03 Integration of Knowledge and Ideas		
19.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
19.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
19.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
19.04 Range of Reading and Level of Text Complexity		
19.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.04.2		
20.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Environmental Resources	
20.01 Text Types and Purposes		
20.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
20.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
20.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
20.02 Production and Distribution of Writing		
20.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>20.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>20.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
20.03 Research to Build and Present Knowledge	
<p>20.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>20.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>20.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
20.04 Range of Writing	
<p>20.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
21.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Environmental Resources	
<p>21.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>21.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>21.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
21.04 Model with mathematics.	MAFS.K12.MP.4.1	
21.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
21.06 Attend to precision.	MAFS.K12.MP.6.1	
21.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
21.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.0 Collect and test samples used to determine soil characteristics--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.10 SC.912.N.1.1, 3, 4, 5, 6	
22.01 Collect soil samples from test area and complete soil data forms.			
22.02 Determine soil pH using pH test kit.			
22.03 Conduct soil, mineral and elemental analysis using soil test kit.			
22.04 Determine and record texture, structure, temperature and color of each soil layer.			
22.05 Construct a soil profile or soil pit.			
22.06 Analyze soil data and write lab report.			
22.07 Determine the effect of texture, density, and porosity on permeability/infiltration rates and seasonal high groundwater table.			
22.08 Examine the relationship between soil texture, water movement and water holding capacity.			
22.09 Determine land class capability utilizing resources, such as: NRCS County Soil Survey, using Geographic Information Systems or other resources.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
23.0	Determine the quality and quantity of water resources--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.16 SC.912.N.1.1;	
23.01	Determine water quality of groundwater, rivers, lakes, and spring water.			
23.02	Determine stream flow.			
23.03	Collect, store and label water samples from a representative test site.			
23.04	Determine the quality of water samples by measuring for pH, turbidity, dissolved solids and dissolved oxygen.			
23.05	Investigate water shed boundaries and drainage patterns.			
23.06	Monitor water levels of rivers, streams, ponds and lakes.			
24.0	Identify, classify and preserve samples and specimens of flora and fauna-- The student		SC.912.L.17.7, 11, 12 SC.912.N.1.1	
24.01	Identify invasive species and their impact on the environment.			
24.02	Perform a comprehensive ecological study of a forest.			
24.03	Identify native species and their range, habitat, and functions.			
24.04	Identify threatened and endangered upland species, range, and habitat.			
24.05	Demonstrate sample collection and preservation methods.			
25.0	Identify major ecosystems in Florida--The student will be able to:		SC.912.L.15.3 SC.912.L.17.1, 6, 7, 8, 9, 15, 16	
25.01	Identify common plant and animal species of the major ecosystems.			
25.02	Identify the boundary between uplands and wetlands using resources such as: aerial photographs, soils, plants, and/or hydrology.			
25.03	Identify environmental factors affecting Florida's major ecosystems.			
25.04	Identify threatened and endangered plant and animal species of specific habitats.			
25.05	Analyze political, biological, economical, and sociological impacts			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
on managing ecosystems.			
25.06 Trace the effects of pollution through an ecosystem.			
25.07 Demonstrate knowledge of biodegradable and non-biodegradable products.			
25.08 Explain how lack of predation contributes to uncontrollable exotic populations.			
25.09 Explain how exotic populations stress native.			
26.0 Collect, record and analyze data--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.N.1.1, 2, 3, 6	
26.01 Maintain lab journal.			
26.02 Construct data tables.			
26.03 Compile data.			
26.04 Make inferences from data.			
26.05 Use word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and Geographic Information Systems (GIS).			
27.0 Demonstrate orienteering and map reading skills--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2		
27.01 Interpret legal land descriptions.			
27.02 Interpret current and historical aerial photography for land cover and land use applications.			
27.03 Explain topographic map symbols and legends.			
27.04 Measure acreage on maps.			
27.05 Determine location and other information from maps, using technology such as Global Positioning System (GPS) and compass.			
27.06 Measure elevation in the field using survey equipment.			
28.0 Research environmental issues--The student will be able to:		SC.912.L.17.13, 14, 16 SC.912.N.1.1, 2, 3, 4, 5, 6, 7	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
28.01 Conduct an environmental issue investigation.			
28.02 Develop an action plan based on investigation.			
28.03 Prepare and present oral and written presentation.			
29.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
29.01 Assess the agricultural impact upon the US gross national product and the total global economy.			
29.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.			
29.03 Identify and describe the primary government agencies involved with agriculture.			
29.04 Research new and emerging technologies and their impact on the economy.			
29.05 Recognize the value of the food and agribusiness industry.			
30.0 Examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:			
30.01 Define and explore agriculture and agribusinesses and their role in the economy.			
30.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
30.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.			
30.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.			
30.05 Prepare and present oral and written presentation.			

**Florida Department of Education
Student Performance Standards**

Course Title: Environmental Resources 4
Course Number: 8113020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of land management, weather systems, wildlife programs, commodity and non-commodity resources, sustainable agriculture and environmental research.

Florida Standards		Correlation to CTE Program Standard #
19.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Environmental Resources	
	19.01 Key Ideas and Details	
	19.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	19.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	19.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	19.02 Craft and Structure	
	19.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	19.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	19.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
19.03 Integration of Knowledge and Ideas		
19.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
19.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
19.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
19.04 Range of Reading and Level of Text Complexity		
19.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
19.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
20.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Environmental Resources		
20.01 Text Types and Purposes		
20.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
20.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
20.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
20.02 Production and Distribution of Writing		
20.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
20.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
20.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
20.03 Research to Build and Present Knowledge		
20.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
20.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
20.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
20.04 Range of Writing		
20.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
21.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Environmental Resources.	
21.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
21.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
21.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
21.04 Model with mathematics.	MAFS.K12.MP.4.1
21.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
21.06 Attend to precision.	MAFS.K12.MP.6.1
21.07 Look for and make use of structure.	MAFS.K12.MP.7.1
21.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.0 Understand the management of lands--The student will be able to:		SC.912.L.17.13, 18	
31.01 Describe the management of federal lands.			
31.02 Describe the management of state lands.			
31.03 Describe the management of local lands.			
31.04 Describe the management of private lands.			
31.05 Demonstrate how burning of vegetation releases nutrients into the soil.			
31.06 Investigate the merits of growing season burns versus non-growing season burns.			
31.07 Demonstrate safety precautions for controlled burns and legal ramifications.			
31.08 Identify different types of buffers and riparian zones and their applications.			
31.09 Determine the applications and benefits of buffers.			
31.10 Develop and discuss theoretical strategies for managing/eradicating exotic species.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
32.0 Investigate the application of weather systems in the agricultural industry-- The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.8 SC.912.N.1.1	
32.01 Interpret a weather map.			
32.02 Obtain and record measurements of local rainfall, temperature, air pressure, relative humidity, cloud cover and type, and wind speed, using resources such as Florida Automated Weather Network.			
32.03 Demonstrate the use of a hurricane-tracking chart.			
32.04 Analyze the impact of weather in regards to risk management.			
33.0 Practice sustainable agriculture--The student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2	SC.912.L.17.12, 13, 14, 20	
33.01 Describe why it is important to sustain domestic agriculture.			
33.02 Explain international issues affecting domestic agriculture.			
33.03 Apply principles of nutrient, water, and waste management to environmental problems.			
33.04 Compare practices that either enhance or hinder the sustainability of agriculture.			
33.05 Analyze the benefit of recent technological advances on the agricultural industry.			
33.06 Identify and monitor erosion hazards and environmental quality.			
33.07 Differentiate between point and non-point sources of pollution.			
33.08 Describe Best Management Practices (BMP) and their significance.			
33.09 Identify Best Management Practices relevant in your area.			
34.0 Explain the relationship between agriculture and regulatory processes-- The student will be able to			
34.01 Identify environmental regulations and their impacts to agriculture.			
34.02 Identify regulatory agencies that govern agriculture activities.			
34.03 Compare alternative programs to regulations (Examples: local partnerships, agricultural BMPs and others).			
35.0 Identify environmental detriments to agriculture--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
35.01 Identify diseases and pests that impact agriculture production.			
35.02 Explain methods to control and eradicate diseases and pests.			
35.03 Describe isolation or quarantine methods to minimize spread of diseases and pests.			
36.0 Explain the components of the American business system.—The student will be able to:			
36.01 Describe the five basic ways American business is organized.			
36.02 Distinguish and identify between the characteristics of each method of doing business.			
36.03 Evaluate the advantages and disadvantages provided by each business method.			
36.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			
37.0 Investigate agricultural cooperatives structure and function.—The student will be able to:			
37.01 Explain the definition of a cooperative.			
37.02 Understand the history of cooperative principles and practices.			
37.03 Describe the five areas that classify cooperative structure.			
37.04 Distinguish and identify between the five types of cooperative structure and their functions.			

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
32.0 Describe plant classifications and the economic impact to your region--The student will be able to:			
32.01 Classify plants based upon their regional use and importance.			
32.02 Describe the economic impact of regionally produced products.			
32.03 Describe the regional growing conditions that impact the feasibility of producing particular plant products.			
32.04 Identify economically significant plant families.			
32.05 Identify at least fifty plants by common and scientific names.			
33.0 Apply genetic principles to plant improvement--The student will be able to:			
33.01 Describe the relationship between reproduction and plant improvement.			
33.02 Demonstrate the reproductive cycle in seed plants, angiosperms and gymnosperms, mosses and ferns.			
33.03 Describe how genetic processes and structures control inheritance in plants.			
33.04 Explain polyploidy in both natural settings and in commercial plant production.			
33.05 Differentiate phenotypic versus genotypic expression in plant crosses.			
33.06 Describe the processes used for mutation induction.			
34.0 Demonstrate methods of micropropagating plants--The student will be able to:			
34.01 Evaluate the advantages and disadvantages of using micropropagation techniques.			
34.02 Demonstrate aseptic/sterile technique.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
34.03 Prepare and mix stock solutions of media for micro-propagation.			
34.04 Produce a crop using tissue culture methods and prepare a written report of results.			
34.05 Propagate plants using tissue culture techniques for producing synthetic seed culture.			
34.06 Develop and write a protocol to insert a gene of interest in plants.			
34.07 Propagate plants using cell cultures, callus culture, and algae culture.			
34.08 Research uses of cryopreservation in seed and in-vitro propagation methods.			
35.0 Demonstrate methods of plant production--The student will be able to:			
35.01 Evaluate the advantages and disadvantages of non-traditional crop production techniques (hydroponic/substrate, greenhouse, tunnel/hoop, etc.).			
35.02 Demonstrate different production methods used in hydroponics production.			
35.03 Determine the cultural needs in hydroponics production.			
35.04 Describe crops grown commercially by non-traditional techniques in your region.			
36.0 Use plants to demonstrate growth disorders (nutrients, pathogens, pests)--The student will be able to:			
36.01 Identify plant nutrient-related disorders.			
36.02 Identify pathogen-related disorders in plants.			
36.03 Identify pest-related disorders in plants.			
36.04 Discuss how IPM and biotechnology are used to solve plant disorders.			
36.05 Prepare plant tissue samples for submission to determine nutrient levels.			
36.06 Demonstrate factors that affect the nutrient levels in plant tissue.			
37.0 Identify the historical, social, cultural and potential applications of plant biotechnology--The student will be able to:			
37.01 Research and report on the major innovators and milestones in the development of biotechnology.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
37.02 Analyze the scope and impact of plant biotechnology in today's global society.			
37.03 Assess the future impact plant biotechnology could have on world populations.			
37.04 Research, evaluate, and articulate a major regulatory issue pertaining to plant biotechnology.			
37.05 Research, evaluate, and articulate the implications of an ethical, legal, social, or cultural biotechnology issue in plant production.			
37.06 Research and debate an ethical issue associated with plant biotechnology.			
37.07 Analyze an intellectual/genetic property issue associated with bioethics in plant production.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Veterinary Assisting
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8115110
CIP Number	0151080810
Grade Level	9-12, 30, 31
Standard Length	5 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	31-9096 - Veterinary Assistants and Laboratory Animal Caretakers 29-2056 - Veterinary Technologists and Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 broad, transferable skills and stresses understanding and demonstration of the following elements of the veterinary assisting industry: planning, management, finance, technical and production skills, underlying principles of technology, labor issues,

community issues and health, safety and environmental issues. The program also provides supplemental training for persons previously or currently employed as veterinary assistants.

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 consisting three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8111510	Veterinary Assisting 1	1 credit	31-9096	3
	8111540	Veterinary Assisting 2	1 credit		3
	8111550	Veterinary Assisting 3	1 credit		3
B	8111520	Veterinary Assisting 4	1 credit	31-9096	3
C	8111530	Veterinary Assisting 5	1 credit	29-2056	3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Veterinary Assisting 1	^^	^^	^^	5/53 9%	8/52 15%	19/56 34%	15/55 27%	8/58 14%	14/35 40%	16/42 38%	15/56 27%	10/53 19%
Veterinary Assisting 2	^^	^^	^^	**	**	**	**	**	**	**	**	**
Veterinary Assisting 3	^^	^^	^^	5/53 9%	2/52 4%	14/56 25%	3/55 5%	2/58 3%	8/35 23%	4/42 10%	3/56 5%	3/53 6%
Veterinary Assisting 4	^^	^^	^^	4/53 8%	1/52 2%	4/56 7%	2/55 4%	1/58 2%	2/35 6%	3/42 7%	2/56 4%	1/53 2%

Veterinary Assisting 5	^^	^^	^^	3/53 6%	1/52 2%	11/56 20%	3/55 5%	1/58 2%	11/35 31%	4/42 10%	3/56 5%	1/53 2%
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^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Veterinary Assisting.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Veterinary Assisting.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Veterinary Assisting.
- 04.0 Describe veterinary science and the role of animals in society.
- 05.0 Describe the socioeconomic role of veterinary sciences on the companion animal livestock industries.
- 06.0 Discuss the human-animal bond and its effects on human health.
- 07.0 Demonstrate the proper use of veterinary science terminology.
- 08.0 Identify careers in the animal industry.
- 09.0 Practice safety.
- 10.0 Recognize normal and abnormal animal behaviors.
- 11.0 Restrain and control companion and livestock animals.
- 12.0 Identify common breeds of companion animals.
- 13.0 Investigate the common husbandry practices and daily care of several species of animals.
- 14.0 Demonstrate human-relations, communications and leadership through FFA activities.
- 15.0 Demonstrate basic first aid for companion and livestock animals.
- 16.0 Demonstrate the use of tools, equipment and instruments in the veterinary science and companion animal industry.
- 17.0 Demonstrate proper techniques in taking vital signs.
- 18.0 Identify common breeds of livestock animals.
- 19.0 Identify parts and functions of various systems of selected animals.
- 20.0 Investigate the common husbandry practices and daily care of companion animals and exotic animals and fish.
- 21.0 Explain the various methods of animal identification.
- 22.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Veterinary Assisting.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Veterinary Assisting.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Veterinary Assisting.
- 25.0 Demonstrate knowledge of animal control and animal welfare organizations.
- 26.0 Describe the problems, causes, and solutions of animal overpopulation.
- 27.0 Locate and interpret animal-related laws.
- 28.0 Identify the different digestive systems of animals and the nutritional requirements of selected species.
- 29.0 Explain the reproductive system and breeding of selected animals.
- 30.0 Identify common species and/or breeds of exotic animals.
- 31.0 Demonstrate human-relations, communications, leadership and employability skills.

- 32.0 Differentiate between animal welfare and animal rights.
- 33.0 Explain the role of animals in research.
- 34.0 Maintain and analyze records.
- 35.0 Demonstrate knowledge of preventive medicine and disease control.
- 36.0 Explain diagnostic testing.
- 37.0 Describe internal and external parasites and control methods.
- 38.0 Groom selected companion and livestock animals.
- 39.0 Describe exotic animals and the effects of captivity on them.
- 40.0 Assess techniques used in surgical assisting and surgical preparation.
- 41.0 Demonstrate knowledge of pharmacology.
- 42.0 Explain proper methods of syringe and hypodermic needle use.

**Florida Department of Education
Student Performance Standards**

Course Title: Veterinary Assisting 1
Course Number: 8111510
Course Credit: 1

Course Description:

This course is designed to develop competencies in areas such as the history of the animal industry; applied scientific and technological concepts; safety; terminology; careers; breed identification; animal care and human relations skills.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Veterinary Assisting.	
01.01 Key Ideas and Details	
<ul style="list-style-type: none"> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1 	
<ul style="list-style-type: none"> Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2 	
<ul style="list-style-type: none"> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3 	
01.02 Craft and Structure	
<ul style="list-style-type: none"> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4 	
<ul style="list-style-type: none"> Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5 	
<ul style="list-style-type: none"> Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question 	

Florida Standards	Correlation to CTE Program Standard #
<p style="text-align: center;">the author seeks to address.</p> <p style="text-align: right;">LAFS.910.RST.2.6</p>	
<p>01.03 Integration of Knowledge and Ideas</p>	
<ul style="list-style-type: none"> • Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. <p style="text-align: right;">LAFS.910.RST.3.7</p>	
<ul style="list-style-type: none"> • Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. <p style="text-align: right;">LAFS.910.RST.3.8</p>	
<ul style="list-style-type: none"> • Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. <p style="text-align: right;">LAFS.910.RST.3.9</p>	
<p>01.04 Range of Reading and Level of Text Complexity</p>	
<ul style="list-style-type: none"> • By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. • By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. <p style="text-align: right;">LAFS.910.RST.4.10</p>	
<p>02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Veterinary Assisting.</p>	
<p>02.01 Text Types and Purposes</p>	
<ul style="list-style-type: none"> • Write arguments focused on discipline-specific content. <p style="text-align: right;">LAFS.910.WHST.1.1</p>	
<ul style="list-style-type: none"> • Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. <p style="text-align: right;">LAFS.910.WHST.1.2</p>	
<ul style="list-style-type: none"> • Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. <p style="text-align: right;">LAFS.910.WHST.1.3</p>	
<p>02.02 Production and Distribution of Writing</p>	
<ul style="list-style-type: none"> • Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. 	

Florida Standards	Correlation to CTE Program Standard #
LAFS.910.WHST.2.4	
<ul style="list-style-type: none"> Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. 	
LAFS.910.WHST.2.5	
<ul style="list-style-type: none"> Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. 	
LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
<ul style="list-style-type: none"> Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. 	
LAFS.910.WHST.3.7	
<ul style="list-style-type: none"> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. 	
LAFS.910.WHST.3.8	
<ul style="list-style-type: none"> Draw evidence from informational texts to support analysis, reflection, and research. 	
LAFS.910.WHST.3.9	
02.04 Range of Writing	
<ul style="list-style-type: none"> Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. 	
LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Veterinary Assisting.	
03.01 Make sense of problems and persevere in solving them.	
MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively.	
MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others.	
MAFS.K12.MP.3.1	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Describe veterinary science and the role of animals in society--The students will be able to:		SC.912.L.14.6 SC.912.L.15.13, 15 SC.912.L.16.7, 10, 12 SC.912.L.17.11, 12, 13, 14, 15, 16, 17, 18, 19 SC.912.N.1.2 SC.912.N.2.1 SC.912.N.4.1
04.01 Define veterinary science.		
04.02 Identify key components in the domestication of animals.		
04.03 Choose current issues facing the animal industry today and describe the effect of each on society.		
05.0 Describe the socioeconomic role of veterinary sciences on the companion animal and livestock industries--The students will be able to:		SC.912.L.14.6 SC912.L.15.3, 4, 13, 15; SC.912.L.16.7, 10, 12; SC.912.L.17.2, 11, 12, 13, 14, 15, 16, 17, 18, 19; 51 SC.912.N.1.2 SC.912.N.4.1, 2

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
05.01 Summarize the history of the veterinary sciences, companion animal and livestock industry.		
05.02 Assess the impact of companion animals on the veterinary science industry.		
05.03 Discuss the role of the animal industry in the interaction of population, food, energy, and the environment.		
06.0 Discuss the human-animal bond and its effects on human health--The students will be able to:		SC.912.L.14.6 SC.912.L.16.10, 11 SC.912.L.17.20
06.01 <i>Demonstrate appropriate understanding and respect for the human-animal bond and its influence on veterinary care.</i>		
06.02 <i>Explain the different types of human-animal bonds, how they vary between clients and how to interact with each type of client and their animal</i>		
06.03 <i>Explain the different types of human-animal bonds for companion animals versus working animals and livestock.</i>		
06.04 Discuss the positive health effects on people resulting from their interaction with animals.		
06.05 Discuss programs that use human-animal interaction as a therapy tool.		
06.06 Describe the characteristics of animals used in the animal-facilitated therapy programs.		
06.07 Describe national and local programs that use animal-facilitated therapy.		
06.08 Discuss grief-response and emotional impact of animal loss.		
07.0 Demonstrate the proper use of veterinary science terminology--The students will be able to:		
07.01 Define common veterinary and medical terms.		
07.02 <i>Compile a list of prefixes, suffixes, and root words for veterinary medical terminology.</i>		
07.03 Categorize gender and species-related terminology.		
07.04 <i>List common medical and veterinary abbreviations</i>		
07.05 <i>Illustrate terms lateral, medial, dorsal, ventral, sterna, rostral, and caudal</i>		
08.0 Identify careers in the animal industry--The students will be able to:		
08.01 Compile a list of major animal-industry careers.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
08.02 Describe training requirements for entry and advancement in animal-industry careers.		
08.03 Identify professional organizations and trade journals in the animal industry.		
08.04 Investigate career opportunities in the veterinary science, companion animal, and large animal industry; also identify educational experiences needed to prepare for those careers.		
08.05 Using Florida Veterinary Medical Association (FVMA) as a reference, distinguish between a Veterinary Assistant, Certified Veterinary Assistant, Veterinary Technician, Certified Veterinary Technician, and Veterinary Technologist.		
08.06 Investigate requirements necessary for recertification.		
09.0 Practice safety--The students will be able to:		
09.01 <i>Recognize and avoid potential safety hazards (physical, chemical, biological and zoonotic).</i>		
09.02 <i>Utilize proper safety precautions and procedures when working in the hospital (laboratory, kennel, surgery/prep area, treatment, and exam room).</i>		
09.03 <i>Demonstrate knowledge on how to use personal protective equipment-PPE (wears gloves, goggles, face mask, ear plugs, apron, gown, cap, and shoe covers when needed)</i>		
09.04 <i>Locate and demonstrates use of an eye wash solution or station</i>		
09.05 <i>Locate first aid kit and fire extinguisher</i>		
09.06 <i>Explain emergency procedures, locates emergency contact phone numbers and veterinary hospital safety plans for emergency situations such as fire, severe weather, evacuations, etc.</i>		
09.07 <i>Explain OSHA (Occupational Safety and Health Act) and its regulations pertaining to a veterinary practice, including sanitation, safety of employees and the employee's right to know of potential work place hazards through MSDS (Material Safety Data Sheets) and the written hazard communication plan</i>		
09.08 <i>Demonstrate knowledge of OSHA regulations regarding the handling, placement and disposition of sharps and bio-hazardous material</i>		
09.09 <i>Handle and uses disposable "sharps" containers in a safe manner</i>		
09.10 <i>Explain correct labeling of secondary containers with appropriate safety</i>		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
<i>information</i>		
09.11 Recognize allergic reactions and toxicity.		
09.12 Control minor hemorrhage and/or trauma.		
09.13 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation		
09.14 List the most common causes of animal related accidents.		
09.15 Practice safety precautions around animals.		
09.16 Discuss the impact of unsafe procedures.		
10.0 Recognize normal and abnormal animal behaviors--The students will be able to:		SC.912.L15.1, 2, 13, 14 SC.912.L.17.8
10.01 Distinguish between instinctive and learned behaviors.		
10.02 Recognize normal and abnormal behavioral characteristics of animals through observations.		
10.03 Recognize signs of aggressive animal behaviors.		
10.04 Identify behavioral problems.		
10.05 Describe behavioral changes due to aging.		
11.0 Restrain and control companion and livestock animals--The students will be able to:		SC.912.L.15.13
11.01 <i>Trainee demonstrates knowledge of the proper method for placing large animals in a stall, paddock, and trailer.</i>		
11.02 <i>Safely handle and restrain dogs, cats, and other animals for exams, procedures, and treatment by currently accepted standards to prevent undue stress or harm to either animals or humans</i>		
11.03 <i>Demonstrate verbal and physical restraint of animals</i>		
11.04 <i>Demonstrate how to match appropriate level of restraint for an individual animal's level of resistance and situation</i>		
11.05 <i>Demonstrate the proper method for placing a lead on a dog -slip lead and standard leash</i>		
11.06 <i>Utilize currently accepted standards for lifting, positioning, and restraining animals</i>		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
11.07 <i>Demonstrate positioning an animal in sternal, dorsal, and lateral recumbency</i>		
11.08 <i>Demonstrate restraint of a small dog on an exam table</i>		
11.09 <i>Demonstrate restraint of a cat on an exam table</i>		
11.10 <i>Demonstrate restraint of a large dog on an exam table, lift table, and on the floor</i>		
11.11 <i>Explain appropriate methods for placing and removing animals from kennels</i>		
11.12 <i>Identify the following venipuncture sites and accepted restraint for each; cephalic vein (cat & dog), jugular vein (cat & dog), femoral vein (cat), saphenous vein (dog)</i>		
11.13 <i>Demonstrate use of restraint muzzle on a dog using commercial, leash, catch/restraint pole and gauze muzzles of appropriate size</i>		
11.14 <i>Demonstrate currently accepted standards for restraint of the cat including towels, scruff technique, commercial muzzles, cat bags, pillow cases, leather gloves, and the squeeze cage</i>		
11.15 <i>Explain commonly accepted standards of restraint for exotic and avian</i>		
11.16 Identify the appropriate restraining methods for the following: <ul style="list-style-type: none"> • Halter, tie and lead horses and cattle • Apply twitch, nose tongs • Restrain sheep and swine • Load large animals 		
11.17 Discuss chemical restraints of animals.		
12.0 Identify common breeds of companion animals--The students will be able to:		SC.912.L.15.4, 5, 6
12.01 Identify canine breeds and list breed characteristics.		
12.02 Identify feline breeds and list breed characteristics.		
12.03 Identify breeds of rabbits and list their primary use.		
13.0 Investigate the common husbandry practices and daily care of several species of animals--The students will be able to:		SC.912.L.17.13
13.01 Describe husbandry and care of canine breeds.		
13.02 Describe husbandry and care of feline breeds.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
13.03 Describe husbandry and care of rabbits.		
13.04 Describe husbandry and care of rodents.		
13.05 Describe husbandry and care of bovine.		
13.06 Describe husbandry and care of ovine.		
13.07 Describe husbandry and care of caprine.		
13.08 Describe husbandry and care of porcine.		
13.09 Describe husbandry and care of equine.		
13.10 Describe husbandry and care of poultry.		
13.11 <i>Demonstrate knowledge of basic pet care for puppies/kittens; including advice on house-breaking or litter box use, puppy/kitten-proofing the house, health care, vaccination schedules, intestinal parasite prevention, flea and tick control, feeding, training, and spaying/neutering</i>		
13.12 <i>Explain common diseases of the canine and feline and current recommendations for disease prevention</i>		
13.13 <i>List benefits of spaying and neutering pets including health benefits as well as population control</i>		
14.0 Demonstrate human-relations, communications and leadership through FFA activities--The student will be able to:		
14.01 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.		
14.02 Delineate the major events in the history of the FFA.		
14.03 Develop, implement, and maintain work-based learning through a Supervised Agricultural Experience (SAE) program.		
14.04 Collect, interpret, and analyze data using an organized record-keeping system		
14.05 Demonstrate procedures for preparing, maintaining and exhibiting animals.		
14.06 Cite requirements to show and exhibit selected animals.		

**Florida Department of Education
Student Performance Standards**

Course Title: Veterinary Assisting 2
Course Number: 8111540
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas such as basic first aid; scientific and technological; tools and equipment; breed identification; and functions of systems.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Veterinary Assisting	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Veterinary Assisting	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Veterinary Assisting	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
15.0 Demonstrate basic first aid for companion and livestock animals--The students will be able to:		SC.912.L.14.36
15.01 Recognize emergency health (physical and behavioral) status.		
15.02 Describe procedures to restrain and move injured animals.		
15.03 Demonstrate hemorrhage control.		
15.04 Dress wounds and punctures.		
15.05 Demonstrate the correct emergency procedures for shock, burns, heatstroke, and fractures.		
15.06 Describe and access up-to-date information on animal health.		
15.07 Demonstrate animal CPR.		
16.0 Demonstrate the use of tools, equipment, and instruments in the veterinary science and companion animal industry--The students will be able to:		SC.912.P.12.3 SC.912.L.14.4
16.01 Identify and select the proper tools, equipment, and instruments for a specific job.		
16.02 Describe the principles of selected mechanical applications as it relates to large animal restraint equipment (e.g., levers, pulleys, hydraulics).		
16.03 Demonstrate the ability to use an equipment or instrument manual.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
16.04 Demonstrate the use of selected tools, equipment, and instruments.		
16.05 Service, maintain, and store tools, equipment, instruments, and supplies.		
16.06 <i>Demonstrate the proper placement of a slide in the microscope and focus on 100X and 400X magnification</i>		
16.07 <i>Explain appropriate materials for cleaning the microscope</i>		
16.08 <i>Demonstrate the centrifugation of a sample</i>		
16.09 <i>Explain the purpose of the blood analyzer machine.</i>		
17.0 Demonstrate proper techniques in taking vital signs.—The student will be able to:		
17.01 <i>Obtain and record the TPR (temperature, pulse, and respiratory rate) with minimal discomfort to pet.</i>		
17.02 <i>Demonstrate how to use, clean, and store thermometers.</i>		
17.03 <i>Appropriately identify and record the MM (mucus membrane color).</i>		
17.04 <i>Appropriately obtain and record the CRT (capillary refill time).</i>		
17.05 <i>Identify normal and abnormal range for each parameter (TPR, MM, and CRT).</i>		
18.0 Identify common breeds of livestock animals--The students will be able to:		SC.912.L.15.4, 5, 6
18.01 Identify bovine breed and their characteristics.		
18.02 Identify ovine breed and their characteristics.		
18.03 Identify caprine breed and their characteristics.		
18.04 Identify porcine breed and their characteristics.		
18.05 Identify equine breed and their characteristics.		
18.06 Identify poultry breed and their characteristics.		
19.0 Identify parts and functions of various systems of selected animals--The students will be able to:		SC.912.L.14.2, 3, 11, 12, 13, 14, 36, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52
19.01 Identify internal and external anatomy of selected animals.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
19.02 Identify parts of the skeletal system of selected animals.		
19.03 Compare the human skeletal system to that of other animals.		
19.04 Identify parts and functions of the following systems of animals using correct terminology:		
19.04.01 <i>Identify the general function of the respiratory system and the major organs</i>		
19.04.02 <i>Identify the general function of the skeletal system and the major bones of the axial and appendicular skeleton</i>		
19.04.03 <i>Identify the general function of the muscular system and major groups of muscles</i>		
19.04.04 <i>Identify the general function of the digestive system and the major organs</i>		
19.04.05 <i>Identify the general function of the cardiovascular system and the major organs</i>		
19.04.06 <i>Identify the general function of the respiratory system and the major organs</i>		
19.04.07 <i>Identify the general function of the endocrine and the major organs</i>		
19.04.08 <i>Identify the general function of the urinary system and the major organs</i>		
19.04.09 <i>Identify the general function of the reproductive system and both male and female organs</i>		
19.04.10 <i>Identify the general function of the nervous system and the major organs</i>		
19.04.11 <i>Identify the general function of the integumentary system and the major organs</i>		
19.04.12 <i>Explain the species differences in species of the digestive tracks of ruminates monogastric non-ruminants, and hindgut fermenters</i>		
19.04.13 <i>Explain the differences in the teeth and eating habits for omnivores, carnivores and herbivores</i>		
20.0 Investigate the common husbandry practices and daily care of companion animals and exotic animals and fish–The students will be able to:		SC.912.L.17.13
20.01 Describe husbandry and care of guinea pigs.		
20.02 Describe husbandry and care of chinchillas and degus.		
20.03 Describe husbandry and care of ferrets.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
20.04 Describe husbandry and care of amphibians.		
20.05 Describe husbandry and care of reptiles.		
20.06 Describe husbandry and care of birds.		
20.07 Describe husbandry and care of fish.		
21.0 Explain the various methods of animal identification.-- The student will be able to:		
21.01 Explain types of identification tags and their use.		
21.02 Explain the use of microchips for animal identification.		
21.03 Explain types of tattoos for animals and the use in both companion and production animals.		
21.04 Explain the types of ear tags and their use in production animals.		
21.05 Explain types of ear notching and use for identification.		

**Florida Department of Education
 Student Performance Standards**

Course Title: Veterinary Assisting 3
Course Number: 8111550
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas animal digestive systems; animal breeding; animal control; animal overpopulation; animal related laws; and breeds.

Florida Standards	Correlation to CTE Program Standard #
22.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Veterinary Assisting	
22.01 Key Ideas and Details	
<ul style="list-style-type: none"> Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1 	
<ul style="list-style-type: none"> Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2 	
<ul style="list-style-type: none"> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3 	
22.02 Craft and Structure	
<ul style="list-style-type: none"> Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4 	
<ul style="list-style-type: none"> Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5 	
<ul style="list-style-type: none"> Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. 	

Florida Standards	Correlation to CTE Program Standard #
LAFS.1112.RST.2.6	
22.03 Integration of Knowledge and Ideas	
<ul style="list-style-type: none"> Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. <p style="text-align: right;">LAFS.1112.RST.3.7</p>	
<ul style="list-style-type: none"> Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. <p style="text-align: right;">LAFS.1112.RST.3.8</p>	
<ul style="list-style-type: none"> Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. <p style="text-align: right;">LAFS.1112.RST.3.9</p>	
22.04 Range of Reading and Level of Text Complexity	
<ul style="list-style-type: none"> By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. <p style="text-align: right;">LAFS.1112.RST.4.10</p>	
23.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Veterinary Assisting	
23.01 Text Types and Purposes	
<ul style="list-style-type: none"> Write arguments focused on discipline-specific content. <p style="text-align: right;">LAFS.1112.WHST.1.1</p>	
<ul style="list-style-type: none"> Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. <p style="text-align: right;">LAFS.1112.WHST.1.2</p>	
<ul style="list-style-type: none"> Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. <p style="text-align: right;">LAFS.1112.WHST.1.3</p>	
23.02 Production and Distribution of Writing	
<ul style="list-style-type: none"> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. <p style="text-align: right;">LAFS.1112.WHST.2.4</p>	

Florida Standards	Correlation to CTE Program Standard #
<ul style="list-style-type: none"> Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5 	
<ul style="list-style-type: none"> Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6 	
23.03 Research to Build and Present Knowledge	
<ul style="list-style-type: none"> Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7 	
<ul style="list-style-type: none"> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8 	
<ul style="list-style-type: none"> Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9 	
23.04 Range of Writing	
<ul style="list-style-type: none"> Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10 	
24.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Veterinary Assisting	
24.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
24.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
24.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
24.04 Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
24.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
24.06 Attend to precision.	MAFS.K12.MP.6.1
24.07 Look for and make use of structure.	MAFS.K12.MP.7.1
24.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
25.0 Demonstrate knowledge of animal control and animal welfare organizations--The students will be able to:		SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2
25.01 Differentiate between animal control agencies and animal welfare organizations.		
25.02 Describe the responsibilities and goals of animal control agencies and animal welfare organizations		
25.03 Identify and locate local animal control agencies and animal welfare organizations.		
26.0 Describe the problems, causes, and solutions of animal overpopulation--The students will be able to:		SC.912.L.17.1, 5, 8, 11
26.01 Explain the cause and effect of overpopulation in animals.		
26.02 Define euthanasia and describe its role in animal overpopulation.		
26.03 Identify organizations involved in the public education of animal overpopulation.		
26.04 Explain the pet owners' and societies' responsibilities concerning animal overpopulation.		
26.05 Discuss the medical benefits of spaying and neutering.		
27.0 Locate and interpret animal-related laws--The students will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
27.01 Describe local animal control laws.		
27.02 Describe permitting requirements for exotic and wildlife animals.		
27.03 Demonstrate knowledge of local and state animal regulations.		
27.04 Determine the legal limitations of duties of an employee in the animal services industry.		
27.05 Identify when an Animal Health Certificate is required.		
27.06 Explain the laws governing the sale of animals and the disposal of animals.		
27.07 <i>List the options for euthanasia.</i>		
27.08 <i>List the options for disposal of the pet's body.</i>		
28.0 Identify the different digestive systems of animals and the nutritional requirements of selected species--The students will be able to:		SC.912.L.14.46 SC.912.L.18.2, 3
28.01 Differentiate between ruminants and non-ruminants (monogastric and hind gut fermentors).		
28.02 Differentiate the teeth and eating habits of omnivorous, carnivores, and herbivores.		
28.03 Describe the basic nutritional requirements of selected species.		
28.04 Analyze different feed labels and identify feed ingredients.		
28.05 Differentiate animal food products for healthy and ill animals.		
28.06 <i>Explain the appropriate storage for dry and canned dog or cat food.</i>		
28.07 <i>Identify the date code for dry and canned dog or cat food and appropriate disposal if out of date.</i>		
28.08 <i>Identify the feeding guide for dry and canned dog or cat food and appropriate measuring cup or device.</i>		
28.09 <i>Demonstrate knowledge of nutritional based on life stage and size of animal and chooses appropriate food and amount for specific animals for general care.</i>		
28.10 <i>Demonstrate ability to follow oral or written instructions for therapeutic pet food including type, amount, and frequency.</i>		
28.11 <i>Explain potential problems with feeding therapeutic foods incorrectly or to the wrong patient.</i>		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
28.12 <i>Monitor and record in the medical record food and water intake for each patient.</i>		
28.13 <i>Notify supervisors of vomiting, diarrhea, lack of eating, lack of drinking or any other abnormalities with food and water intake.</i>		
29.0 Explain the reproductive system and breeding of selected animals--The students will be able to:		SC.912.L.14.33, 41 SC.912.L.15.9, 14, 15 SC.912.L.16.1, 2, 13 SC.912.L.17.13
29.01 Describe the male and female reproductive systems.		
29.02 Determine sex of animals.		
29.03 Determine appropriate age for breeding.		
29.04 Identify gestation length.		
29.05 Describe estrous cycle.		
29.06 Describe breeding techniques.		
29.07 Select male and female for breeding.		
29.08 Care of breeding stock.		
29.09 Care of newborn.		
29.10 Explain the differences and similarities between reproduction in different animal species.		
30.0 Identify common species and/or breeds of exotic animals--The students will be able to:		SC.912.L.15.4, 5, 6
30.01 Identify common avian species/breed and their characteristics.		
30.02 Identify common reptile species/breed and their characteristics.		
30.03 Identify common exotic mammal species/breed and their characteristics.		
30.04 Identify common pet fish species/breed and their characteristics.		
31.0 Demonstrate human-relations, communications, leadership and employability skills--The students will be able to:		
31.01 Demonstrate acceptable work habits and attitudes.		
31.02 Follow oral and written directions with understanding; ask questions that clarify directions, as needed.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
31.03 Communicate effectively in verbal, written, and nonverbal modes; demonstrate effective telephone skills.		
31.04 Recognize and demonstrate listening skills and assertive communications skills in the workplace.		
31.05 Conduct small, informal, formal, and group meetings.		
31.06 Identify the opportunities for leadership development available through an appropriate students and/or professional organization.		
31.07 Demonstrate acceptable employee hygiene habits.		
31.08 Demonstrate appropriate responses to criticism from employer, supervisor, and peers.		
31.09 Complete pertinent forms for employment, such as a resume, a job application, a W-4 form.		
31.10 Demonstrate job interview techniques.		
31.11 <i>Trainee avoids misrepresentation, slander, violating client confidentiality, substandard patient care, substance abuse, or animal abuse/neglect.</i>		
31.12 <i>Demonstrates acceptable work habits and attitude</i>		
31.13 <i>Explains the veterinarian-client-patient relationships</i>		
31.14 <i>Recognizes the importance of keeping their credentials current with continuing education credits</i>		
31.15 <i>Recognizes and adheres to the governing laws for veterinary medicine in Florida.</i>		
31.16 <i>Conforms to safety and professional dress code by dressing in well- fitting scrubs or uniforms, closed- toed shoes, avoids excessive or loose jewelry, or excessive and visible body-piercings or tattoos, avoids long or fake nails, and keeps hair short or tied back.</i>		
31.17 <i>Actively observe his/her working environment and animals promptly reporting observations and concerns to the veterinary technician or veterinarian as needed.</i>		
31.18 <i>Demonstrate initiative to complete tasks as delegated.</i>		
31.19 <i>Accurately follow both oral and written instructions.</i>		
31.20 <i>Resolve complaints or conflicts with either pet owners/clients or co-workers in a professional manner.</i>		
31.21 <i>Explain the forms of communication including verbal-spoken; nonverbal-body language, and written.</i>		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
<i>31.22 Utilize appropriate communication skills including courtesy, kindness, patience, tactfulness, sympathy, empathy, and active listening skills.</i>		

**Florida Department of Education
Student Performance Standards**

Course Title: Veterinary Assisting 4
Course Number: 8111520
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of animal welfare and rights; research; record keeping; disease and parasites.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Veterinary Assisting	
	23.01 Key Ideas and Details	
	23.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	23.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	23.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	23.02 Craft and Structure	
	23.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	23.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	23.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
23.03 Integration of Knowledge and Ideas		
23.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
23.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
23.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
23.04 Range of Reading and Level of Text Complexity		
23.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
23.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Veterinary Assisting		
24.01 Text Types and Purposes		
24.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
24.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
24.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
24.02 Production and Distribution of Writing		
24.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>24.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>24.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
<p>24.03 Research to Build and Present Knowledge</p>	
<p>24.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>24.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>24.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
<p>24.04 Range of Writing</p>	
<p>24.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
<p>25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Veterinary Assisting.</p>	
<p>25.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>25.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>25.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards	Correlation to CTE Program Standard #
25.04 Model with mathematics.	MAFS.K12.MP.4.1
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
25.06 Attend to precision.	MAFS.K12.MP.6.1
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
32.0 Differentiate between animal welfare and animal rights--The students will be able to:		SC.912.L.17.13
32.01 Define animal welfare and animal rights.		
32.02 Compare and contrast between animal welfare and animal rights.		
32.03 Identify animal welfare and animal rights advocate groups.		
32.04 Debate current events concerning animal welfare and animal rights.		
32.05 Describe animal cruelty and the consequences of cruel treatment of animals.		
33.0 Explain the role of animals in research--The students will be able to:		SC.912.L.16.10; SC.912.N.4.1
33.01 Describe the history of the role of animals in research.		
33.02 Discuss medical advances made possible through the use of animals in research.		
33.03 Define USDA and explain its roles in using animals for research.		
33.04 Describe the role of the Institutional Animal Care and Use Committee (IACUC) with regard to animal research facilities.		
33.05 Explain the controversy over using animals in research.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
33.06 Identify organizations that are in favor of and those that are against the use of animals in research.		
33.07 Develop a personal position on the use of animals in research and support that position.		
33.08 Explain how biotechnology has affected animal research.		
33.09 Debate the use of cloning for research purposes.		
34.0 Maintain and analyze records--The students will be able to:		
34.01 Maintain and analyze animal records.		
34.02 Discuss the legal requirements of maintaining animal health records, and maintain and analyze animal health records.		
34.03 Maintain and analyze basic business records (inventory, depreciation, receipts, expenses), using computer applications.		
34.04 <i>Demonstrate knowledge of and ability to schedule appointments.</i>		
34.05 <i>Demonstrate knowledge of admissions and discharges for boarders or non-medical cases.</i>		
34.06 <i>Demonstrate filing and retrieving of records from both numerical and alphabetical filing systems.</i>		
34.07 <i>Demonstrate knowledge of computer and keyboarding skills.</i>		
34.08 <i>Demonstrate knowledge of data collection from organized records.</i>		
34.09 <i>Recognize that medical records are legal documents and must meet the following legal requirements: (1)establish veterinarian-client-patient relationship, (2)contain owner and patient information, (3)contain patient history, and (4) contain contemporaneously written medical procedures</i>		
34.10 <i>Demonstrate knowledge of proper telephone skills.</i>		
34.11 <i>Demonstrate the ability to follow oral and written directions.</i>		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
<p>34.12 Describe the duties of an office or hospital staff member as outlined by NAVTA which includes:</p> <ul style="list-style-type: none"> • <i>Greet pet owner/client, identifies his/herself by name and as veterinary assistant in a professional manner</i> • <i>Obtain or confirm pet owner/client and pet information including pet owner/client's name, address and phone numbers; pet's name, species, breed, color, sex and neutered/not neutered, and age or birth date</i> • <i>Discuss process for recording new information and/or confirms existing information on medical record using appropriate medical terminology and concise notations. Include current date and reason for appointment.</i> • <i>Obtain and record the pet's vital signs (TPR, MM, & CRT) and weight with minimal restraint to the pet.</i> • <i>Leave the exam room courteously indicating the veterinarian will be right in.</i> 		
34.13 Explain the importance of client/patient confidentiality.		
34.14 Generalize the basic use of practice management software.		
35.0 Demonstrate knowledge of preventive medicine and disease control--The students will be able to:		SC.912.L.14.6, 38, 52
35.01 Describe the importance of preventive medicine for animal health.		
35.02 Differentiate between healthy and sick animals.		
35.03 Describe common infectious and noninfectious diseases of animals to include bacterial, viral, fungal, prion and zoonotic.		
35.04 Describe vaccinations available for disease prevention and vaccination procedures.		
35.05 Describe isolation or quarantine procedures for new or sick animals.		
<ul style="list-style-type: none"> • Describe methods of preventive medicine and quarantine for disease control in a kennel, cattery, paddock, rabbitry, and zoo. 		
35.06 Discuss the terms immunology and active and passive immunity as it applies to disease and vaccination.		
35.07 Describe concepts for periodic health check-up.		
35.08 <i>List and discuss common zoonotic diseases.</i>		
35.09 Demonstrate proper sanitation techniques for an examination room, hospital		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
facilities, surgical suites, kennel, cattery, paddock, rabbit hutch, and zoo.		
35.09.01 <i>Keep assigned work areas clean and organized</i>		
35.09.02 <i>Explain sanitary procedures including physical cleaning, disinfecting, and sterilizing</i>		
35.09.03 <i>Demonstrate proper cleaning protocols for kennels, runs, and enclosures including cleaning and disinfecting all sides of the kennel (floor, ceiling, walls, & door) and all items in the kennel (bowls, blankets, toys, etc)</i>		
35.09.04 <i>List precautions to take when mixing or using multiple cleaning and disinfecting agents i.e. NEVER mix bleach with ammonia containing cleaners or disinfectants</i>		
35.09.05 <i>Change bedding materials in a timely and efficient manner.</i>		
35.09.06 <i>Demonstrate of the proper disposal of bedding and waste materials.</i>		
35.09.07 <i>Notify supervisor of needed repair or maintenance on cages, kennels, or stalls</i>		
35.10 Determine containment procedure and treatment for an epidemic.		
36.0 Explain diagnostic testing--The students will be able to:		SC.912.L.14.37 SC.912.N.3.5 SC.912.P.8.2
36.01 Explain diagnostic blood tests including: obtaining a blood sample and blood chemistry profiles (to monitor organ function).		
36.02 Explain a urinalysis including:		
36.02.01 <i>List methods for urine collection commonly used in the veterinary practice</i>		
36.02.02 <i>Collect a free-caught urine sample using proper techniques for dogs</i>		
36.02.03 <i>Identify time and storage parameters for urine samples</i>		
36.02.04 <i>List precautions and safety factors in handling urine samples including personal protection equipment</i>		
36.03 Explain fecal test including:		
36.03.01 <i>Explain methods of collecting fecal samples.</i>		
36.03.02 <i>Identify time and storage parameters for fecal samples.</i>		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
36.03.03	<i>Identify appropriate volume of feces for each method of testing.</i>		
36.03.04	<i>Demonstrate the correct technique for handling and preparing the fecal samples for analysis by flotation, sedimentation, and direct smear.</i>		
36.03.05	<i>Explain appropriate method of placing sample on microscope slide or cover slip.</i>		
36.03.06	<i>List precautions and safety factors in handling fecal samples including personal protection equipment.</i>		
36.04	Summarize procedures necessary for completing a skin scrapping, cytology, and gram stain.		
36.05	Examine radiology, electrocardiogram and ultrasound imaging techniques and safety.		
36.05.01	<i>Discuss restrictions from radiation exposure for pregnant women and minors.</i>		
36.05.02	<i>Explain what a dosimeter badge does and who wears it and when.</i>		
36.05.03	<i>Demonstrate the area of exposure in the radiology room including direct beam and scatter radiation.</i>		
36.05.04	<i>Explain the correct use of personal protection equipment including lead-shielded gowns, lead gloves, lead thyroid shield, lead glasses, and other lead protective wear.</i>		
36.05.05	<i>Explain methods of restraint for positioning for radiographs including no-hold positioning.</i>		
36.05.06	<i>Explain the proper handling of radiographic film including safe light use.</i>		
36.05.07	<i>Demonstrate the appropriate labeling of a radiograph including date, patient. name, view or side of patient, machine calibrations, and film developing</i>		
36.05.08	<i>Maintain radiograph log and filing of films.</i>		
36.05.09	<i>Explain how digital radiography differs from film.</i>		
36.06	Explain a necropsy and discuss disposal of dead animal- esp. how to handle rabies suspect.		
36.06.01	<i>List the common species which may transmit rabies to humans.</i>		
36.06.02	<i>Explain the methods of transmission of rabies to animals and humans.</i>		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
<i>36.06.03 List the symptoms associated with rabies.</i>		
<i>36.06.04 Explain the proper safety measures to follow when handling an animal suspected of having rabies.</i>		
<i>36.06.05 Explain the procedure for euthanasia suitable as an explanation for a pet owner.</i>		
<i>36.06.06 Discuss the grief process that an owner may experience on the loss of the pet.</i>		
<i>36.06.07 Discuss the importance of presenting the body of the pet in a respectful and empathetic way.</i>		
37.0 Describe internal and external parasites and control methods--The students will be able to:		
<i>37.01 Set up fecal flotations or centrifuged fecal samples</i>		
<i>37.02 Identify ectoparasites fleas, ticks, lice, and mites and explain the life cycle and treatment and prevention methods</i>		
<i>37.03 Identify ova of endoparasites roundworms, hookworms, whipworms, strongyles and explain the life cycle and treatment and prevention methods</i>		
<i>37.04 Identify adult endoparasites roundworms, hookworms, whipworms, strongyles and heartworms</i>		
<i>37.05 Identify giardia and coccidia in fecal samples</i>		
<i>37.06 Identify tapeworm segments in fecal sample or on pet</i>		
<i>37.07 Understand an accurately describe route of transmission, parasite vectors, and zoonotic potential.</i>		

**Florida Department of Education
Student Performance Standards**

Course Title: Veterinary Assisting 5
Course Number: 8111530
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of grooming, effects of captivity of exotics; genetics and biotechnology in reproduction; diagnostic and therapeutic testing; surgical preparation; and pharmacology.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
38.0 Groom selected companion and livestock animals--The students will be able to:		
38.01 Demonstrate a basic knowledge of using a variety of brushes, combs, flea combs, mat splitters, undercoat rakes, etc. to groom animal hair/fur as needed for both cosmetic and therapeutic reasons.		
38.02 Demonstrate a basic knowledge of using clippers to cut animal hair/fur as needed for both cosmetic and therapeutic reasons.		
38.03 Explain the necessity of following written and oral instructions and all label directions regarding shampoos for bathing and therapeutic or flea rinses (dips).		
38.04 List precautions in bathing and dipping including avoiding soap or chemicals in the eyes, lathering the entire body, timing the shampoo application according to directions, and towel or blow drying.		
38.05 Identify the area of blood and nerve supply of the nail in the dog and cat and common pets such as rabbits and ferrets.		
38.06 Identify appropriate instrument or nail trimmer for small and large dogs and cats.		
38.07 Demonstrate comfortable handling of paw or limb during nail trim for dog and cat.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
38.08 <i>Explain methods for hemostasis if nail is accidentally trimmed too short.</i>		
38.09 <i>Notify supervisor of abnormalities including in-grown nails and abnormal growth or shape.</i>		
38.10 Describe the steps in expressing anal sacs using the external method.		
38.11 Discuss proper hoof care and hoof trimming needs.		
39.0 Describe exotic animals and the effects of captivity on them--The students will be able to:		SC.912.L.17.8, 13
39.01 Define exotic animal, zoo animal, invasive and native animals.		
39.02 Identify exotic animals native and invasive to Florida.		
39.03 Explain the effects of urbanization on the wildlife population.		
39.04 Describe the roles of the Florida Fish and Wildlife Conservation Commission in wildlife management.		
39.05 Explain the effects of state, national, and international laws on the domestication of the exotic animals.		
40.0 Assess techniques used in surgical assisting and surgical preparation--The students will be able to:		
<p>40.01 <i>Prepare and sterilize surgical equipment and supplies.</i></p> <ul style="list-style-type: none"> • <i>Explain standard procedure for cleaning and lubricating all stainless steel instruments.</i> • <i>Explain appropriate use of ultrasonic instrument cleaning and proper solutions.</i> • <i>Explain cold sterilization trays and appropriate solutions.</i> • <i>Demonstrate assembly and wrapping of surgical packs for sterilization.</i> • <i>Demonstrate folding and wrapping a surgical gown for sterilization.</i> • <i>Explain proper procedure for sterilizations methods including the autoclave and gas sterilization (ethylene oxide) including safety precautions with each.</i> 		
<p>40.02 <i>Describe components of surgical assisting.</i></p> <ul style="list-style-type: none"> • <i>Explain aseptic protocol for maintaining sterility of the surgical field</i> • <i>Demonstrate what can and cannot be touched when assisting in a surgical environment.</i> • <i>Demonstrate how suture material might be removed from its outer packaging and passed to the surgeon while maintaining sterility</i> 		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
<p>40.03 Summarize procedures necessary of patient preparation.</p> <ul style="list-style-type: none"> • Explain reason for pre-surgical fasting and appropriate time interval. • List methods to identify animal for surgery and confirm identity. • Demonstrate dorsal and sternal recumbancy positioning and securing animal in each on the surgery table under anesthesia as instructed by the veterinary technician or veterinarian. • Demonstrate clipping or shaving surgical field as instructed by the veterinary technician or veterinarian. • Demonstrate cleaning and disinfecting the surgical field using currently accepted standards for aseptic technique and surgical scrub. 		
<p>40.04 Identify proper post-surgical care techniques.</p> <ul style="list-style-type: none"> • List parameters to monitor during recovery and signs of distress in the recovery period. • Explain the swallow reflex and the appropriate time and method for endotracheal tube removal. • Explain appropriate transfer of animal from surgery to recovery kennel, positioning in kennel, and precautions in kennel. • Confirm “No food or water” or similar instructions on recovery kennel. 		
<p>41.0 Demonstrate knowledge of pharmacology--The students will be able to:</p>		
<p>41.01 Identify forms of medication including tablet, capsule, liquid, powder, granules, topical creams, liquids, and gels.</p>		
<p>41.02 Explain the application of topical flea medication which is absorbed through the skin and precautions for safety of pets and humans.</p>		
<p>41.03 Demonstrate the reconstitution of vaccine using appropriate diluents and amounts of diluents.</p>		
<p>41.04 Demonstrate administration of a tablet or capsule to a cat and to a dog.</p>		
<p>41.05 Demonstrate the administration of a liquid to a cat and to a dog.</p>		
<p>41.06 Explain per os, oral, topical, parenteral, and injectable in terms of administering pharmaceuticals.</p>		
<p>41.07 Demonstrate the ability to follow oral and written instructions on medication, form of medication, amount of medication, and route of administration of medication.</p>		
<p>41.08 List the components that must be present on a prescription label.</p>		
<p>41.09 Observe and understand controlled substances logs and security</p>		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
41.10 <i>Inventory pharmacy supplies and notify supervisor of low supplies</i>		
41.11 <i>Identify expiration date on labels and notify supervisor of expired drugs</i>		
41.12 <i>Maintain clean shelves and storage areas for pharmaceuticals</i>		
41.13 Describe the process for administering medications by injection, oral, nasal and topical.		
41.14 Describe the procedure for safe disposal of medications.		
41.15 Determine methods to observe animals for medicine side effects or allergies.		
42.0 Explain proper methods of syringe and hypodermic needle use. – The student will be able to:		
42.01 <i>Identify and give the correct alignment from smallest to largest of hypodermic needles including 12 g, 18g, 20 g, 22 g and 25 g.</i>		
42.02 <i>Identify specified needle gauge and length when requested.</i>		
42.03 <i>Identify and align from smallest to largest commonly used syringes including 3cc, 6cc, 12cc, 20cc, 35cc, 60cc and 1cc tuberculin or insulin syringe.</i>		
42.04 <i>Identify specified syringe size when requested.</i>		
42.05 <i>Demonstrate the ability to read the precise volume of medication in a syringe and to fill a syringe with medication to a specified volume when requested.</i>		
42.06 <i>Describe appropriate SQ, IM, and IV injection sites.</i>		

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Benchmarks that appear in italics within the framework are skills or competencies that have been taken directly from the Skills Competency Validation list. Contact the Florida Veterinary Medical Association for the most up to date skills list.

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Extended Student Supervision

Because of the production and marketing cycle of the animal 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 appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Program Title: Agricultural Sales and Services
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8116000
CIP Number	0101010500
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	41-4011 - Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 consisting of one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations	1 credit	41-4011	3
	8116010	Agricultural Sales and Services 2	1 credit		2
	8116020	Agricultural Sales and Services 3	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Agricultural Sales and Services 2	^^	^^	^^	**	**	**	**	**	**	**	**	**
Agricultural Sales and Services 3	^^	^^	^^	**	**	**	**	**	**	**	**	**

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and

language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Sales and Services.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Sales and Services.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Sales and Services.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Describe the basic concepts of agribusiness.
- 14.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 15.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 16.0 Explain business logistics
- 17.0 Demonstrate positive customer-relations skills.
- 18.0 Demonstrate employability skills.
- 19.0 Conduct appropriate market and marketing research.
- 20.0 Develop a marketing plan.
- 21.0 Develop strategies for marketing plan implementation.
- 22.0 Model effective sales principles and techniques.
- 23.0 Demonstrate knowledge of the general principles of agribusiness.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Sales and Services.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Sales and Services.
- 26.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Sales and Services.
- 27.0 Explain the components of the American business system.
- 28.0 Investigate agricultural cooperatives structure and function.
- 29.0 Perform agricultural business activities.
- 30.0 Summarize methods of selling agricultural products and services.
- 31.0 Develop specific tactics to market AFNR products and services.

- 32.0 Merchandise products and services to achieve specific marketing goals.
- 33.0 Perform promotional activities.
- 34.0 Observe local, state, and federal rules and regulations.

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Sales and Services.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Sales and Services.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
<p>02.03 Research to Build and Present Knowledge</p>	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
<p>02.04 Range of Writing</p>	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
<p>03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Sales and Services.</p>	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Sales and Services 2
Course Number: 8116010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the basic concepts of agribusiness; the operation and maintenance of equipment and maintenance of facilities; handling merchandise; demonstration of positive customer-relations and employability skills.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Sales and Services	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Sales and Services		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Sales and Services	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Describe the basic concepts of agribusiness--The student will be able to:			
13.01 Explain the following concepts: <ul style="list-style-type: none"> • business cycle • profit / loss • competition 			
13.02 Identify and discuss ethical issues in agribusiness.			
13.03 Identify the different roles in agriculture sales careers.			
14.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
14.01 Assess the agricultural impact upon the US gross national product and the total global economy.			
14.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.			
14.03 Identify and describe the primary government agencies involved with agriculture.			
14.04 Research new and emerging technologies and their impact on the economy.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.05 Recognize the value of the food and agribusiness industry.			
15.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:			
15.01 Define and explore agriculture and agribusinesses and their role in the economy.			
15.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
15.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.			
15.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.			
16.0 Explain business logistics --The student will be able to:			
16.01 Operate and maintain the equipment appropriate for a selected agribusiness.			
16.02 Maintain facilities for a selected agribusiness.			
16.03 Store received agricultural products according to the manufacturer's specifications.			
16.04 Prepare agricultural products for shipment.			
16.05 Conduct an inventory and utilize a computerized inventory-control system.			
16.06 Describe inventory rotation.			
17.0 Demonstrate acceptable customer-relations skills--The student will be able to:			
17.01 Explain the purpose of a customer file system.			
17.02 Evaluate the importance of self-control in customer-relations.			
17.03 Identify and demonstrate appropriate responses to criticism and praise.			
17.04 Explain the effects of positive human relations on success in business.			
17.05 Demonstrate respect for the customer's desires and property.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.06 Practice effective telephone skills to enhance customer relations.			
18.0 Demonstrate employability skills--The student will be able to:			
18.01 Conduct a job search and identify advanced-training opportunities and requirements.			
18.02 Compile the components of an employer's investment. (Ex. products, employees, equipment)			
18.03 Secure information about a job, including employee benefits.			
18.04 Prepare a resume.			
18.05 Evaluate a job offer, considering various factors such as career advancement, job satisfaction, employee benefits, etc.			
18.06 Demonstrate ethical and responsible practices.			
18.07 Evaluate the importance of pride in the quality of workmanship.			
18.08 Describe the advantages of a good driving record and the ramifications of a poor driving record on employability opportunities.			
18.09 Reinforce the importance of confidentiality in various workplace situations. (Ex. product launch, customer information, personal social media use)			
18.10 Demonstrate appropriate responses to performance evaluations from the employer, the supervisor, and other persons in the workplace.			
19.0 Conduct appropriate market and marketing research. -- The student will be able to:			
19.01 Investigate the meaning and methods of marketing in AFNR as related to agricultural commodities, products and services and to agricultural goods in domestic and international markets.			ABS.06.01.01.a
19.02 Apply benefit/cost analysis to marketing in AFNR businesses.			ABS.06.01.01.b
19.03 Implement and evaluate marketing strategies with agricultural commodities, products and services.			ABS.06.01.01.c
19.04 Describe functions in agricultural marketing.			ABS.06.01.02.a
19.05 Assess the presence of marketing infrastructure for agricultural commodities.			ABS.06.01.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.06 Evaluate alternative marketing strategies, such as valueadding, branding and niche marketing, and propose and implement appropriate modifications to achieve AFNR business goals.			ABS.06.01.02.c
20.0 Develop a marketing plan.-- The student will be able to:			
20.01 Identify the purpose, components and developmental processes of marketing plans.			ABS.06.02.01.a
20.02 Perform a marketing analysis, including evaluation of the competitors, customers, international and domestic policy environment, regulations and rules, standards and AFNR business resources.			ABS.06.02.01.b
20.03 Establish marketing plan goals/objectives, including monitoring, measuring and analyzing goal achievement.			ABS.06.02.01.c
21.0 Develop strategies for marketing plan implementation. -- The student will be able to:			
21.01 Identify and use strategies frequently employed in marketing programs, including those used in niche markets.			ABS.06.03.01.a
21.02 Determine marketing strategies that are most likely to be effective in an AFNR business.			ABS.06.03.01.b
21.03 Revise marketing strategies based on monitoring and measurement information for target customer base.			ABS.06.03.01.c
22.0 Model effective sales principles and techniques—The student will be able to:			
22.01 Describe the process of creating an opening.			
22.02 Prepare strategies for handling objections.			
22.03 Compare different methods for highlighting selling points.			
22.04 Create versions of closing strategies.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Sales and Services 3
Course Number: 8116020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the general principles of agribusiness; performing agricultural business activities; merchandising and selling agricultural products and services; performing promotional activities and local, state, and federal rules and regulations.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Sales and Services	
23.01	Key Ideas and Details	
23.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
23.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
23.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
23.02	Craft and Structure	
23.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
23.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
23.02.3	Analyze the author's purpose in providing an explanation, describing a	

Florida Standards	Correlation to CTE Program Standard #
<p>procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p> <p style="text-align: right;">LAFS.1112.RST.2.6</p>	
<p>23.03 Integration of Knowledge and Ideas</p>	
<p>23.03.1 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.</p> <p style="text-align: right;">LAFS.1112.RST.3.7</p>	
<p>23.03.2 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p style="text-align: right;">LAFS.1112.RST.3.8</p>	
<p>23.03.3 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p style="text-align: right;">LAFS.1112.RST.3.9</p>	
<p>23.04 Range of Reading and Level of Text Complexity</p>	
<p>23.04.1 By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> <p>23.04.2 By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.</p> <p style="text-align: right;">LAFS.1112.RST.4.10</p>	
<p>24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Sales and Services</p>	
<p>24.01 Text Types and Purposes</p>	
<p>24.01.1 Write arguments focused on discipline-specific content.</p> <p style="text-align: right;">LAFS.1112.WHST.1.1</p>	
<p>24.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p style="text-align: right;">LAFS.1112.WHST.1.2</p>	
<p>24.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.</p> <p style="text-align: right;">LAFS.1112.WHST.1.3</p>	
<p>24.02 Production and Distribution of Writing</p>	
<p>24.02.1 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.WHST.2.4	
24.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	
	LAFS.1112.WHST.2.5	
24.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	
	LAFS.1112.WHST.2.6	
24.03	Research to Build and Present Knowledge	
24.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
	LAFS.1112.WHST.3.7	
24.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	
	LAFS.1112.WHST.3.8	
24.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	
	LAFS.1112.WHST.3.9	
24.04	Range of Writing	
24.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	
	LAFS.1112.WHST.4.10	
25.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Sales and Services	
25.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
25.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
25.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
25.04	Model with mathematics.	MAFS.K12.MP.4.1

Florida Standards		Correlation to CTE Program Standard #
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
25.06 Attend to precision.	MAFS.K12.MP.6.1	
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.0 Explain the components of the American business system.—The student will be able to:			
26.01 Describe the five basic ways American business is organized.			
26.02 Distinguish and identify between the characteristics of each method of doing business.			
26.03 Evaluate the advantages and disadvantages provided by each business method.			
26.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			
27.0 Investigate agricultural cooperatives structure and function.—The student will be able to:			
27.01 Explain the definition of a cooperative.			
27.02 Understand the history of cooperative principles and practices.			
27.03 Describe the five areas that classify cooperative structure.			
27.04 Distinguish and identify between the five types of cooperative structure and their functions.			
28.0 Demonstrate knowledge of the general principles of agribusiness--The student will be able to:			
28.01 Explain the different types of record-keeping systems used in agribusiness.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
28.02 Explain and differentiate variable and fixed costs.			
28.03 Identify the various types and sources of credit.			
28.04 Compose a formula to determine the value of your product or service.			
28.05 Describe the decision-making process involved in purchasing capital and sales products.			
29.0 Perform agricultural business activities--The student will be able to:			
29.01 Prepare for a customer call or visit.			
29.02 Create a customer record that includes past order history.			
29.03 Order supplies and equipment through various methods, including catalogs and telecommunication and electronic-communication devices.			
29.04 Determine margins and discounts for pricing agricultural supplies and products (e.g., cash, bulk, quantity, early season, etc.).			
29.05 Convey updates on prices of products.			
29.06 Use a computer, demonstrating word-processing skills and the ability to maintain a database, produce a spreadsheet, and access an electronic network.			
30.0 Summarize methods of selling agricultural products and services--The student will be able to:			
30.01 Analyze marketing and pricing alternatives.			
30.02 Differentiate marketing, pricing, value, and grading standards for different agricultural products.			
30.03 Promote agricultural products.			
30.04 Explain the purpose, benefit, and quality of the products sold.			
30.05 Determine customer needs and wants.			
30.06 Recommend products and services that meet the customer's needs or wants.			
30.07 Demonstrate effective sales principles and techniques.			
30.08 Take and fill customer orders by various means, including electronic communications.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.09 Perform sales counter activities (e.g., processing sales transactions, completing a purchase order and an invoice, calculating state sales tax, etc.).			
30.10 Follow up to ensure the quality of services provided to customers.			
30.11 Provide technical assistance to customers.			
30.12 Respond to customer complaints.			
31.0 Develop specific tactics to market AFNR products and services. -- The student will be able to:			
31.01 Explain the meaning and use of the four Ps (product, price, place, and promotion) in marketing.			ABS.06.04.01.a
31.02 Develop advertising campaigns that promote products and services.			ABS.06.04.01.b
31.03 Implement sales goals and incentive programs, and identify pricing strategies used by competitors.			ABS.06.04.01.c
32.0 Merchandise products and services to achieve specific marketing goals. -- The student will be able to:			
32.01 Identify, explain and organize components of the sales process.			ABS.06.05.01.a
32.02 Develop effective customer relationships using approaches that are consistent and comprehensive.			ABS.06.05.01.b
32.03 Monitor marketing approaches to determine effectiveness in goal achievement, and make needed changes in such approaches.			ABS.06.05.01.c
32.04 Develop strategies to gain new customers.			ABS.06.05.02.a
32.05 Devise sales practices to achieve goals effectively and efficiently.			ABS.06.05.05.b
32.06 Prepare and make sales presentations.			ABS.06.05.02.c
32.07 Identify and maintain needed sales records.			ABS.06.05.03.a
32.08 Use strategies to follow up sales to provide post-sales service.			ABS.06.05.03.b
32.09 Intercept, interpret and process customer complaints, needs and problems with products and services.			ABS.06.05.03.c
33.0 Perform promotional activities--The student will be able to:			
33.01 Identify potential customers.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.02 Collect and analyze market information.			
33.03 Develop a plan for advertising an agricultural product or service.			
33.04 Identify appropriate trade shows and demonstrations.			
33.05 Make an oral presentation in a promotional meeting, utilizing visual aids.			
34.0 Observe local, state, and federal rules and regulations--The student will be able to:			
34.01 Identify current basic government agricultural programs.			
34.02 Identify licensing, inspection, and government-record requirements.			
34.03 Identify the governmental and regulatory agencies related to agribusiness and explain their impact on agribusiness.			
34.04 Identify the sources of technical assistance available from private and government. (Ex. Extension, FDACS, FDA, IFAS)			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Agricultural Communications
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8117000
CIP Number	0101080200
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	27-3099 - Media and Communication Workers, All Other
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction in instruction in animal and plant production and processing; agriculture marketing and communications; employability skills; mathematics; basic science; biological sciences; and human-relations skills.

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 consisting of one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations	1 credit	27-3099	3
	8117010	Agricultural Communications 2	1 credit		2
	8117020	Agricultural Communications 3	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Agricultural Communications 2	^^	^^	^^	3/53 4%	16/52 31%	9/56 16%	15/55 27%	16/58 28%	5/35 14%	15/42 36%	15/56 27%	15/53 28%
Agricultural Communications 3	^^	^^	^^	2/53 4%	14/52 27%	7/56 13%	14/55 25%	14/58 24%	5/35 14%	13/42 31%	14/56 25%	3/53 6%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Communications.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Communications.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Communications.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Investigate the communications sector of the agricultural industry.
- 14.0 Identify the forms of communication.
- 15.0 Develop communication messages.
- 16.0 Demonstrate oral communications skills.
- 17.0 Conduct interviews.
- 18.0 Utilize printed agricultural media.
- 19.0 Utilize photography and graphics.
- 20.0 Develop, design and edit publications and documents.
- 21.0 Develop audio and video media.
- 22.0 Investigate ethical and professional issues in agricultural communications.
- 23.0 Demonstrate leadership, employability, and human relations skills.
- 24.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 25.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 26.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Communications.
- 27.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Communications.
- 28.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Communications.
- 29.0 Explore the communications sector of the agricultural industry.
- 30.0 Create communication messages.
- 31.0 Demonstrate oral communications skills.

- 32.0 Generate printed agricultural media.
- 33.0 Modify photography and graphics.
- 34.0 Create, design and edit publications and documents.
- 35.0 Create or analyze audio and video media
- 36.0 Investigate ethical and professional issues in agricultural communications.
- 37.0 Demonstrate leadership, employability, and human relations skills.
- 38.0 Use online social media.
- 39.0 Create an agricultural communications campaign.
- 40.0 Explain the components of the American business system.
- 41.0 Investigate agricultural cooperatives structure and function.

**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.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Communications.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Communications.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
02.03 Research to Build and Present Knowledge	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
02.04 Range of Writing	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Communications.	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02. b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02. b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.			CS.11.01.01 CS.11.02.01
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01. a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a AS.06.01.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b .
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a .
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b .
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c
12.04 Participate in community based learning activities.			CS.01.05.01.c
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Communications 2
Course Number: 8117010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the communications sector of the agricultural industry including instruction in developing and editing materials for printed media and media broadcast, utilizing photography and graphics, the importance of the internet in communications, writing technical papers and media scripts and ethical and professional issues in the industry.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Agricultural Communications	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Agricultural Communications	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Agricultural Communications		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Investigate the communications sector of the agricultural industry--The student will be able to:			
13.01 Describe the importance of communications in American agriculture.			
13.02 Discuss career opportunities in agricultural communications including the educational requirements.			
13.03 Identify professional organizations related to agricultural communications.			
13.04 Identify the impact of communications to the agriculture industry and to society.			
14.0 Identify the forms of communication--The student will be able to:		SC.912.N.1.4, 5	
14.01 Explain the purpose of communication.			
14.02 Explain the different types of communication: verbal, non-verbal, written and visual.			
14.03 Compare the various forms of communication technologies: print, video, online media, visual arts and social media.			
14.04 Identify communication barriers and determine methods of overcoming these barriers.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
15.0 Develop communication messages--The student will be able to:			
15.01 Conduct an audience analysis.			
15.02 Research information for message development.			
15.03 Analyze research for credibility.			
15.04 Utilize elements of informative and persuasive messages.			
15.05 Compare and contrast media channels.			
15.06 Identify agricultural messages in the media.			
15.07 Create informative and persuasive messages using various communication methods.			
16.0 Demonstrate oral communications skills--The student will be able to:			
16.01 Determine types of speeches: informative, persuasive.			
16.02 Identify the importance of public speaking skills in career development.			
16.03 Explain the characteristics of an effective public speaker.			
16.04 Explain the steps necessary to prepare a speech.			
16.05 Present a prepared speech.			
16.06 Present an extemporaneous speech.			
16.07 Create visual aids for presentations.			
17.0 Conduct interviews--The student will be able to:			
17.01 Research information for an interview (including company or organization information and information about the interviewee to build report).			
17.02 Identify the types of interview questions.			
17.03 Write interview questions.			
17.04 Conduct an interview, using various methods of media.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.05 Conduct follow-up procedures.			
18.0 Utilize printed agricultural media--The student will be able to:			
18.01 Explain the evolution and relevance of printed media in the agricultural industry. Describe the components of various styles in written articles.			
18.02 Identify and list the criteria for newsworthiness of a news story.			
18.03 Explain the structure of the inverted pyramid.			
18.04 List the five Ws and the H: who, what, when, where, why and how.			
18.05 Write a lead for a story.			
18.06 Compose a news story and news release on an agricultural topic.			
18.07 Use the <i>Associated Press Stylebook and Libel Manual</i> to edit articles.			
18.08 Define the components of an editorial.			
19.0 Utilize photography and graphics--The student will be able to:			
19.01 Identify types of photographs and graphics and describe the importance of each to agricultural communications. Identify key terms in digital photography and digital photo editing.			
19.02 Compose a quality photograph.			
19.03 Demonstrate the use of technology, software, and hardware used in photography and graphic design.			
19.04 Explain the difference among digital file formats. .			
20.0 Develop, design and edit publications and documents--The student will be able to:			
20.01 Identify key terms in publication and document design.			
20.02 Explain and apply the components of the publication and document development process.			
20.03 Identify common mistakes in publication and document design.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
20.04 Use the appropriate software to design a publication and document.			
21.0 Develop audio and video media--The student will be able to:			
21.01 Explain and implement the electronic media production process.			
21.02 Write video and audio scripts.			
21.03 Describe the importance of grammar and punctuation in writing scripts.			
21.04 Draw a video storyboard.			
21.05 Write a video shot outline.			
21.06 Identify a proper video shot sequence (long shot, medium shot, close-up).			
21.07 Create a promotional video.			
21.08 Demonstrate proper tone and voice inflection for radio and video.			
21.09 Produce a video message with no narration.			
22.0 Investigate ethical and professional issues in agricultural communications--The student will be able to:			
22.01 Demonstrate characteristics of responsible/ethical media professionals: public relations professional, reporter and editor.			
22.02 Adhere to all media deadlines.			
22.03 Describe plagiarism, libel, slander, copyright and intellectual property.			
23.0 Demonstrate leadership, employability, and human relations skills--The student will be able to:			
23.01 Conduct a job search for a career in agricultural communications.			
23.02 Develop a resume and an application letter. Identify documents that may be required when applying for a job in the agricultural communication field.			
23.03 Identify and demonstrate proper human relation skills.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.04 Complete a job application form.			
23.05 Write a proper thank you letter.			
23.06 Identify proper workplace and interview attire.			
23.07 Create business letters.			
23.08 Create electronic correspondence.			
24.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
24.01 Assess the agricultural impact upon the US gross national product and the total global economy.			
24.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.			
24.03 Identify and describe the primary government agencies involved with agriculture.			
24.04 Research new and emerging technologies and their impact on the economy.			
24.05 Recognize the value of the food and agribusiness industry.			
25.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:			
25.01 Define and explore agriculture and agribusinesses and their role in the economy.			
25.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
25.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.			
25.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society			

**Florida Department of Education
 Student Performance Standards**

Course Title: Agricultural Communications 3
Course Number: 8117020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the communications sector of the agricultural industry including instruction in developing and editing materials for printed media and media broadcast, utilizing photography and graphics, the importance of the internet in communications, writing technical papers and media scripts, ethical and professional issues in the industry, and advertising and marketing.

Florida Standards		Correlation to CTE Program Standard #
26.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Communications	
	26.01 Key Ideas and Details	
26.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
26.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
26.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	26.02 Craft and Structure	
26.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
26.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
26.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
26.03 Integration of Knowledge and Ideas		
26.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
26.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
26.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
26.04 Range of Reading and Level of Text Complexity		
26.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
26.04.2		
27.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Agricultural Communications	
27.01 Text Types and Purposes		
27.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
27.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
27.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
27.02 Production and Distribution of Writing		
27.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.WHST.2.4	
27.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	
	LAFS.1112.WHST.2.5	
27.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	
	LAFS.1112.WHST.2.6	
27.03 Research to Build and Present Knowledge		
27.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
	LAFS.1112.WHST.3.7	
27.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	
	LAFS.1112.WHST.3.8	
27.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	
	LAFS.1112.WHST.3.9	
27.04 Range of Writing		
27.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	
	LAFS.1112.WHST.4.10	
28.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Agricultural Communications		
28.01	Make sense of problems and persevere in solving them.	
	MAFS.K12.MP.1.1	
28.02	Reason abstractly and quantitatively.	
	MAFS.K12.MP.2.1	
28.03	Construct viable arguments and critique the reasoning of others.	
	MAFS.K12.MP.3.1	
28.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
28.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
28.06 Attend to precision.	MAFS.K12.MP.6.1
28.07 Look for and make use of structure.	MAFS.K12.MP.7.1
28.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
29.0 Explore the communications sector of the agricultural industry--The student will be able to:			
29.01 Identify influential, historical and current issues in the agricultural industry that necessitates agricultural communication.			
29.02 Objectively debate agricultural issues.			
30.0 Create communication messages--The student will be able to:		SC.912.N.1.1, 4	
30.01 Define what persuasion is and explain how it can be used to influence others.			
30.02 Describe and provide an example of how persuasion is used in the media.			
30.03 Create persuasive media.			
30.04 Identify different types of communication research methods.			
31.0 Demonstrate oral communications skills--The student will be able to:			
31.01 Identify various forms of visual aids for an oral presentation.			
31.02 Construct visual aids for an oral presentation.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.03 Present a speech using visual aids and non-verbal cues.			
31.04 Evaluate a speech.			
32.0 Generate printed agricultural media--The student will be able to:		SC.912.N.1.1	
32.01 Develop a media kit consisting of a backgrounder, fact sheet, news release and other media.			
32.02 Compose an advance story, feature story, follow-up story, cover story and news release on an agricultural topic.			
33.0 Modify photography and graphics--The student will be able to:			
33.01 Crop and edit photographs and graphics to enhance an article or press release.			
33.02 Write effective captions/cutlines for photographs and graphics.			
34.0 Create, design and edit publications and documents--The student will be able to:			
34.01 Create a magazine layout, brochure, poster, newsletter, and/or display for an agriculture product or event.			
35.0 Create or analyze audio and video media--The student will be able to:			
35.01 Create or analyze an informational video.			
35.02 Create or analyze a persuasive video.			
35.03 Create or analyze an audio program or podcast.			
36.0 Investigate ethical and professional issues in agricultural communications--The student will be able to:			
36.01 Define key terms related to ethics and professionalism and discuss their relationship to agriculture.			
36.02 Describe the importance of confidentiality in agricultural communications.			
36.03 Respond appropriately to opposing views in a professional manner.			
36.04 Identify concepts of risk communication and crisis communication.			
37.0 Demonstrate leadership, employability, and human relations skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
37.01 Demonstrate competence in job interview techniques			
37.02 Identify or demonstrate appropriate responses to criticism.			
37.03 Answer interview questions competently.			
37.04 Participate in mock interviews.			
37.05 Analyze one's own online presence.			
38.0 Use online and social media--The student will be able to:			
38.01 Compare and contrast the methods of delivering a message through different types of online and social media.			
38.02 Analyze online and social media for credibility and relevance.			
38.03 Research the agricultural industry's use of online and social media.			
38.04 Compose a professional e-mail.			
38.05 Demonstrate an understanding of web design software and language.			
38.06 Create or analyze an agricultural website.			
39.0 Create an agricultural communications campaign--The student will be able to:			
39.01 Define key terms in communications campaign development.			
39.02 Identify and perform the various professional roles in a communications campaign.			
39.03 Identify the strengths and weaknesses of various media for use in communication campaigns.			
39.04 Develop a communications campaign.			
39.05 Develop a research report for the agricultural industry using an industry standard format.			
40.0 Explain the components of the American business system.—The student will be able to:			
40.01 Describe the five basic ways American business is organized.			
40.02 Distinguish and identify between the characteristics of each method of doing business.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
40.03 Evaluate the advantages and disadvantages provided by each business method.			
40.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			
41.0 Investigate agricultural cooperatives structure and function.—The student will be able to:			
41.01 Explain the definition of a cooperative.			
41.02 Understand the history of cooperative principles and practices.			
41.03 Describe the five areas that classify cooperative structure.			
41.04 Distinguish and identify between the five types of cooperative structure and their functions.			
41.05 Demonstrate the need for internal and external communications in a cooperative.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

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

Secondary – Career Preparatory

Program Number	8118300
CIP Number	0103050101
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 AGRI RES #7
CTSO	FFA
SOC Codes (all applicable)	45-4011 - Forest and Conservation Workers 19-4093 - Forest and Conservation Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 forestry industry within 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 consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations	1 credit	45-4011	3
	8118310	Forestry and Natural Resources 2	1 credit		2
	8118320	Forestry and Natural Resources 3	1 credit		2
B	8118330	Forestry 4	1 credit	19-4093	2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Forestry and Natural Resources 2	^^	^^	^^	1/53 2%	5/52 10%	11/56 20%	13/55 24%	5/58 9%	2/35 6%	10/42 24%	13/56 23%	9/53 17%
Forestry and Natural Resources 3	^^	^^	^^	1/53 2%	5/52 10%	13/56 23%	9/55 16%	8/58 14%	3/35 9%	14/42 33%	10/56 18%	7/53 13%
Forestry and Natural Resources 4	^^	^^	^^	1/53 2%	4/52 8%	3/56 5%	6/55 11%	4/58 7%	1/35 3%	6/42 14%	6/56 11%	4/53 8%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Forestry.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Forestry.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Forestry.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Describe the forestry and natural resources industry.
- 14.0 Practice forestry and natural resources safety.
- 15.0 Operate, maintain, and repair machinery, equipment, and facilities.
- 16.0 Monitor water resources.
- 17.0 Collect and test soil samples.
- 18.0 Apply multi-use principles to forests and other lands.
- 19.0 Perform basic surveying operations.
- 20.0 Read and interpret aerial photographs and maps
- 21.0 Analyze and interpret soil survey data.
- 22.0 Perform basic nursery operation activities.
- 23.0 Apply basic financial management skills.
- 24.0 Demonstrate leadership and employability skills.
- 25.0 Monitor air quality.
- 26.0 Describe timber marketing procedures and techniques.
- 27.0 Measure trees and forest volume.
- 28.0 Perform preventive maintenance, checks, and services for forestry equipment.
- 29.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Forestry.
- 30.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Forestry.
- 31.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Forestry.
- 32.0 Apply forestry and natural resources safety.
- 33.0 Operate, maintain, and repair machinery, equipment, and facilities according to forestry industry standards.
- 34.0 Identify the major ecosystems in Florida.
- 35.0 Perform monitoring of water resources.

- 36.0 Assist in controlling and using fire in forests and other lands.
- 37.0 Assist in managing forest pests.
- 38.0 Identify applicable local, state, and federal rules and regulations and assistance programs.
- 39.0 Apply multi-use principles to forest and other lands.
- 40.0 Use aerial photographs and maps.
- 41.0 Collect and test water samples.
- 42.0 Interpret soil survey data.
- 43.0 Apply the principles of Best Management Practices (BMP).
- 44.0 Identify technological advances in the industry.
- 45.0 Identify wildlife population management practices.
- 46.0 Identify multi-use principles for forest and other lands.
- 47.0 Apply basic financial management skills.
- 48.0 Demonstrate leadership and management skills.
- 49.0 Apply the principles of basic nursery operations.
- 50.0 Assist in managing the urban forest.
- 51.0 Apply business management skills and identify appropriate legal documents.
- 52.0 Explain the basic silvicultural systems used in forest management.
- 53.0 Prescribe burning for forest management.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Forestry.	
	01.01 Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Forestry.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
02.03 Research to Build and Present Knowledge	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
02.04 Range of Writing	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Forestry.	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.P.8.7;	
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.			CS.11.01.01 CS.11.02.01
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b .
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a .
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a .
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: 8118310
Course Number: Forestry and Natural Resources 2
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of career opportunities; safety; operation, maintenance and repair of machinery, equipment and facilities; soil testing, surveying; water resources; and financial management skills.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Forestry	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards	Correlation to CTE Program Standard #
<p>procedure, or discussing an experiment in a text, defining the question the author seeks to address.</p> <p style="text-align: right;">LAFS.910.RST.2.6</p>	
<p>01.03 Integration of Knowledge and Ideas</p>	
<p>01.03.1 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p style="text-align: right;">LAFS.910.RST.3.7</p>	
<p>01.03.2 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.</p> <p style="text-align: right;">LAFS.910.RST.3.8</p>	
<p>01.03.3 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p style="text-align: right;">LAFS.910.RST.3.9</p>	
<p>01.04 Range of Reading and Level of Text Complexity</p>	
<p>01.04.1 By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> <p>01.04.2 By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.</p> <p style="text-align: right;">LAFS.910.RST.4.10</p>	
<p>02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Forestry</p>	
<p>02.01 Text Types and Purposes</p>	
<p>02.01.1 Write arguments focused on discipline-specific content.</p> <p style="text-align: right;">LAFS.910.WHST.1.1</p>	
<p>02.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p style="text-align: right;">LAFS.910.WHST.1.2</p>	
<p>02.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.</p> <p style="text-align: right;">LAFS.910.WHST.1.3</p>	
<p>02.02 Production and Distribution of Writing</p>	
<p>02.02.1 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Forestry	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Describe the forestry and natural resources industry--The student will be able to:		SC.912.L.17.18, 19, 20 SC.912.N.1.1, 4, 5	
13.01 Identify career and educational opportunities in the forestry and natural resources industries.			
13.02 Describe the importance of forestry and natural resources.			
13.03 Identify professional and interest organizations and trade journals in the forestry and natural resources industries.			
14.0 Practice forestry and natural resources safety--The student will be able to:			
14.01 Identify and eliminate hazards of the workplace.			
14.02 Observe color-coded warnings in work areas and on equipment and machinery.			
14.03 Demonstrate safety procedures and workplace "housekeeping" practices.			
14.04 Identify safe and effective fire extinguishing techniques.			
14.05 Apply minor first aid treatment and identify emergency procedures.			
14.06 Safely handle and store flammable and nonrestricted chemicals.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.07 Select personal safety equipment and appropriate clothing.			
14.08 Operate machinery and equipment according to the safety recommendations of the manufacturers.			
15.0 Operate, maintain, and repair machinery, equipment, and facilities--The student will be able to:		SC.912.L.17.14, 17, 20	
15.01 Use the equipment operator parts, and repair manuals.			
15.02 Service and maintain small gasoline engines.			
15.03 Operate, service, and maintain tractors and equipment.			
15.04 Dispose of waste products according to required procedures.			
15.05 Use shop and lab instruments and equipment.			
15.06 Perform minor welding repairs using arc and oxy-acetylene equipment.			
16.0 Monitor water resources--The student will be able to:		SC.912.L.17.16 SC.912.L.18.12 SC.912.P.12.2	
16.01 Identify important physical and chemical properties of water.			
16.02 Identify present and potential sources of water pollution.			
17.0 Collect and test soil samples--The student will be able to:		SC.912.L.17.11, 19 SC.912.N.1.4 SC.912.P.8.2, 3, 11	
17.01 Identify important physical and chemical properties of soil.			
17.02 Collect soil samples representative of an area, complete soil data forms, and submit them for laboratory analysis.			
17.03 Test soil for acidity or alkalinity and recommend proper soil additives to correct the pH level.			
17.04 Determine the appropriate conservation management practices for planting a particular area.			
17.05 Determine land classes according to soil classification standards.			
18.0 Apply multi-use principles to forests and other lands--The student will be able to:		SC.912.L17.13, 16, 17	
18.01 Identify the types of land ownership.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.0 Perform basic surveying operations--The student will be able to:			
19.01 Make linear measurements and calculate an area of land.			
19.02 Perform basic surveying operations.			
19.03 Locate a land area, using a legal land description.			
20.0 Read and interpret aerial photographs and maps--The student will be able to:		SC.912.L.17.13, 15, 17	
20.01 Interpret the terms, symbols, and scales used on soil and topographic maps.			
21.0 Analyze and interpret soil survey data--The student will be able to:		SC.912.N.1.1, 6	
21.01 Locate a designated site in the soil survey.			
21.02 Analyze and interpret soil survey data.			
22.0 Perform basic nursery operation activities--The student will be able to:		SC.912.L.14.7 SC.912.L.16.17 SC.912.L.17.4 SC.912.L.18.7	
22.01 Identify methods of propagation.			
22.02 Perform basic nursery operation activities, such as pruning, trimming, and fertilizing.			
22.03 Maintain plants.			
23.0 Apply basic financial management skills--The student will be able to:			
23.01 Complete basic financial records.			
23.02 Demonstrate the use of banking procedures.			
24.0 Demonstrate leadership and employability skills--The student will be able to:			
24.01 Identify documents that may be required for a job application.			
24.02 Complete a job application form.			
24.03 Demonstrate competencies in job-interview techniques.			
25.0 Monitor air quality--The student will be able to:		SC.912.L.17.15, 16	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
		SC.912.N.1.4 SC.912.P.8.2	
25.01 Identify important physical and chemical properties of air.			
25.02 Identify present and potential sources of air pollution.			
25.03 Analyze and interpret lab results.			
26.0 Describe timber marketing procedures and techniques--The student will be able to:		SC.912.E.6.2	
26.01 Identify the products made from trees and other natural resources and their value.			
26.02 Select and mark trees to be removed in timber stand improvement.			
26.03 Conduct a simple cruise.			
26.04 Calculate the volume and value of timber.			
26.05 Identify the components of timber sales contracts.			
26.06 Identify the methods of harvesting and erosion prevention.			
27.0 Measure trees and forest volume--The student will be able to:			
27.01 Identify and describe the use of tree measuring tools and instruments, such as dendrometers, hypsometers, increment borers, prisms, volume tables, and logger's tape.			
27.02 Measure trees and forests, using selected forest measurement tools.			
28.0 Perform preventive maintenance, checks, and services for forestry equipment--The student will be able to:		SC.912.L.17.14, 17, 20	
28.01 Perform daily operator maintenance checks for equipment.			
28.02 Determine the preventive maintenance procedures, using the equipment operator manuals.			
28.03 Perform scheduled preventive maintenance procedures.			
28.04 Interpret and perform operator's troubleshooting procedures as described in the operator's manual.			
28.05 Keep records of the maintenance and servicing of equipment.			

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**Florida Department of Education
Student Performance Standards**

Course Title: 8118320
Course Number: Forestry and Natural Resources 3
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; operation, maintenance, and repair of machinery, equipment and facilities; ecosystems; water resources; wildlife populations; fire use and control; pest management; analyzing and interpreting data.

Florida Standards		Correlation to CTE Program Standard #
29.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Forestry	
	29.01 Key Ideas and Details	
	29.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	29.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	29.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	29.02 Craft and Structure	
	29.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	29.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	29.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
29.03 Integration of Knowledge and Ideas		
29.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
29.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
29.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
29.04 Range of Reading and Level of Text Complexity		
29.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
29.04.2		
30.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Forestry		
30.01 Text Types and Purposes		
30.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
30.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
30.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
30.02 Production and Distribution of Writing		
30.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
30.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
30.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
30.03 Research to Build and Present Knowledge	
30.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
30.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
30.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
30.04 Range of Writing	
30.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
31.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Forestry	
31.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
31.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
31.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
31.04 Model with mathematics.	MAFS.K12.MP.4.1
31.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
31.06 Attend to precision.	MAFS.K12.MP.6.1
31.07 Look for and make use of structure.	MAFS.K12.MP.7.1
31.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
32.0 Apply forestry and natural resources safety--The student will be able to:			
32.01 Comply with Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) safety rules and regulations.			
32.02 Describe Florida's "Right-to-Know" law (as recorded in the Florida Statutes, Chapter 442).			
33.0 Operate, maintain, and repair machinery, equipment, and facilities according to forestry industry standards.--The student will be able to:		SC.912.L.17.14, 17, 20	
33.01 Keep records of the maintenance and repair of equipment and machinery.			
33.02 Prepare equipment for storage.			
33.03 Maintain and repair facilities.			
34.0 Identify the major ecosystems in Florida--The student will be able to:		SC.912.E.7.4, 8 SC.912.L.17.4, 10, 16, 17	
34.01 Define "ecosystem" and identify the major ecosystems in Florida.			
34.02 Identify common plant and animal species of the major ecosystems.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
34.03 Identify environmental factors affecting each ecosystem in Florida.			
34.04 Identify habitats of the most threatened and endangered plant and animal species in Florida.			
34.05 Identify the hydrologic cycle of and the major uses for water.			
35.0 Perform monitoring of water resources--The student will be able to:		SC.912.L.17.16 SC.912.L.18.12 SC.912.P.12.2	
35.01 Determine stream flow.			
35.02 Monitor water levels of rivers, streams, ponds, and lakes.			
35.03 Identify and monitor erosion hazards and environmental quality.			
36.0 Assist in controlling and using fire in forests and other lands--The student will be able to:		SC.912.E.7.5	
36.01 Identify the major causes of wildfire.			
36.02 Assist in determining fire danger in forests and other lands.			
36.03 Describe personal safety procedures for wildland fire fighters.			
36.04 Identify and describe the use of basic tools for wildland firefighting.			
36.05 Explain the uses of prescribed burning in forestry, natural resources, and wildlife management.			
36.06 Identify the different types of burning assistance that are available through agencies or vendors.			
37.0 Assist in managing forest pests--The student will be able to:		SC.912.L.17.6	
37.01 Identify common forest pests, insects, and diseases.			
37.02 Assist with common forest pest control.			
37.03 Assist with chemical, mechanical, and other controls of undesirable species.			
38.0 Identify applicable local, state, and federal rules and regulations and assistance programs--The student will be able to:		SC.912.L.17.13, 15, 16, 17	
38.01 Locate applicable portions of comprehensive plans.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
38.02 Identify agencies affecting land and wildlife utilization.			
38.03 Identify agencies regulating employee/employer relations (e.g., the Occupational Safety and Health Administration [OSHA]).			
38.04 Identify public- and private-assistance programs for private-land owners.			
38.05 Describe applicable local, state, and federal rules and regulations.			
39.0 Apply multi-use principles to forests and other lands--The student will be able to:		SC.912.L.17.13, 16, 17	
39.01 Assist in preparing a multi-use plan for forests and other lands.			
40.0 Use aerial photographs and maps--The student will be able to:		SC.912.L.17.13, 15, 17	
40.01 Use maps and aerial photographs for determining acreage.			
40.02 Use aerial photographs to identify major timber types and land features.			
41.0 Collect and test water samples--The student will be able to:		SC.912.N.1.4 SC.912.P.8.11	
41.01 Collect, store, and label water samples.			
42.0 Interpret soil survey data--The student will be able to:		SC.912.N.1.1, 6	
42.01 Apply soil survey information to silvicultural practices and environmental management.			
43.0 Apply the principles of Best Management Practices (BMP)--The student will be able to:		SC.912.L.18.12	
43.01 Define the terms used in Best Management Practices (BMP).			
43.02 Determine erosion and slope coefficients, using the BMP manual.			
43.03 Solve problems in land use, applying the principles found in the BMP manual.			
44.0 Identify technological advances in the industry--The student will be able to:			
44.01 Identify satellite surveying operations and laser systems.			
44.02 Identify satellite thermal infrared imagery.			
44.03 Identify computer mapping systems and geographic information			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
systems.			
44.04 Use electronic communication devices.			
44.05 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications.			
44.06 Employ computer operations applications to access, create, manage, integrate, and store information.			
44.07 Employ collaborative/groupware applications to facilitate group work.			
45.0 Identify wildlife population management practices--The student will be able to:		SC.912.L.15.4, 6, 13 SC.912.L.17.5, 6, 9, 13, 16, 17	
45.01 Identify appropriate management practices for a wildlife habitat.			
45.02 Identify species of Florida's common wildlife (land and aquatic) and classify them as game, non-game, endangered, or threatened.			
46.0 Identify multi-use principles for forest and other lands--The student will be able to:		SC.912.L.17.12, 13 SC.912.N.4.1	
46.01 Identify the different types of leases and their necessary components.			
47.0 Apply basic financial management skills--The student will be able to:			
47.01 Calculate interest on loans.			
47.02 Complete selected income tax return forms.			
48.0 Demonstrate leadership and management skills--The student will be able to:			
48.01 Demonstrate knowledge of how to make job changes appropriately.			
48.02 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.			
48.03 Describe the importance of a drug free workplace and the industry policies regarding drug use.			
48.04 Demonstrate appropriate responses to performance evaluations from an employer, a supervisor, or other persons in the workplace.			

**Florida Department of Education
Student Performance Standards**

Course Title: Forestry 4
Course Number: 8118330
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of urban forest; timber marketing; business management skills; measuring trees and forest volume; silvicultural systems; prescribed burning; preventative maintenance.

Florida Standards		Correlation to CTE Program Standard #
29.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Forestry	
	29.01 Key Ideas and Details	
	29.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	29.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	29.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	29.02 Craft and Structure	
	29.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	29.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	29.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
29.03	Integration of Knowledge and Ideas	
29.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
29.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
29.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
29.04	Range of Reading and Level of Text Complexity	
29.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
29.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
30.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Forestry	
30.01	Text Types and Purposes	
30.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
30.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
30.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
30.02	Production and Distribution of Writing	
30.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>30.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>30.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
<p>30.03 Research to Build and Present Knowledge</p>	
<p>30.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>30.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>30.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
<p>30.04 Range of Writing</p>	
<p>30.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
<p>31.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Forestry.</p>	
<p>31.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>31.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>31.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards	Correlation to CTE Program Standard #
31.04 Model with mathematics.	MAFS.K12.MP.4.1
31.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
31.06 Attend to precision.	MAFS.K12.MP.6.1
31.07 Look for and make use of structure.	MAFS.K12.MP.7.1
31.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
49.0 Apply the principles of basic nursery operations--The student will be able to:			
49.01 Select the method of, and assist in, site preparation.			
49.02 Care for seedlings from the nursery to planting.			
49.03 Plant tree seedlings, using a hand or mechanical planter.			
49.04 Explain the requirements for reforestation.			
50.0 Assist in managing the urban forest--The student will be able to:		SC.912.L.17.12, 13 SC.912.N.1.1 SC.912.N.4.1, 2	
50.01 Assist in selecting, planting, and transplanting trees in the urban landscape.			
50.02 Demonstrate proper tree pruning, trimming, and fertilization techniques.			
50.03 Describe the procedure for an urban tree inventory.			
50.04 Develop a vegetative plan for improving wildlife habitat in urban areas.			
50.05 Develop a plan for the basic maintenance of tree health.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
51.0 Apply business management skills and identify appropriate legal documents--The student will be able to:		SC.912.L.17.13, 16, 17 SC.912.N.4.2	
51.01 Identify business liability and the use of liability insurance.			
51.02 Identify eligibility requirements for greenbelt, bluebelt, and homestead tax exemptions.			
51.03 Identify the characteristics of legal documents (such as contracts, deeds, and leases).			
52.0 Explain the basic silvicultural systems used in forest management--The student will be able to:		SC.912.L.17.11, 13, 16, 17, 19 SC.912.N.4.1, 2	
52.01 Identify basic silvicultural systems.			
52.02 Conduct a site evaluation.			
52.03 Select tree species according to the site evaluation.			
52.04 Explain the requirements for tree growth for effective forest management.			
52.05 Determine site quality and growth rate for a timber stand.			
52.06 Prepare a basic forest management plan, including cost and profit analyses.			
53.0 Prescribe burning for forest management--The student will be able to:		SC.912.E.7.5	
53.01 Develop a plan for a prescribed burning, including permits, maps, and descriptions of desirable burning conditions and fire lines.			
53.02 Prepare a smoke management plan.			
53.03 Describe the requirements for obtaining different types of burning authorization and the applicable restrictions.			
53.04 Prepare a sample prescribed burning authorization request using the phone or website.			
53.05 Explain the effects of fuel characteristics and weather factors on fire behavior.			
53.06 Identify the precautions to be followed in using fire as a management tool.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**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	8121300
CIP Number	0101060510
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	37-3011 - Landscaping and Groundskeeping Workers 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, an Groundskeeping Workers
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

This program is a planned sequence of instruction consisting of a core and two completion points.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	37-1012	3
	8121510	Introductory Horticulture 2	1 credit		3
	8121520	Horticulture Science 3	1 credit		3
B	8121310	Landscape and Turf Science 4	1 credit	37-1012	2
	8121320	Landscape and Turf Science 5	1 credit		2
	8121330	Landscape Operations 6	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Introductory Horticulture 2	^^	^^	^^	4/53 8%	2/52 4%	18/56 32%	4/55 7%	4/58 7%	4/35 11%	5/42 12%	4/56 7%	4/53 8%

Horticulture Science 3	^^	^^	^^	8/53 15%	4/52 8%	18/56 32%	8/55 15%	5/58 9%	5/35 14%	9/42 21%	8/56 14%	5/53 9%
Landscape and Turf Science 4	^^	^^	^^	2/53 4%	2/52 4%	2/56 4%	2/55 4%	2/58 3%	3/35 9%	2/42 5%	2/56 4%	1/53 2%
Landscape and Turf Science 5	^^	^^	^^	2/53 4%	2/52 4%	3/56 5%	2/55 4%	2/58 3%	2/35 6%	2/42 5%	2/56 4%	6/53 11%
Landscape Operations 6	^^	^^	^^	2/53 4%	2/52 4%	2/56 4%	2/55 4%	5/58 9%	2/35 6%	2/42 5%	2/56 4%	2/53 4%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Landscape Operations.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Landscape Operations.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Landscape Operations.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Describe the horticulture industry.
- 14.0 Identify safety procedures in the workplace.
- 15.0 Identify and classify plants.
- 16.0 Demonstrate plant propagation techniques.
- 17.0 Identify growing media and fertilizers.
- 18.0 Explain irrigation techniques for plants and turf.
- 19.0 Describe Integrated Pest Management approaches.
- 20.0 Describe the principles and requirements of plant growth.
- 21.0 Apply best management practices in the horticulture industry.
- 22.0 Identify principles of landscape design.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Landscape Operations.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Landscape Operations.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Landscape Operations.
- 26.0 Apply safety procedures in the workplace.
- 27.0 Classify plants based on scientific principles.
- 28.0 Demonstrate proper use of growing media and fertilizers
- 29.0 Demonstrate Integrated Pest Management approaches.
- 30.0 Identify the principles and requirements of plant growth.
- 31.0 Apply best management practices in landscape design.

- 32.0 Apply principles of landscape design and maintenance.
- 33.0 Harvest, transport, and install plant materials.
- 34.0 Identify procedures to operate, repair, and maintain tools and equipment.
- 35.0 Identify emerging technologies in the horticulture industry.
- 36.0 Demonstrate leadership, employability, communications and human relations skills.
- 37.0 Maintain tools and equipment.
- 38.0 Demonstrate application of chemicals and calibrate spray equipment.
- 39.0 Classify plants and turfgrass.
- 40.0 Demonstrate fertilization skills.
- 41.0 Irrigate plants and turf.
- 42.0 Perform service on tools and equipment.
- 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 Layout and/or install landscape and/or interiorscape.
- 48.0 Maintain landscape.
- 49.0 Maintain customer relations and observe follow-up procedures.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Landscape Operations.	
01.01 Key Ideas and Details		
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure		
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Landscape Operations.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Landscape Operations.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Landscape Operations	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Landscape Operations	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Landscape Operations		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Describe the horticulture industry--The student will be able to:			
13.01 Describe the importance of horticulture to the American and global economies.			
13.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.			
13.03 Describe the importance of horticulture to the environment, including sustainability practices			
14.0 Identify safety procedures in the workplace--The student will be able to:		SC.912.L.17.14, 17	
14.01 Identify the common causes of accidents in the horticulture industry.			
14.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.			
14.03 Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OHSA) Regulations.			
15.0 <u>Identify and classify plants</u> --The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.2, 3, 7, 8,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9	
12.01 Identify plants by scientific and common names.			PS.01.01.02.b PS.01.01.02.c
12.02 Classify plants botanically.			PS.01.01.01.c
12.03 Write scientific names for plants.			
16.0 Demonstrate plant propagation techniques --The student will be able to:		SC.912.L.14.7, 8 SC.912.L.16.3, 12, 14, 16	
16.01 Identify propagating and growing facilities and structures.			
16.02 Prepare propagation media.			PS.02.02.01.c
16.03 Select and collect propagation materials.			
16.04 Demonstrate propagation by sexual and asexual methods.			PS.03.01.02.a PS.03.01.03.a
16.05 Demonstrate environmental controls for propagation materials.			
16.06 Identify and select proper rooting hormones based on plant characteristics.			
17.0 Identify growing media and fertilizers--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.1, 11	
17.01 Identify soil and media materials.			PS.02.02.01.b
17.02 Identify nutritional needs of plants.			PS.02.03.01.a
17.03 Identify symptoms of nutritional deficiencies and toxicities of plants.			PS.02.03.01.b
17.04 Identify types and kinds of fertilizers.			
17.05 Identify methods of distributing fertilizers.			PS.02.03.04.a
17.06 Interpret information on a label of fertilizer used in Florida.			
18.0 Explain irrigation techniques for plants and turf--The student will be able		SC.912.L.18.12	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
to:		SC.912.E.7.1	
18.01 Identify water needs of plants.			
18.02 Irrigate plants at recommended rates.			
18.03 Identify the symptoms of excessive water and water stress in plants.			
18.04 Describe the basic irrigation systems and principles used in the landscape and nursery.			
19.0 Describe Integrated Pest Management approaches--The student will be able to:		SC.912.L.14.9	
19.01 Identify common pests of plants.			PS.03.03.01.a
19.02 Describe life cycles of common pests of plants.			PS.03.03.02.c PS.03.03.02.b
19.03 Recognize signs of damage from pests.			PS.03.03.02.a
20.0 Describe the principles and requirements of plant growth--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.7.1 SC.912.L.18.7, 9, 10 SC.912.P.10.1	
20.01 Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis.			PS.01.03.01.b
20.02 Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature.			PS.01.03.01.c
20.03 Explain the process of respiration and the flow of energy in plants.			PS.01.03.02.b PS.01.03.02.c
20.04 Describe the influence of light and temperature on plant growth including photo tropism.			PS.01.03.04.b
21.0 Apply best management practices in the horticulture industry--The student will be able to:		SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4	
21.01 Identify and apply Best Management Practices to reduce pollution and conserve water.			
21.02 Identify and apply Best Management Practices on fertilizer recommendations for Florida plants and turf.			
22.0 Identify principles of landscape design --The student will be able to:		SC.912.L.17.17	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.01 Compare and contrast the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
22.02 Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.01.a
22.03 Identify points of emphasis and major design areas in the residential landscape.			PS.04.01.01.c
22.04 Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.			
22.05 Read and interpret a landscape plan.			
22.06 Develop skills for drawing and identifying symbols.			
22.07 Draw and design a landscape plan for a small garden.			
22.08 Construct a landscape display.			

**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.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Landscape Operations	
	23.01 Key Ideas and Details	
23.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
23.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
23.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	23.02 Craft and Structure	
23.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
23.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
23.02.3	Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
23.03 Integration of Knowledge and Ideas		
23.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
23.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
23.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
23.04 Range of Reading and Level of Text Complexity		
23.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
23.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Landscape Operations		
24.01 Text Types and Purposes		
24.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
24.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
24.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
24.02 Production and Distribution of Writing		
24.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>24.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>24.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
24.03 Research to Build and Present Knowledge	
<p>24.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>24.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>24.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
24.04 Range of Writing	
<p>24.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Landscape Operations	
<p>25.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>25.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>25.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
25.04 Model with mathematics.	MAFS.K12.MP.4.1	
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
25.06 Attend to precision.	MAFS.K12.MP.6.1	
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.0 Apply safety procedures in the workplace--The student will be able to:			
26.01 Describe emergency procedures in the horticulture workplace.			
26.02 Create preventive measures to avoid hazardous situations.			
26.03 Apply problem solving skills to correct a hazardous situation.			
27.0 Classify plants based on scientific principles--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.2, 3, 7, 8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9	
27.01 Describe principles of plant biology and growth.			PS.01.03.03.c
27.02 Explain the role of plants in the ecosystem.			
27.03 Describe the major classifications of plants based on life cycle.			PS.01.01.01.c
27.04 Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.			
27.05 Demonstrate proper use of scientific names.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
28.0 Demonstrate proper use of growing media and fertilizers--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.5, 7, 11	
28.01 Apply information on a label of fertilizer used in Florida.			
28.02 Apply fertilizer and soil amendments.			Ps.02.03.04.b PS.02.03.04.c
28.03 Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.			PS.02.03.02.a PS.02.03.02.c
28.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.			
28.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.			PS.02.03.01.a
28.06 Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.			
29.0 Demonstrate Integrated Pest Management approaches--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.9 SC.912.L.17.6, 7, 12, 13, 15	
29.01 Classify insects according to feeding habits.			
29.02 Describe biological, chemical, and cultural methods of controlling plant pests.			PS.03.03.03.a
29.03 Diagnose and outline a plan for controlling pests on a horticultural crop.			PS.03.03.02.c
29.04 Describe methods of controlling nematode pests on ornamental plants.			
29.05 Develop a pest control program for a horticultural crop using Integrated Pest Management.			
30.0 Identify the principles and requirements of plant growth--The student will be able to:		SC.912.L.14.7, 15, 17, 31 SC.912.N.1.1, 7 SC.912.P.8.8, 9, 10	
30.01 Demonstrate methods of pruning plants.			
30.02 Identify appropriate time to prune plants.			
30.03 Identify and select pruning tools.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.04 Demonstrate proper use of pruning tools and care.			
30.05 Identify Plant Growth Regulators and their use on horticulture and landscape plants.			PS.01.03.04.a
30.06 Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.			
30.07 Identify specific cultural, mechanical, chemical, and biological methods of weed management.			
31.0 Apply best management practices in landscape design--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4	
31.01 Identify and apply Best Management Practices for the design and installation of landscapes.			
31.02 Identify and apply Best Management Practices on the management and handling of pesticides.			PS.03.03.04.b
32.0 Apply principles of landscape design and maintenance--The student will be able to:		SC.912.L.17.17	
32.01 Demonstrate the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
32.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.02.b
32.03 Apply points of emphasis and major design areas in the commercial landscape.			
32.04 Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.			
32.05 Create a landscape plan for a residential or commercial property.			PS.04.01.02.c
32.06 Calculate materials needed according to the identified landscape plan.			PS.04.01.01.c
32.07 Identify factors in selecting turf for landscape installation.			
33.0 Harvest, transport, and install plant materials--The student will be able to:		SC.912.L.17.4, 15, 17	
33.01 Determine requirements for preserving plant viability.			
33.02 Demonstrate proper landscape plant establishment techniques.			
33.03 Select and prepare plants for transporting and transplanting.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.04 Select horticultural products according to Florida grades and standards.			PS.03.05.04.b
34.0 Identify procedures to operate, repair, and maintain tools and equipment--The student will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1	
34.01 Perform equipment pre-operational check.			
34.02 Identify, maintain, and operate hand tools and power tools.			PS.03.05.01.c
35.0 Identify emerging technologies in the horticulture industry--The student will be able to:		SC.912.L.16.1, 2, 7, 9, 10 SC.912.L.17.15, 17	
35.01 Investigate DNA and genetics applications in horticulture including the theory of probability.			PS.03.01.05
35.02 Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).			PS.03.01.04.a PS.03.01.05.b
36.0 Demonstrate leadership, employability, communications and human relations skills--The student will be able to:		SC.912.N.1.7	
36.01 Identify acceptable work habits and personal characteristics.			
36.02 Identify acceptable employee hygiene habits.			
36.03 Identify or demonstrate appropriate responses to criticism from employer,			
36.04 Describe the importance of industry certifications.			

**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.

Florida Standards		Correlation to CTE Program Standard #
24.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Landscape Operations	
24.01 Key Ideas and Details		
24.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
24.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
24.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
24.02 Craft and Structure		
24.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
24.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
24.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
24.03 Integration of Knowledge and Ideas		
24.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
24.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
24.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
24.04 Range of Reading and Level of Text Complexity		
24.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
24.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
25.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Landscape Operations		
25.01 Text Types and Purposes		
25.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
25.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
25.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	

Florida Standards		Correlation to CTE Program Standard #
25.02	Production and Distribution of Writing	
25.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
25.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
25.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
25.03	Research to Build and Present Knowledge	
25.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
25.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
25.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
25.04	Range of Writing	
25.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
26.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Landscape Operations.	
26.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
26.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
26.03 Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
26.04 Model with mathematics.	MAFS.K12.MP.4.1
26.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
26.06 Attend to precision.	MAFS.K12.MP.6.1
26.07 Look for and make use of structure.	MAFS.K12.MP.7.1
26.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
37.0 Maintain tools and equipment--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4 SC.912.P.12.3, 5	
37.01 Maintain oil level in engines of power equipment.			
37.02 Check and maintain tire air pressure on equipment.			
37.03 Maintain fuel levels using proper fuel or fuel mixtures.			
37.04 Demonstrate proper equipment operations.			
37.05 Identify, operate, and maintain tractor and power equipment.			
38.0 Demonstrate application of chemicals and calibrate spray equipment--The student will be able to:		SC.912.L.16.6 SC.912.L.17.15, 16, 17 SC.912.N.1.1 SC.912.N.2.4	
38.01 Select, mix, and apply a non-restricted chemical according to the label and local, state, federal, and EPA regulations.			
38.02 Identify and report insect and disease damage on plants and turf.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
38.03 Diagnose a plant or disease problem on turf.			
39.0 Classify plants and turfgrass--The student will be able to:		SC.912.L.14.5, 7, 10, 53 SC.912.L.15.4, 6 SC.912.L.17.7 SC.912.N.1.1 SC.912.N.2.4	
39.01 Classify plants and turfgrass as annuals, biennials, and perennials.			
39.02 Identify plants and turfgrass that are specific to a region.			
39.03 Identify common weeds on Florida turf grasses.			
40.0 Demonstrate fertilization skills--The students will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1 SC.912.N.2.4	
40.01 Develop a fertilization schedule.			
40.02 Interpret fertilizer charts and develop recommendations according to turf species.			
41.0 Irrigate plants and turf--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.15	
41.01 Identify various types of irrigation systems.			
41.02 Install and maintain piping and water distribution components.			
41.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.			

**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.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.0 Perform service on tools and equipment--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.3 SC.912.P.12.3, 4, 5	
42.01 Service and maintain battery and electrical systems.			
42.02 Perform minor tune-up on engines.			
42.03 Load, 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:		SC.912.L.17.15 SC.912.N.1.1 SC.912.N.2.4	
43.01 Calibrate spray and spread equipment.			
43.02 Determine chemical compatibility.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
43.03 Determine appropriate time frequency and method of chemical application.			
43.04 Apply Best Management Practices for fertilizer recommendations for plants and			
44.0 Perform classification of plants and turfgrass--The student will be able to:		SC.912.L.14.5, 7, 10, 53 SC.912.L.15.4, 6 SC.912.N.1.1 SC.912.N.2.4	
44.01 Classify plants and turfgrass according to growth habit.			
44.02 Identify hazardous plants.			
45.0 Use fertilization skills--The students will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1	
45.01 Determine rate of fertilizer application and calibration equipment.			
45.02 Calibrate fertilizer equipment.			
46.0 Perform irrigation of plants and 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 and turf grasses.			

**Florida Department of Education
Student Performance Standards**

Course Title: Landscape Operations 6
Course Number: 8121330
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.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
47.0 Layout and/or install landscape and/or interiorscape--The student will be able to:			
47.01 Prepare landscape and/or interiorscape.			
47.02 Prepare final grade.			
47.03 Install mulch and perform final cleanup.			
47.04 Calculate labor costs associated with installation.			
48.0 Maintain landscape--The student will be able to:		SC.912.E.7.4, 5, 6 SC.912.N.1.1 SC.912.N.2.4	
49.01 Perform maintenance inspection of the project.			
49.02 Determine water requirements and apply at proper rates.			
49.03 Identify weeds and apply herbicides safely.			
49.04 Determine fertilization requirements and apply at proper rates.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
49.05 Identify plant pest and disease problems and apply corrective measures.			
49.06 Trim and prune landscape plants.			
49.07 Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash.			
49.08 Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.			
49.09 Cultivate and mulch plants.			
49.10 Brace and repair trees.			
49.11 Provide protection for plants from adverse weather conditions.			
49.12 Comply with local, state, and federal regulations regarding landscape maintenance and pesticide applications.			
49.13 Demonstrate sanitation and safety practices when maintaining landscape.			
49.0 Maintain customer relations and observe follow-up procedures--The student will be able to:			
49.01 Conduct walk-through of project with client to assure satisfaction.			
49.02 Identify current and future maintenance requirements.			
49.03 Analyze project records for profitability and employee performance			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Sports and Recreational Turf Operations
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8121400
CIP Number	0101060700
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	37-3011 - Landscaping and Groundskeeping Workers 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, an Groundskeeping Workers
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

This program is a planned sequence of instruction consisting of a core and two completion points.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	37-1012	3
	8121510	Introductory Horticulture 2	1 credit		3
	8121520	Horticulture Science 3	1 credit		3
B	8121310	Landscape and Turf Science 4	1 credit	37-1012	2
	8121320	Landscape and Turf Science 5	1 credit		2
	8121410	Sports and Recreational Turf Operations 6	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Introductory Horticulture 2	^^	^^	^^	4/53 8%	2/52 4%	18/56 32%	4/55 7%	4/58 7%	4/35 11%	5/42 12%	4/56 7%	4/53 8%
Horticulture Science 3	^^	^^	^^	8/53 15%	4/52 8%	18/56 32%	8/55 15%	5/58 9%	5/35 14%	9/42 21%	8/56 14%	5/53 9%

Landscape and Turf Science 4	^^	^^	^^	2/53 4%	2/52 4%	2/56 4%	2/55 4%	2/58 3%	3/35 9%	2/42 5%	2/56 4%	1/53 2%
Landscape and Turf Science 5	^^	^^	^^	2/53 4%	2/52 4%	3/56 5%	2/55 4%	2/58 3%	2/35 6%	2/42 5%	2/56 4%	6/53 11%
Sports and Recreational Turf Operations 6	^^	^^	^^	3/53 6%	3/52 6%	3/56 5%	3/55 5%	3/58 5%	3/35 9%	3/42 7%	3/56 5%	3/53 6%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Sports and Recreational Turf Operations.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Sports and Recreational Turf Operations.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Sports and Recreational Turf Operations.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Describe the horticulture industry.
- 14.0 Identify safety procedures in the workplace.
- 15.0 Identify and classify plants.
- 16.0 Demonstrate plant propagation techniques.
- 17.0 Identify growing media and fertilizers.
- 18.0 Explain irrigation techniques for plants and turf.
- 19.0 Describe Integrated Pest Management approaches.
- 20.0 Describe the principles and requirements of plant growth.
- 21.0 Apply best management practices in the horticulture industry.
- 22.0 Identify principles of landscape design.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Sports and Recreational Turf Operations.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Sports and Recreational Turf Operations.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Sports and Recreational Turf Operations.
- 26.0 Apply safety procedures in the workplace.
- 27.0 Classify plants based on scientific principles.
- 28.0 Demonstrate proper use of growing media and fertilizers
- 29.0 Demonstrate Integrated Pest Management approaches.
- 30.0 Identify the principles and requirements of plant growth.
- 31.0 Apply best management practices in landscape design.

- 32.0 Apply principles of landscape design and maintenance.
- 33.0 Harvest, transport, and install plant materials.
- 34.0 Identify procedures to operate, repair, and maintain tools and equipment.
- 35.0 Identify emerging technologies in the horticulture industry.
- 36.0 Demonstrate leadership, employability, communications and human relations skills.
- 37.0 Maintain tools and equipment.
- 38.0 Demonstrate application of chemicals and calibrate spray equipment.
- 39.0 Classify plants and turfgrass.
- 40.0 Demonstrate fertilization skills.
- 41.0 Irrigate plants and turf.
- 42.0 Perform service on tools and equipment.
- 43.0 Apply chemicals and calibrate spray equipment.
- 44.0 Perform classification of plants and turfgrass.
- 45.0 Use fertilization skills.
- 46.0 Maintaining athletic fields
- 47.0 Develop recreational areas
- 48.0 Maintain sports turf
- 49.0 Maintain fairways, roughs, and traps
- 50.0 Fertilize turf
- 51.0 Establish turfgrass.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Sports and Recreational Turf Operations.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Sports and Recreational Turf Operations.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Sports and Recreational Turf Operations.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.			CS.11.01.01 CS.11.02.01
06.06 Interpret, analyze, and report data.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Sports and Recreational Turf Operations	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Sports and Recreational Turf Operations	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Sports and Recreational Turf Operations	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Describe the horticulture industry--The student will be able to:			
13.01 Describe the importance of horticulture to the American and global economies.			
13.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.			
13.03 Describe the importance of horticulture to the environment, including sustainability practices			
14.0 Identify safety procedures in the workplace--The student will be able to:		SC.912.L.17.14, 17	
14.01 Identify the common causes of accidents in the horticulture industry.			
14.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.			
14.03 Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OHSA) Regulations.			
15.0 <u>Identify and classify plants</u> --The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.2, 3, 7,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9	
12.01 Identify plants by scientific and common names.			PS.01.01.02.b PS.01.01.02.c
12.02 Classify plants botanically.			PS.01.01.01.c
12.03 Write scientific names for plants.			
16.0 Demonstrate plant propagation techniques --The student will be able to:		SC.912.L.14.7, 8 SC.912.L.16.3, 12, 14, 16	
16.01 Identify propagating and growing facilities and structures.			
16.02 Prepare propagation media.			PS.02.02.01.c
16.03 Select and collect propagation materials.			
16.04 Demonstrate propagation by sexual and asexual methods.			PS.03.01.02.a PS.03.01.03.a
16.05 Demonstrate environmental controls for propagation materials.			
16.06 Identify and select proper rooting hormones based on plant characteristics.			
17.0 Identify growing media and fertilizers--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.1, 11	
17.01 Identify soil and media materials.			PS.02.02.01.b
17.02 Identify nutritional needs of plants.			PS.02.03.01.a
17.03 Identify symptoms of nutritional deficiencies and toxicities of plants.			PS.02.03.01.b
17.04 Identify types and kinds of fertilizers.			
17.05 Identify methods of distributing fertilizers.			PS.02.03.04.a
17.06 Interpret information on a label of fertilizer used in Florida.			
18.0 Explain irrigation techniques for plants and turf--The student will be able		SC.912.L.18.12	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
to:		SC.912.E.7.1	
18.01 Identify water needs of plants.			
18.02 Irrigate plants at recommended rates.			
18.03 Identify the symptoms of excessive water and water stress in plants.			
18.04 Describe the basic irrigation systems and principles used in the landscape and nursery.			
19.0 Describe Integrated Pest Management approaches--The student will be able to:		SC.912.L.14.9	
19.01 Identify common pests of plants.			PS.03.03.01.a
19.02 Describe life cycles of common pests of plants.			PS.03.03.02.c PS.03.03.02.b
19.03 Recognize signs of damage from pests.			PS.03.03.02.a
20.0 Describe the principles and requirements of plant growth--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.7.1 SC.912.L.18.7, 9, 10 SC.912.P.10.1	
20.01 Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis.			PS.01.03.01.b
20.02 Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature.			PS.01.03.01.c
20.03 Explain the process of respiration and the flow of energy in plants.			PS.01.03.02.b PS.01.03.02.c
20.04 Describe the influence of light and temperature on plant growth including photo tropism.			PS.01.03.04.b
21.0 Apply best management practices in the horticulture industry--The student will be able to:		SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4	
21.01 Identify and apply Best Management Practices to reduce pollution and conserve water.			
21.02 Identify and apply Best Management Practices on fertilizer recommendations for Florida plants and turf.			
22.0 Identify principles of landscape design --The student will be able to:		SC.912.L.17.17	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.01 Compare and contrast the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
22.02 Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.01.a
22.03 Identify points of emphasis and major design areas in the residential landscape.			PS.04.01.01.c
22.04 Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.			
22.05 Read and interpret a landscape plan.			
22.06 Develop skills for drawing and identifying symbols.			
22.07 Draw and design a landscape plan for a small garden.			
22.08 Construct a landscape display.			

**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.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Sports and Recreational Turf Operations	
	23.01 Key Ideas and Details	
23.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
23.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
23.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	23.02 Craft and Structure	
23.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
23.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
23.02.3	Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
23.03 Integration of Knowledge and Ideas		
23.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
23.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
23.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
23.04 Range of Reading and Level of Text Complexity		
23.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
23.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Sports and Recreational Turf Operations		
24.01 Text Types and Purposes		
24.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
24.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
24.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
24.02 Production and Distribution of Writing		
24.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>24.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>24.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
24.03 Research to Build and Present Knowledge	
<p>24.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>24.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>24.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
24.04 Range of Writing	
<p>24.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Sports and Recreational Turf Operations	
<p>25.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>25.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>25.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards	Correlation to CTE Program Standard #
25.04 Model with mathematics.	MAFS.K12.MP.4.1
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
25.06 Attend to precision.	MAFS.K12.MP.6.1
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.0 Apply safety procedures in the workplace--The student will be able to:			
26.01 Describe emergency procedures in the horticulture workplace.			
26.02 Create preventive measures to avoid hazardous situations.			
26.03 Apply problem solving skills to correct a hazardous situation.			
27.0 Classify plants based on scientific principles--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.2, 3, 7, 8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9	
27.01 Describe principles of plant biology and growth.			PS.01.03.03.c
27.02 Explain the role of plants in the ecosystem.			
27.03 Describe the major classifications of plants based on life cycle.			PS.01.01.01.c
27.04 Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.			
27.05 Demonstrate proper use of scientific names.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
28.0 Demonstrate proper use of growing media and fertilizers--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.5, 7, 11	
28.01 Apply information on a label of fertilizer used in Florida.			
28.02 Apply fertilizer and soil amendments.			Ps.02.03.04.b PS.02.03.04.c
28.03 Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.			PS.02.03.02.a PS.02.03.02.c
28.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.			
28.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.			PS.02.03.01.a
28.06 Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.			
29.0 Demonstrate Integrated Pest Management approaches--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.9 SC.912.L.17.6, 7, 12, 13, 15	
29.01 Classify insects according to feeding habits.			
29.02 Describe biological, chemical, and cultural methods of controlling plant pests.			PS.03.03.03.a
29.03 Diagnose and outline a plan for controlling pests on a horticultural crop.			PS.03.03.02.c
29.04 Describe methods of controlling nematode pests on ornamental plants.			
29.05 Develop a pest control program for a horticultural crop using Integrated Pest Management.			
30.0 Identify the principles and requirements of plant growth--The student will be able to:		SC.912.L.14.7, 15, 17, 31 SC.912.N.1.1, 7 SC.912.P.8.8, 9, 10	
30.01 Demonstrate methods of pruning plants.			
30.02 Identify appropriate time to prune plants.			
30.03 Identify and select pruning tools.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.04 Demonstrate proper use of pruning tools and care.			
30.05 Identify Plant Growth Regulators and their use on horticulture and landscape plants.			PS.01.03.04.a
30.06 Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.			
30.07 Identify specific cultural, mechanical, chemical, and biological methods of weed management.			
31.0 Apply best management practices in landscape design--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4	
31.01 Identify and apply Best Management Practices for the design and installation of landscapes.			
31.02 Identify and apply Best Management Practices on the management and handling of pesticides.			PS.03.03.04.b
32.0 Apply principles of landscape design and maintenance--The student will be able to:		SC.912.L.17.17	
32.01 Demonstrate the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
32.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.02.b
32.03 Apply points of emphasis and major design areas in the commercial landscape.			
32.04 Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.			
32.05 Create a landscape plan for a residential or commercial property.			PS.04.01.02.c
32.06 Calculate materials needed according to the identified landscape plan.			PS.04.01.01.c
32.07 Identify factors in selecting turf for landscape installation.			
33.0 Harvest, transport, and install plant materials--The student will be able to:		SC.912.L.17.4, 15, 17	
33.01 Determine requirements for preserving plant viability.			
33.02 Demonstrate proper landscape plant establishment techniques.			
33.03 Select and prepare plants for transporting and transplanting.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.04 Select horticultural products according to Florida grades and standards.			PS.03.05.04.b
34.0 Identify procedures to operate, repair, and maintain tools and equipment--The student will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1	
34.01 Perform equipment pre-operational check.			
34.02 Identify, maintain, and operate hand tools and power tools.			PS.03.05.01.c
35.0 Identify emerging technologies in the horticulture industry--The student will be able to:		SC.912.L.16.1, 2, 7, 9, 10 SC.912.L.17.15, 17	
35.01 Investigate DNA and genetics applications in horticulture including the theory of probability.			PS.03.01.05
35.02 Evaluate advances in biotechnology that impact horticulture. (E.g. transgenic crops, biological controls, micro propagation etc.).			PS.03.01.04.a PS.03.01.05.b
36.0 Demonstrate leadership, employability, communications and human relations skills--The student will be able to:		SC.912.N.1.7	
36.01 Identify acceptable work habits and personal characteristics.			
36.02 Identify acceptable employee hygiene habits.			
36.03 Identify or demonstrate appropriate responses to criticism from employer,			
36.04 Describe the importance of industry certifications.			

**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.

Florida Standards		Correlation to CTE Program Standard #
24.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Sports and Recreational Turf Operations	
24.01 Key Ideas and Details		
24.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
24.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
24.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
24.02 Craft and Structure		
24.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
24.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
24.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
24.03 Integration of Knowledge and Ideas		
24.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
24.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
24.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
24.04 Range of Reading and Level of Text Complexity		
24.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.04.2		
25.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Sports and Recreational Turf Operations		
25.01 Text Types and Purposes		
25.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
25.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
25.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	

Florida Standards		Correlation to CTE Program Standard #
25.02	Production and Distribution of Writing	
25.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
25.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
25.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
25.03	Research to Build and Present Knowledge	
25.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
25.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
25.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
25.04	Range of Writing	
25.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
26.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Sports and Recreational Turf Operations.	
26.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
26.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
26.03 Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
26.04 Model with mathematics.	MAFS.K12.MP.4.1
26.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
26.06 Attend to precision.	MAFS.K12.MP.6.1
26.07 Look for and make use of structure.	MAFS.K12.MP.7.1
26.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
37.0 Maintain tools and equipment--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4 SC.912.P.12.3, 5	
37.01 Maintain oil level in engines of power equipment.			
37.02 Check and maintain tire air pressure on equipment.			
37.03 Maintain fuel levels using proper fuel or fuel mixtures.			
37.04 Demonstrate proper equipment operations.			
37.05 Identify, operate, and maintain tractor and power equipment.			
38.0 Demonstrate application of chemicals and calibrate spray equipment--The student will be able to:		SC.912.L.16.6 SC.912.L.17.15, 16, 17 SC.912.N.1.1 SC.912.N.2.4	
38.01 Select, mix, and apply a non-restricted chemical according to the label and local, state, federal, and EPA regulations.			
38.02 Identify and report insect and disease damage on plants and turf.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
38.03 Diagnose a plant or disease problem on turf.			
39.0 Classify plants and turfgrass--The student will be able to:		SC.912.L.14.5, 7, 10, 53 SC.912.L.15.4, 6 SC.912.L.17.7 SC.912.N.1.1 SC.912.N.2.4	
39.01 Classify plants and turfgrass as annuals, biennials, and perennials.			
39.02 Identify plants and turfgrass that are specific to a region.			
39.03 Identify common weeds on Florida turf grasses.			
40.0 Demonstrate fertilization skills--The students will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1 SC.912.N.2.4	
40.01 Develop a fertilization schedule.			
40.02 Interpret fertilizer charts and develop recommendations according to turf species.			
41.0 Irrigate plants and turf--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.15	
41.01 Identify various types of irrigation systems.			
41.02 Install and maintain piping and water distribution components.			
41.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.			

**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.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.0 Perform service on tools and equipment--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.3 SC.912.P.12.3, 4, 5	
42.01 Service and maintain battery and electrical systems.			
42.02 Perform minor tune-up on engines.			
42.03 Load, 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:		SC.912.L.17.15 SC.912.N.1.1 SC.912.N.2.4	
43.01 Calibrate spray and spread equipment.			
43.02 Determine chemical compatibility.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
43.03 Determine appropriate time frequency and method of chemical application.			
43.04 Apply Best Management Practices for fertilizer recommendations for plants and			
44.0 Perform classification of plants and turfgrass--The student will be able to:		SC.912.L.14.5, 7, 10, 53 SC.912.L.15.4, 6 SC.912.L.17.7 SC.912.N.1.1 SC.912.N.2.4	
44.01 Classify plants and turfgrass according to growth habit.			
44.02 Identify hazardous plants.			
45.0 Use fertilization skills--The students will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1	
45.01 Determine rate of fertilizer application and calibration equipment.			
45.02 Calibrate fertilizer equipment.			
46.0 Perform irrigation of plants and 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 and turf grasses.			

**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 maintenance of greens and tees; maintenance of fairways, roughs and traps; fertilization of turf and establishing turfgrass.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
47.0 Maintaining athletic fields—The student will be able to:		SC.912.N.1.1; SC.912.N.2.4, 5	
47.01 Apply proper line marks for athletic field.			
47.02 Painting fields (school logos or names)			
47.03 Apply proper techniques for clay maintenance.			
47.04 Mow grass to appropriate height for field use.			
48.0 Develop recreational areas--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4, 5	
48.01 Establish plant beds with annuals, biennials, and perennials.			
48.02 Plant accent trees and shrubs in a recreational area.			
48.03 Establish sports turf.			
49.0 Maintain sports turf--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4, 5	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
49.01 Mow sport turf with reel mowers.			
49.02 Relocate cups and markers.			
49.03 Irrigate turf.			
49.04 Verticut turf.			
49.05 Aerate turf and remove debris.			
49.06 Repair ball marks on greens.			
50.0 Maintain fairways, roughs, and traps--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4, 5	
50.01 Irrigate fairways.			
50.02 Repair divots.			
50.03 Add sand to traps.			
50.04 Rake and trim sand traps.			
50.05 Edge sand traps.			
51.0 Fertilize turf--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4, 5	
51.01 Apply top dressing.			
51.02 Overseed turf.			
51.03 Apply fertilizer.			
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.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Horticulture Science and Services
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8121600
CIP Number	0101060610
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-1013 – Soil and Plant Scientist 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, an Groundskeeping Workers
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

This program is a planned sequence of instruction consisting of a core and two completion points.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	37-1012	3
	8121510	Introductory Horticulture 2	1 credit		3
	8121520	Horticulture Science 3	1 credit		3
B	8121610	Horticulture Science and Services 4	1 credit	19-1013	2
	8121620	Horticulture Science and Services 5	1 credit		2
	8121630	Horticulture Science and Services 6	1 credit		2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^^	^^	^^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Introductory Horticulture 2	^^	^^	^^	4/53 8%	2/52 4%	18/56 32%	4/55 7%	4/58 7%	4/35 11%	5/42 12%	4/56 7%	4/53 8%

Horticulture Science 3	^^	^^	^^	8/53 15%	4/52 8%	18/56 32%	8/55 15%	5/58 9%	5/35 14%	9/42 21%	8/56 14%	5/53 9%
Horticulture Science and Services 4	^^	^^	^^	2/53 4%	#	10/56 18%	1/55 2%	#	6/35 17%	2/42 5%	1/56 2%	#
Horticulture Science and Services 5	^^	^^	^^	2/53 4%	4/52 8%	14/56 25%	7/55 13%	4/58 7%	7/35 20%	7/42 17%	7/56 13%	5/53 9%
Horticulture Science and Services 6	^^	^^	^^	1/53 2%	4/52 8%	5/56 9%	7/55 13%	4/58 7%	2/35 6%	6/42 14%	7/56 13%	5/53 9%

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Horticulture Science and Services.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Horticulture Science and Services.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Describe the horticulture industry.
- 14.0 Identify safety procedures in the workplace.
- 15.0 Identify and classify plants.
- 16.0 Demonstrate plant propagation techniques.
- 17.0 Identify growing media and fertilizers.
- 18.0 Explain irrigation techniques for plants and turf.
- 19.0 Describe Integrated Pest Management approaches.
- 20.0 Describe the principles and requirements of plant growth.
- 21.0 Apply best management practices in the horticulture industry.
- 22.0 Identify principles of landscape design.
- 23.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Horticulture Science and Services.
- 24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Horticulture Science and Services.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services.
- 26.0 Apply safety procedures in the workplace.
- 27.0 Classify plants based on scientific principles.
- 28.0 Demonstrate proper use of growing media and fertilizers
- 29.0 Demonstrate Integrated Pest Management approaches.
- 30.0 Identify the principles and requirements of plant growth.
- 31.0 Apply best management practices in landscape design.

- 32.0 Apply principles of landscape design and maintenance.
- 33.0 Harvest, transport, and install plant materials.
- 34.0 Identify procedures to operate, repair, and maintain tools and equipment.
- 35.0 Identify emerging technologies in the horticulture industry.
- 36.0 Demonstrate leadership, employability, communications and human relations skills.
- 37.0 Propagate plants.
- 38.0 Operate, repair, and maintain tools and equipment.
- 39.0 Identify emerging technologies in the horticulture industry.
- 40.0 Identify and classify plants.
- 41.0 Prepare growing media.
- 42.0 Irrigate plants.
- 43.0 Classify plants.
- 44.0 Irrigate plants using an irrigation system.
- 45.0 Maintain and analyze records
- 46.0 Apply proper fertilizer application components.
- 47.0 Fertilize plant material.
- 48.0 Control Pests.

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Horticulture Science and Services.	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Horticulture Science and Services.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards		Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c PST.01.03.01.a
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Horticulture Science and Services	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Horticulture Science and Services	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 Describe the horticulture industry--The student will be able to:			
13.01 Describe the importance of horticulture to the American and global economies.			
13.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.			
13.03 Describe the importance of horticulture to the environment, including sustainability practices			
14.0 Identify safety procedures in the workplace--The student will be able to:		SC.912.L.17.14, 17	
14.01 Identify the common causes of accidents in the horticulture industry.			
14.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.			
14.03 Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OHSA) Regulations.			
15.0 <u>Identify and classify plants</u> --The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.2, 3, 7, 8,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9	
12.01 Identify plants by scientific and common names.			PS.01.01.02.b PS.01.01.02.c
12.02 Classify plants botanically.			PS.01.01.01.c
12.03 Write scientific names for plants.			
16.0 Demonstrate plant propagation techniques --The student will be able to:		SC.912.L.14.7, 8 SC.912.L.16.3, 12, 14, 16	
16.01 Identify propagating and growing facilities and structures.			
16.02 Prepare propagation media.			PS.02.02.01.c
16.03 Select and collect propagation materials.			
16.04 Demonstrate propagation by sexual and asexual methods.			PS.03.01.02.a PS.03.01.03.a
16.05 Demonstrate environmental controls for propagation materials.			
16.06 Identify and select proper rooting hormones based on plant characteristics.			
17.0 Identify growing media and fertilizers--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.1, 11	
17.01 Identify soil and media materials.			PS.02.02.01.b
17.02 Identify nutritional needs of plants.			PS.02.03.01.a
17.03 Identify symptoms of nutritional deficiencies and toxicities of plants.			PS.02.03.01.b
17.04 Identify types and kinds of fertilizers.			
17.05 Identify methods of distributing fertilizers.			PS.02.03.04.a
17.06 Interpret information on a label of fertilizer used in Florida.			
18.0 Explain irrigation techniques for plants and turf--The student will be able		SC.912.L.18.12	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
to:		SC.912.E.7.1	
18.01 Identify water needs of plants.			
18.02 Irrigate plants at recommended rates.			
18.03 Identify the symptoms of excessive water and water stress in plants.			
18.04 Describe the basic irrigation systems and principles used in the landscape and nursery.			
19.0 Describe Integrated Pest Management approaches--The student will be able to:		SC.912.L.14.9	
19.01 Identify common pests of plants.			PS.03.03.01.a
19.02 Describe life cycles of common pests of plants.			PS.03.03.02.c PS.03.03.02.b
19.03 Recognize signs of damage from pests.			PS.03.03.02.a
20.0 Describe the principles and requirements of plant growth--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.7.1 SC.912.L.18.7, 9, 10 SC.912.P.10.1	
20.01 Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis.			PS.01.03.01.b
20.02 Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature.			PS.01.03.01.c
20.03 Explain the process of respiration and the flow of energy in plants.			PS.01.03.02.b PS.01.03.02.c
20.04 Describe the influence of light and temperature on plant growth including photo tropism.			PS.01.03.04.b
21.0 Apply best management practices in the horticulture industry--The student will be able to:		SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4	
21.01 Identify and apply Best Management Practices to reduce pollution and conserve water.			
21.02 Identify and apply Best Management Practices on fertilizer recommendations for Florida plants and turf.			
22.0 Identify principles of landscape design --The student will be able to:		SC.912.L.17.17	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.01 Compare and contrast the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
22.02 Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.01.a
22.03 Identify points of emphasis and major design areas in the residential landscape.			PS.04.01.01.c
22.04 Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.			
22.05 Read and interpret a landscape plan.			
22.06 Develop skills for drawing and identifying symbols.			
22.07 Draw and design a landscape plan for a small garden.			
22.08 Construct a landscape display.			

**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.

Florida Standards		Correlation to CTE Program Standard #
23.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Horticulture Science and Services	
	23.01 Key Ideas and Details	
23.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
23.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
23.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	23.02 Craft and Structure	
23.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
23.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
23.02.3	Analyze the author's purpose in providing an explanation, describing a	

Florida Standards	Correlation to CTE Program Standard #
<p>procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p> <p style="text-align: right;">LAFS.1112.RST.2.6</p>	
<p>23.03 Integration of Knowledge and Ideas</p>	
<p>23.03.1 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.</p> <p style="text-align: right;">LAFS.1112.RST.3.7</p>	
<p>23.03.2 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p style="text-align: right;">LAFS.1112.RST.3.8</p>	
<p>23.03.3 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p style="text-align: right;">LAFS.1112.RST.3.9</p>	
<p>23.04 Range of Reading and Level of Text Complexity</p>	
<p>23.04.1 By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> <p>23.04.2 By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.</p> <p style="text-align: right;">LAFS.1112.RST.4.10</p>	
<p>24.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Horticulture Science and Services</p>	
<p>24.01 Text Types and Purposes</p>	
<p>24.01.1 Write arguments focused on discipline-specific content.</p> <p style="text-align: right;">LAFS.1112.WHST.1.1</p>	
<p>24.01.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.</p> <p style="text-align: right;">LAFS.1112.WHST.1.2</p>	
<p>24.01.3 Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.</p> <p style="text-align: right;">LAFS.1112.WHST.1.3</p>	
<p>24.02 Production and Distribution of Writing</p>	
<p>24.02.1 Produce clear and coherent writing in which the development,</p>	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4</p>	
<p>24.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5</p>	
<p>24.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6</p>	
24.03 Research to Build and Present Knowledge	
<p>24.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7</p>	
<p>24.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8</p>	
<p>24.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9</p>	
24.04 Range of Writing	
<p>24.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10</p>	
25.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services	
<p>25.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>25.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>25.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
25.04 Model with mathematics.	MAFS.K12.MP.4.1	
25.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
25.06 Attend to precision.	MAFS.K12.MP.6.1	
25.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
25.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.0 Apply safety procedures in the workplace--The student will be able to:			
26.01 Describe emergency procedures in the horticulture workplace.			
26.02 Create preventive measures to avoid hazardous situations.			
26.03 Apply problem solving skills to correct a hazardous situation.			
27.0 Classify plants based on scientific principles--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.2, 3, 7, 8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9	
27.01 Describe principles of plant biology and growth.			PS.01.03.03.c
27.02 Explain the role of plants in the ecosystem.			
27.03 Describe the major classifications of plants based on life cycle.			PS.01.01.01.c
27.04 Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.			
27.05 Demonstrate proper use of scientific names.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
28.0 Demonstrate proper use of growing media and fertilizers--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.5, 7, 11	
28.01 Apply information on a label of fertilizer used in Florida.			
28.02 Apply fertilizer and soil amendments.			Ps.02.03.04.b PS.02.03.04.c
28.03 Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.			PS.02.03.02.a PS.02.03.02.c
28.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.			
28.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.			PS.02.03.01.a
28.06 Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.			
29.0 Demonstrate Integrated Pest Management approaches--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.9 SC.912.L.17.6, 7, 12, 13, 15	
29.01 Classify insects according to feeding habits.			
29.02 Describe biological, chemical, and cultural methods of controlling plant pests.			PS.03.03.03.a
29.03 Diagnose and outline a plan for controlling pests on a horticultural crop.			PS.03.03.02.c
29.04 Describe methods of controlling nematode pests on ornamental plants.			
29.05 Develop a pest control program for a horticultural crop using Integrated Pest Management.			
30.0 Identify the principles and requirements of plant growth--The student will be able to:		SC.912.L.14.7, 15, 17, 31 SC.912.N.1.1, 7 SC.912.P.8.8, 9, 10	
30.01 Demonstrate methods of pruning plants.			
30.02 Identify appropriate time to prune plants.			
30.03 Identify and select pruning tools.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.04 Demonstrate proper use of pruning tools and care.			
30.05 Identify Plant Growth Regulators and their use on horticulture and landscape plants.			PS.01.03.04.a
30.06 Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.			
30.07 Identify specific cultural, mechanical, chemical, and biological methods of weed management.			
31.0 Apply best management practices in landscape design--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4	
31.01 Identify and apply Best Management Practices for the design and installation of landscapes.			
31.02 Identify and apply Best Management Practices on the management and handling of pesticides.			PS.03.03.04.b
32.0 Apply principles of landscape design and maintenance--The student will be able to:		SC.912.L.17.17	
32.01 Demonstrate the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
32.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.02.b
32.03 Apply points of emphasis and major design areas in the commercial landscape.			
32.04 Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.			
32.05 Create a landscape plan for a residential or commercial property.			PS.04.01.02.c
32.06 Calculate materials needed according to the identified landscape plan.			PS.04.01.01.c
32.07 Identify factors in selecting turf for landscape installation.			
33.0 Harvest, transport, and install plant materials--The student will be able to:		SC.912.L.17.4, 15, 17	
33.01 Determine requirements for preserving plant viability.			
33.02 Demonstrate proper landscape plant establishment techniques.			
33.03 Select and prepare plants for transporting and transplanting.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.04 Select horticultural products according to Florida grades and standards.			PS.03.05.04.b
34.0 Identify procedures to operate, repair, and maintain tools and equipment--The student will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1	
34.01 Perform equipment pre-operational check.			
34.02 Identify, maintain, and operate hand tools and power tools.			PS.03.05.01.c
35.0 Identify emerging technologies in the horticulture industry--The student will be able to:		SC.912.L.16.1, 2, 7, 9, 10 SC.912.L.17.15, 17	
35.01 Investigate DNA and genetics applications in horticulture including the theory of probability.			PS.03.01.05
35.02 Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).			PS.03.01.04.a PS.03.01.05.b
36.0 Demonstrate leadership, employability, communications and human relations skills--The student will be able to:		SC.912.N.1.7	
36.01 Identify acceptable work habits and personal characteristics.			
36.02 Identify acceptable employee hygiene habits.			
36.03 Identify or demonstrate appropriate responses to criticism from employer,			
36.04 Describe the importance of industry certifications.			

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science and Services 4
Course Number: 8121610
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.

Florida Standards		Correlation to CTE Program Standard #
24.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Horticulture Science and Services	
	24.01 Key Ideas and Details	
	24.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	24.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	24.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	24.02 Craft and Structure	
	24.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	24.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
24.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
24.03 Integration of Knowledge and Ideas		
24.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
24.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
24.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
24.04 Range of Reading and Level of Text Complexity		
24.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
24.04.2		
25.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Horticulture Science and Services		
25.01 Text Types and Purposes		
25.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
25.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
25.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	

Florida Standards		Correlation to CTE Program Standard #
25.02	Production and Distribution of Writing	
25.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
25.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
25.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
25.03	Research to Build and Present Knowledge	
25.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
25.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
25.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
25.04	Range of Writing	
25.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
26.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services.	
26.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
26.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
26.03 Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
26.04 Model with mathematics.	MAFS.K12.MP.4.1
26.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
26.06 Attend to precision.	MAFS.K12.MP.6.1
26.07 Look for and make use of structure.	MAFS.K12.MP.7.1
26.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
37.0 Propagate plants---The student will be able to:	MAFS.912.S-IC.2	SC.912.L.14.7, 10, 31, 53 SC.912.L.15.4, 5, 6 SC.912.L.16.1, 2, 3, 14, 16, 17 SC.912.L.17.7	
37.01 Prepare propagation materials (seeds, cuttings, etc.) for planting.			PS.03.01.03.a
37.02 Demonstrate sanitation and safety practices when propagating.			
38.0 Operate, repair, and maintain tools and equipment--The student will be able to:		SC.912.N.1.1	
38.01 Identify, operate, and maintain tractor and power equipment.			
39.0 Prepare growing media--The student will be able to:		SC.912.P.8.9, 11 SC.912.L.14.6 SC.912.L.18.11	PS.02.02.01.c
39.01 Sterilize rooting, potting, and growing media.			
39.02 Adjust pH and nutritional levels of media.			PS.02.03.02.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
39.03 Fill and level benches and pots with media.			
39.04 Demonstrate sanitation practices when handling and storing plant media materials.			
40.0 Irrigate plants--The student will be able to:		SC.912.E.7.1 SC.912.N.1.1	
40.01 Design an irrigation system for a propagation area.			
40.02 Design an irrigation system for a growing structure.			
40.03 Design an irrigation system for a retail display.			
40.04 Explain and apply Best Management Practices as they apply to irrigation.			
41.0 Maintain and analyze records--The student will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1	
41.01 Create a plant and inventory supply list.			
41.02 Maintain current plant and supply inventory.			
41.03 Maintain job records, daily log sheets, and inventory.			
41.04 Calculate labor costs involved with product pricing.			
42.0 Apply proper fertilizer application components.—The student will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1, 7 SC.912.N.2.4 SC.912.P.8.11 SC.912.P.12.12	
42.01 Determine proper application based on characteristics of plant species.			PS.02.03.04.a
42.02 Examine how fertilizer application affects the ecosystem.			

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science and Services 5
Course Number: 8121620
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.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
43.0 Classify plants--The student will be able to:		SC.912.L.14.7, 10, 31, 53 SC.912.L.15.4, 5, 6 SC.912.L.16.1, 2, 3, 14, 16, 17 SC.912.L.17.7 SC.912.N.1.1 SC.912.N.2.4 SC.912.P.12.12	
43.01 Identify plants appropriate to a region.			
43.02 Classify plants according to growth habit.			
43.03 Supply growth stimulants to propagation materials			
43.04 Prepare flats and seedbeds and plant seeds.			
44.0 Irrigate plants using an irrigation system.--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4	
44.01 Identify and use various types of irrigation systems (low volume, ebb and flow, drip, mat, re-circulating, etc.).			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
45.0 Maintain and analyze records--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4	
45.01 Prepare and maintain financial records using computer software.			
46.0 Fertilize plant materials--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.16 SC.912.N.1.1, 6 SC.912.N.2.4 SC.912.P.8.11 SC.912.P.12.12	
46.01 Collect soil and leaf tissue samples for analysis.			PS.02.03.03.a
46.02 Demonstrate proper handling and storage of fertilizers, observing safety precautions.			
46.03 Evaluate, operate, and maintain fertilizer distribution equipment.			
46.04 Create fertilizer schedule and/ or record of applications.			PS.02.03.03.c
47.0 Control pests--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.13, 15, 16, 17 SC.912.N.1.1, 3, 4 SC.912.N.2.4	
43.01 Report insect and disease damage.			PS.03.03.02.a
43.02 Identify chemical spray damage.			PS.03.03.04.a

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science and Services 6
Course Number: 8121630
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.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
48.0 Operate, repair, and maintain tools and equipment--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.3 SC.912.P.12.3, 4, 5	
48.01 Load, secure, and transport equipment.			
49.0 Irrigate plants--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4	
49.01 Maintain and repair an irrigation system.			
49.02 Assemble a drip/mist irrigation system for an ornamental crop.			
50.0 Maintain and analyze records--The student will be able to:		SC.912.N.1.1 SC.912.N.2.4	
50.01 Analyze and maintain production and sales records.			
50.02 Determine plant production costs.			
50.03 Prepare a budget.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
51.0 Fertilize plant materials--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.16 SC.912.N.1.1, 6 SC.912.N.2.4 SC.912.P.8.11 SC.912.P.12.12	
51.01 Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.			
51.02 Develop a fertilization schedule for various plant species.			
51.03 Calculate rates of fertilizer application for turf, ornamental plants, and palms.			
52.0 Control pests--The student will be able to:	MAFS.912.S-IC.2	SC.912.L.17.13, 15, 16, 17 SC.912.N.1.1, 3, 4 SC.912.N.2.4	
52.01 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.			
52.02 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Program Title: Food Science Applications
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8129200
CIP Number	0102030100
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICUTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-1012 - Food Scientists and Technologists 35 -1012- First-Line Supervisors of Food Preparation and Serving Workers
Facility Code	204 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 instruction in the application of biological, chemical, and physical principles of converting raw agricultural products into processed forms for human consumption and the storage of these products, human physiology and nutrition, food chemistry, agricultural products processing, food additives, food preparation and packaging,

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 consisting of one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	35 -1012	3
	8129210	Food Science Applications 2	1 credit		2
	8129220	Food Science Applications 3	1 credit	19-1012	2

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	^	^	^	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Food Science Applications 2	^	^	^	**	**	**	**	**	**	**	**	**
Food Science Applications 3	^	^	^	**	**	**	**	**	**	**	**	**

^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Food Science Applications.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Food Science Applications.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Food Science Applications.
- 04.0 Describe the history of agriculture and its influence on the global economy.
- 05.0 Practice agriscience safety skills and procedures.
- 06.0 Apply scientific and technological principles to agriscience issues.
- 07.0 Apply environmental principles to the agricultural industry.
- 08.0 Investigate and utilize basic scientific skills and principles in plant science.
- 09.0 Investigate and utilize basic scientific skills and principles in animal science.
- 10.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 11.0 Demonstrate agribusiness, employability and human relation skills.
- 12.0 Apply leadership and citizenship skills.
- 13.0 Evaluate the significance and implications of changes and trends in the food products and processing industry
- 14.0 Analyze the dangers of food hazards
- 15.0 Apply safety and sanitation procedures in the handling, processing and storing of food products.
- 16.0 Discuss the role of regulatory agencies in the food industry.
- 17.0 Manage operational procedures and create equipment and facility maintenance plans.
- 18.0 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.
- 19.0 Demonstrate worker safety procedures with food product and processing equipment and facilities.
- 20.0 Describe the biological composition and processing of foods.
- 21.0 Summarize the procedures for food service operations
- 22.0 Explain the daily operations of a food service facility
- 23.0 Demonstrate leadership, employability, communications and human relations skills.
- 24.0 Write lab reports to record, interpret and evaluate data
- 25.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy
- 26.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 27.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Food Science Applications.
- 28.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Food Science Applications.
- 29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Food Science Applications.
- 30.0 Utilize harvesting, selection and inspection techniques to obtain quality food products for processing

- 31.0 Describe how proteins, carbohydrates, lipids, vitamins and minerals are digested and how food preparation impacts nutritional value and quality.
- 32.0 Describe the chemical composition and processing of foods.
- 33.0 Describe the physical composition and processing of foods.
- 34.0 Evaluate, grade and classify processed food products.
- 35.0 Identify the importance of raw agricultural products to the food science industry.
- 36.0 Apply principles of science to food processing to provide a safe, wholesome and nutritious food supply
- 37.0 Process, preserve, package and present food and food products for sale and distribution
- 38.0 Explain the process of food product development
- 39.0 Analyze the components of the marketing chain.
- 40.0 Explain the process of food product development.
- 41.0 Discuss food production distribution
- 42.0 Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry
- 43.0 Describe the economic and cultural impact of a global food market
- 44.0 Discuss environmental issues impacting the production and processing of foods
- 45.0 Write lab reports to record, interpret and evaluate data
- 46.0 Explain the components of the American business system.
- 47.0 Investigate agricultural cooperatives structure and function.
- 48.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance

**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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Food Science Applications.	
	01.01 Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Food Science Applications.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge	
02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing	
02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Food Science Applications.	
03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to:		SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2;	
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.			CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.			
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.			
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.			
05.0 Practice agriscience safety skills and procedures--The student will be able to:	MAFS.912.S-IC.2;	SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.01 Identify the common causes and prevention of accidents in agriscience operations.			
05.02 Demonstrate proper safety precautions and use of personal protective equipment.			CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.			FPP.01.02.01.a FPP.02.01.01.a FPP.02.02.02.a FPP.02.03
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations.			CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.			ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.			CS.07.03.01.c
06.0 Apply scientific and technological principles to agriscience issues--The student will be able to:		SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1;	
06.01 Employ scientific measurement skills.			BS.02.02.01 CS.10.01.01.a
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 ESS.01.01.02.b
06.03 Identify the parts and functions of plant and animal cells.			PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.			PS.01.02.01.b. AS.02.02.03.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research			CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
project.			
06.06 Interpret, analyze, and report data.			
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.			BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).			BS.01.01.03.a.
07.0 Apply environmental principles to the agricultural industry--The student will be able to:		SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12	
07.01 Research how different climactic and geological activity influences agriculture.			NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.			NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.			PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.			
07.05 Apply Best Management Practices that enhance the natural environment.			PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.			PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:	MAFS.912.S-IC.2	SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7;	
08.01 Identify and describe the specializations within the plant science industry.			
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.			PS.01.01.01.c.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
08.03 Examine the processes of plant growth including photosynthesis and respiration.			PS.01.03.01 PS.01.03.02
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.			PS.02.03.01
08.05 Analyze information from a fertilizer label.			PS.02.03.04
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.03.01.03 PS.03.01.02
08.07 Investigate the impacts of various pests and propose solutions for their control.			PS.03.03.02 PS.03.03.03 PS.03.03.04
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.			FPP01.01.01.a
08.09 Explore career opportunities in plant science.			
09.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:		SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19;	
09.01 Explain the economic importance of animals and the products obtained from animals.			AS.02.01.02.c
09.02 Categorize animals according to use, type, breed, and scientific classification.			AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.			AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.			AS.02.02.01.c AS.02.02.05.a AS.02.02.05.b AS.02.02.06.b AS.02.03.01.b.
09.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.			AS.02.03.01.a AS.03.01.03.a AS.03.01.03.c. As.03.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			AS.06.01.01.b
09.06 Compare and contrast animal welfare issues.			AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
09.07 Investigate the nature and properties of food, fiber, and by-products from animals.			AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.			AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to	MAFS.912.S-IC.2	SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools			CS.08.01.01.b PST.02.02.02.b.
10.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers			PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).			
11.02 Utilize a record keeping system to collect, interpret, and analyze data.			CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.			CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.			CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.			CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.			CS.01.02.02
12.0 Apply leadership and citizenship skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.01 Identify and describe leadership characteristics.			CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.			CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.			CS.01.05.02.c.
12.04 Participate in community based learning activities.			CS.01.05.01.c.
12.05 Demonstrate the ability to work cooperatively.			CS.01.02.02.b.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.			
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.			

**Florida Department of Education
Student Performance Standards**

Course Title: Food Science Applications 2
Course Number: 8129210
Course Credit: 1

Course Description:

This course is designed to develop competencies in the concepts related to: the use of taste and other sensory tests in developing foods; the application of scientific principles in food processing; food marketing; nutritional and economic value of plant-based food products; safe and efficient distribution and handling of food products; environmental factors in food production and processing; the global and historical impact of food on people; and employability skills necessary in the food industry.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Food Science Applications	
01.01	Key Ideas and Details	
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure	
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	
	LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	
	LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	
	LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	
	LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.	
	LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Food Science Applications	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content.	
	LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	
	LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	
	LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	

Florida Standards		Correlation to CTE Program Standard #
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Food Science Applications		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.3.1
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.0 <i>Evaluate the significance and implications of changes and trends in the food products and processing industry.—The student will be able to:</i>			
13.01 <i>Discuss the history and describe and explain the components. (e.g., processing, distribution, byproducts) of the food products and processing industry.)</i>			FPP.01.01.01.a
13.02 <i>Evaluate changes and trends in the food products and processing industry.</i>			FPP.01.01.01.b
13.03 <i>Predict trends and implications in the food products and processing industry.</i>			FPP.01.01.01.c
13.04 <i>Identify and explain environmental and safety concerns about the food supply.</i>			FPP.01.01.02.a
13.05 <i>Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).</i>			FPP.01.01.02.b
13.06 <i>Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.</i>			FPP.01.01.02.c
14.0 <i>Analyze the dangers of food hazards.-- The student will be able to:</i>			
14.01 <i>Explain types of biological hazards.</i>			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.02 Explain types of chemical hazards.			
14.03 Explain types of physical hazards.			
14.04 Identify the roles food allergens play in food safety.			
15.0 Apply safety and sanitation procedures in the handling, processing and storing of food products. – The student will be able to:			
15.01 Explain techniques and procedures for the safe handling of food products.			FPP.02.03.01.a
15.02 Evaluate food product handling procedures.			FPP.02.03.01.b
15.03 Demonstrate approved food product handling techniques.			FPP.02.03.01.c
15.04 Describe the importance of performing quality-assurance tests on food products.			FPP.02.03.02.a
15.05 Perform quality-assurance tests on food products.			FPP.02.03.02.b
15.06 Interpret quality-assurance test results and apply corrective procedures.			FPP.02.03.02.c
15.07 Describe the effects food-borne pathogens have on food products and humans.			FPP.02.03.03.a
15.08 Explain the importance of microbiological tests in food product preparation, listing common spoilage and pathogenic microorganisms.			FPP.02.03.03.b
15.09 Conduct and interpret microbiological tests for food-borne pathogens and implement corrective procedures.*			FPP.02.03.03.c
15.10 Explain the importance of record keeping in a food products and processing system.			FPP.02.03.04.a
15.11 Discuss documentation procedures in food products and processing system.			FPP.02.03.04.b
15.12 Demonstrate proper record keeping in a food products and processing system.			FPP.02.03.04.c
16.0 Discuss the role of regulatory agencies in the food industry--The student will be able to:			
16.01 Describe the basic requirements of Hazard Analysis and Critical Control Points (HAACP) in food processing.			
16.02 Identify food safety regulatory agencies.			
16.03 Examine the chemical, physical and biological categories of food safety and sanitation.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.04 Discuss the role of sanitation during food processing.			
16.05 Describe regulations governing the food industry and how they are enforced.			
16.06 Describe the importance of self-regulation in controlling food quality and safety.			
17.0 <i>Manage operational procedures and create equipment and facility maintenance plans.—The student will be able to:</i>			
17.01 <i>Explain the importance of developing and maintaining Sanitation Standard Operating Procedures (SSOP).</i>			FPP.02.01.01.a
17.02 <i>Evaluate the SSOP of a food products and processing company.</i>			FPP.02.01.01.b
17.03 <i>Develop SSOP for food products and processing company.</i>			FPP.02.01.01.c
17.04 <i>Explain the purpose of Good Manufacturing Practices (GMP).</i>			FPP.02.01.02.a
17.05 <i>Evaluate the GMP of food products and processing company.</i>			FPP.02.01.02.b
17.06 <i>Implement GMP for food products and processing company.</i>			FPP.02.02.01.c
17.07 <i>Identify reasons for using a planned maintenance program to maintain equipment and facilities.</i>			FPP.02.01.03.a
17.08 <i>Develop a basic equipment and facility maintenance program.</i>			FPP.02.01.03.b
17.09 <i>Perform basic equipment and facility maintenance in food products and processing operation.</i>			FPP.02.01.03.c
18.0 <i>Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.</i>			
18.01 <i>Describe contamination hazards (physical, chemical and biological) associated with food products and processing.</i>			FPP.02.02.01.a
18.02 <i>Outline procedures to eliminate possible contamination hazards associated with food products and processing.</i>			FPP.02.02.01.b
18.03 <i>Analyze the effectiveness of food products and processing company's Critical Control Point (CCP) procedures.</i>			FPP02.02.01.c
18.04 <i>Identify the seven principles of HACCP.</i>			FPP.02.02.02.a
18.05 <i>Explain the implementation of the seven principles of HACCP.</i>			FPP.02.02.02.b
18.06 <i>Implement an HACCP program for a food products and processing facility.</i>			FPP.02.02.02.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.0 <i>Demonstrate worker safety procedures with food product and processing equipment and facilities. – The student will be able to:</i>			
19.01 <i>Explain safety standards that must be observed in facility design and equipment use.*</i>			FPP.02.04.01.a
19.02 <i>Outline guidelines for personnel safety in the food products and processing industry.*</i>			FPP.02.04.01.b
19.03 <i>Evaluate a facility to determine the implementation of safety procedures.*</i>			FPP.02.04.01.c
20.0 Describe the biological composition and processing of foods--The student will be able to:			
20.01 Explain microbiology and its application to food processing.			
20.02 Describe the effects of microbes on food spoilage.			
20.03 Analyze the relationship between time and temperature control. (See current Food Code for recommended temperatures)			
20.04 Recognize characteristics of spoiled food. .			
20.05 Apply the principles of managing Food, Acid, Time, Temperature, Oxygen, and Moisture (FATTOM) in controlling food spoilage.			
20.06 Test the effects of yeasts, bacteria, molds and enzymes in food processing.			
21.0 <i>Summarize the procedures for food service operations.—The student will be able to:</i>			
21.01 <i>Develop criteria for purchasing considerations.</i>			
21.02 <i>Develop criteria for receiving considerations</i>			
21.03 <i>Facilitate proper use of current general inspection guidelines.</i>			
21.04 <i>Select proper criteria for inspecting specific types of food.</i>			
21.05 <i>Explain general storage guidelines.</i>			
21.06 <i>Compare storage guidelines for specific types of food.</i>			
21.07 <i>Demonstrate proper food preparation techniques.</i>			
21.08 <i>Explain proper procedures for cook food. (See current Food Code for temperature information)</i>			
21.09 <i>Recommend proper cooling and reheating procedures for various</i>			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
<i>food items. (See current Food Code for temperatures)</i>			
21.10 <i>Explain procedures for holding food for service.</i>			
21.11 <i>Demonstrate proper techniques in serving food.</i>			
21.12 <i>Develop a plan for offsite service handling of food.</i>			
22.0 <i>Explain the daily operations of a food service facility.—The student will be able to:</i>			
22.01 <i>Discuss proper use of food safety management systems.</i>			
22.02 <i>Determine procedures for active managerial control.</i>			
22.03 <i>Develop a plan for crisis management.</i>			
22.04 <i>Design a plan for operating safely.</i>			
22.05 <i>Explain considerations for other areas of the facility.</i>			
22.06 <i>Develop criteria for equipment selection.</i>			
22.07 <i>Describe procedures for installing and maintaining kitchen equipment.</i>			
22.08 <i>Describe the operations utilities structure.</i>			
22.09 <i>Demonstrate proper procedures for cleaning.</i>			
22.10 <i>Demonstrate proper procedures for sanitizing.</i>			
22.11 <i>Demonstrate proper procedures for dish washing.</i>			
22.12 <i>Demonstrate proper procedures for cleaning the premises.</i>			
22.13 <i>Develop a cleaning program.</i>			
22.14 <i>Explain the importance of (IPM) Integrated Pest Management programs.</i>			
22.15 <i>Identify pests.</i>			
22.16 <i>Explain the importance of working with a pest control operator.</i>			
22.17 <i>Describe pest treatments.</i>			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
22.18 <i>Explain procedures for using and storing pesticides in the facility.</i>			
23.0 Demonstrate leadership, employability, communications and human relations skills--The student will be able to:			
23.01 Investigate career opportunities in the food industry and identify educational experiences necessary to prepare for those careers.			
23.02 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.			
23.03 Describe methods of training staff.			
24.0 Write lab reports to record, interpret and evaluate data--The student will be able to:			
24.01 Explain the importance of scientific exploration of food.			
24.02 Identify and use the basic units of the metric system of measurement.			
24.03 Demonstrate effective manipulation of scientific materials and equipment in the food science laboratory.			
24.04 Practice the expected safety procedures and care while working in the food science laboratory.			
25.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to:			
25.01 Assess the agricultural impact upon the US gross national product and the total global economy.			
25.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.			
25.03 Identify and describe the primary government agencies involved with agriculture.			
25.04 Research new and emerging technologies and their impact on the economy.			
25.05 Recognize the value of the food and agribusiness industry.			
26.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy. -- The student will be able to:			
26.01 Define and explore agriculture and agribusinesses and their role in the economy.			
26.02 Evaluate and explore the agribusiness career opportunities in agriculture.			
26.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
services.			
26.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.			

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Course Title: Food Science Applications 3
Course Number: 8129220
Course Credit: 1

Course Description:

This course is designed to develop competencies the food industry. The course addresses concepts related to: developing new food products; scientific experimentation with the chemical and biological components of foods; the impact of microbes in food production; the nutritional and economic value of animal-based food products; food spoilage and waste management; safety and security risks in the food supply; the international trade of foods; and employability skills necessary in the food industry.

Florida Standards		Correlation to CTE Program Standard #
27.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Food Science Applications	
27.01	Key Ideas and Details	
27.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
27.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
27.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
27.02	Craft and Structure	
27.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
27.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.RST.2.5	
27.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	
	LAFS.1112.RST.2.6	
27.03	Integration of Knowledge and Ideas	
27.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.	
	LAFS.1112.RST.3.7	
27.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	
	LAFS.1112.RST.3.8	
27.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	
	LAFS.1112.RST.3.9	
27.04	Range of Reading and Level of Text Complexity	
27.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
27.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.	
	LAFS.1112.RST.4.10	
28.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Food Science Applications	
28.01	Text Types and Purposes	
28.01.1	Write arguments focused on discipline-specific content.	
	LAFS.1112.WHST.1.1	
28.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	
	LAFS.1112.WHST.1.2	
28.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	
	LAFS.1112.WHST.1.3	

Florida Standards		Correlation to CTE Program Standard #
28.02	Production and Distribution of Writing	
28.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
28.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
28.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
28.03	Research to Build and Present Knowledge	
28.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
28.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
28.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
28.04	Range of Writing	
28.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
29.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Food Science Applications	
29.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
29.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards		Correlation to CTE Program Standard #
29.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
29.04	Model with mathematics.	MAFS.K12.MP.4.1
29.05	Use appropriate tools strategically.	MAFS.K12.MP.5.1
29.06	Attend to precision.	MAFS.K12.MP.6.1
29.07	Look for and make use of structure.	MAFS.K12.MP.7.1
29.08	Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
30.0	Utilize harvesting, selection and inspection techniques to obtain quality food products for processing.—The student will be able to:			
30.01	Identify quality and yield grades of food products.			FPP.04.01.01.a
30.02	Discuss factors that affect quality and yield grades of food products.			FPP.04.01.01.b
30.03	Assign quality and yield grades to food products according to industry standards.			FPP.04.01.01.c
30.04	Select raw food products based on yield grades, quality grades and related selection criteria.			FPP.04.01.02.a
30.05	Perform quality-control inspections of raw food products for processing.			FPP.04.01.02.b
30.06	Implement procedures to maintain original food quality and yield.			FPP.04.01.02.c
30.07	Identify and describe accepted animal treatment and harvesting techniques.			FPP.04.01.03.a
30.08	Compare and contrast accepted animal treatment and harvesting techniques.			FPP.04.01.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.09 Harvest animals using regulatory agency- approved or industry approved techniques.			FPP.04.01.03.c
30.10 Describe the importance of premortem and post-mortem inspections of animals for harvest.			FPP.04.01.04.a
30.11 Explain desirable and undesirable characteristics of both premortem and post-mortem animals in relation to the production of food products.			FPP.04.01.04.b
30.12 Conduct pre-mortem and postmortem inspections of animals.			FPP.04.01.04.c
31.0 Describe how proteins, carbohydrates, lipids, vitamins, and minerals are digested and how food preparation impacts nutritional value and quality--The student will be able to:			
31.01 Discuss the functions of carbohydrates, fats, proteins, minerals, vitamins, water and caloric needs in the body.			
31.02 Compare and contrast food sources of carbohydrates, fats, proteins, minerals, vitamins, water and caloric needs in the body.			
31.03 Identify the effects of preparation methods on nutritional content and food quality.			
32.0 Describe the chemical composition and processing of foods--The student will be able to:			
32.01 Explain the use of color in food processing.			
32.02 Explain the use of flavor in food processing.			
32.03 Explain the use of preservatives in food processing.			
32.04 Explain the use of textural agents in food processing.			
32.05 Examine methods of manipulating color and ripeness of fresh produce.			
32.06 Analyze the molecular structure of carbohydrates.			
32.07 Analyze the molecular structure of fats.			
32.08 Analyze the molecular structure of proteins.			
32.09 Explain the concepts of pH and buffers as they relate to foods.			
32.10 Examine the effects of processing and preparation on the chemical composition of foods.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
32.11 Explain the use of proteins, fats and carbohydrates.			
33.0 Describe the physical composition and processing of foods--The student will be able to:			
33.01 Describe materials handling in the food industry.			
33.02 Describe factors and processes related to heat transfer.			
33.03 Compare and contrast methods of moisture content manipulations.			
33.04 Examine techniques used in producing formed foods.			
33.05 Examine methods for separating food products.			
33.06 Analyze factors related to product mixing.			
33.07 Analyze mechanical factors influencing product preparation.			
33.08 Compare processing methods used to enhance shelf life of fresh produce.			
34.0 Evaluate, grade and classify processed food products.—The student will be able to:			
34.01 Identify and describe foods derived from meat, egg, poultry, fish and dairy products.			FPP.04.02.01.a
34.02 Discuss desirable qualities of processed meat, egg, poultry, fish and dairy products.			FPP.04.02.01.b
34.03 Evaluate, grade and classify processed meat, egg, poultry, fish and dairy products.			FPP.04.02.01.c
34.04 Identify and describe products derived from fruits and vegetables.			FPP.04.02.02.a
34.05 Discuss desirable qualities of fruit and vegetable products.			FPP.04.02.02.b
34.06 Evaluate, grade and classify processed products from fruits and vegetables.			FPP.04.02.02.c
34.07 Identify and describe products derived from grains, legumes and oilseeds.			FPP.04.02.03.a
34.08 Discuss desirable qualities of grain, legume and oilseed products.			FPP.04.02.03.b
34.09 Evaluate, grade and classify finished products derived from grains, legumes and oilseeds.			FPP.04.02.03.c
35.0 Identify the importance of raw agricultural products in the food science industry--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
35.01 Identify wholesale plant, dairy, meat, poultry and aquatic animal food products.			
35.02 Analyze the factors that impact food grades and grading.			
35.03 Identify plant production practices that impact food product quality, quantity and consistency.			
35.04 Examine nutritional content of plant food products.			
35.05 Compare and contrast consumption trends of plant products in the United States.			
35.06 Compare the relative economic value of plant food products.			
36.0 Apply principles of science to food processing to provide a safe, wholesome and nutritious food supply.—The student will be able to:			
36.01 Discuss how research and industry developments lead to improvements in the food products and processing industry.			FPP.03.01.01.a
36.02 Design a research project in food science using the scientific method.			FPP.03.01.01.b
36.03 Conduct research in food science and interpret results to improve food products.			FPP.03.01.01.c
36.04 Explain the application of chemistry and physics to food science.			FPP.03.01.02.a
36.05 Explain how the chemical and physical properties of foods influence nutritional value and eating quality.			FPP.03.01.02.b
36.06 Determine the chemical and physical properties of food products.			FPP.03.01.02.c
36.07 Explain the Food Guide Pyramid in relation to essential nutrients for the human diet.			FPP.03.01.03.a
36.08 Compare and contrast the nutritive value of food and food groups.			FPP.03.01.03.b
36.09 Design a daily food guide for a healthful diet.			FPP.03.01.03.c
36.10 Discuss common food constituents (e.g., proteins, carbohydrates, fats, vitamins, minerals).			FPP.03.01.04.a
36.11 Compare and contrast food constituents and their relative value to product taste, appearance, etc.			FPP.03.01.04.b
36.12 Analyze food products to identify food constituents.			FPP.03.01.04.c
36.13 Identify common food additives (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors).			FPP.03.01.05.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
36.14 Describe the purpose of common food additives.			FPP.03.01.05.b
36.15 Formulate and explain incorporation of additives into food products.			FPP.03.01.05.c
36.16 Explain the importance of food labeling to the consumer.			FPP.03.01.06.a
36.17 Explain the required components of a food label.			FPP.03.01.06.b
36.18 Prepare and label foods according to the established standards of regulatory agencies.			FPP.03.01.07.c
36.19 Describe factors in planning and developing a new food product (e.g., regulation, creativity, and economics).			FPP.03.01.07.a
36.20 Plan and create a new food product.			FPP.03.01.07.b
36.21 Perform sensory-testing and marketing functions to characterize and determine consumer preference and market potential.			FPP.03.01.07.c
37.0 Process, preserve, package and present food and food products for sale and distribution.—The student will be able to:			
37.01 Identify and explain common weights and measures used in the food products and processing industry.			FPP.04.03.01.a
37.02 Weigh and measure food products and perform conversions between units of measure.			FPP.04.03.01.b
37.03 Use weights and measures to formulate and package food products.			FPP.04.03.01.c
37.04 Explain methods and materials for processing foods for sale as fresh-food products.			FPP.04.03.02.a
37.05 Prepare foods for sale and distribution as fresh-food products.			FPP.04.03.02.b
37.06 Evaluate foods prepared for the fresh food market based on factors such as shelf life, shrinkage, appearance and weight.			FPP.04.03.02.c
37.07 Identify methods of food preservation and give examples of foods preserved by each method.			FPP.04.03.03.a
37.08 Explain the processes of food preservation methods.			FPP.04.03.03.b
37.09 Preserve foods using various methods and techniques.			FPP.04.03.03.c
37.10 Explain techniques for preparing ready-to-eat food products.			FPP.04.03.04.a
37.11 Demonstrate techniques of preparing ready-to-eat food products.			FPP.04.03.04.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
37.12 Evaluate ready-to-eat food products.			FPP.04.03.04.c
37.13 Explain materials and methods of food packaging and presentation.			FPP.04.03.05.a
37.14 Select and utilize packaging materials in storing processed foods and raw food products.			FPP.04.03.05.b
37.15 Analyze the foods stored in various packaging materials to determine which materials retain desirable food qualities.			FPP.04.03.05.c
37.16 Identify and explain storage conditions to preserve product quality.			FPP.04.03.06.a
37.17 Select methods and conditions for storing raw and processed food products.			FPP.04.03.06.b
37.18 Compare and contrast foods stored under varying conditions for quality, shelf life and intended use.			FPP.04.03.06.c
38.0 Explain the process of food product development--The student will be able to:			
38.01 Explain how ideas for new products are developed.			
38.02 Describe new product development procedures.			
38.03 Explain consumer response tests.			
38.04 Explain the role of test marketing with new products.			
38.05 Explain sensory analysis.			
38.06 Compare the categories of sensory properties.			
38.07 Assess why the food industry conducts sensory testing.			
39.0 Analyze the components of the marketing chain--The student will be able to:			
39.01 Identify the five features of food labels.			
39.02 Identify USDA regulations regarding food labeling.			
39.03 Design a food label.			
39.04 Develop a food product logo and slogan.			
39.05 Apply basic principles of advertisement.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
39.06 Design a print advertisement.			
39.07 Develop a video or audio advertisement.			
39.08 Explain how package design and size influence consumer acceptance.			
39.09 Explore the relationship between value-added products and profitability.			
39.10 Analyze the economic significance of converting raw products into value-added food products.			
39.11 Discuss retail store layout and product placement.			
39.12 Analyze retail-marketing strategies.			
40.0 Explain the process of food product development--The student will be able to:			
40.01 Develop a new food product.			
40.02 Conduct and analyze a food market test.			
40.03 Apply sensory analysis techniques.			
40.04 Conduct a cost analysis for a new food product.			
41.0 Discuss food production distribution--The student will be able to:			
41.01 Explain the impact of transportation on food cost and availability.			
41.02 Determine the relationship between transportation and packaging needs.			
41.03 Compare modes of food product transportation.			
41.04 Describe the various levels of the food distribution chain.			
41.05 Analyze the factors that influence profit at various levels of the distribution chain.			
41.06 Describe the challenges associated with distributing perishable products.			
42.0 Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry.—The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.01 Explain the purposes of organizations that are part of or regulate the food products and processing industry.			
42.02 Evaluate the changes in the food products and processing industry brought about by industry organizations or regulatory agencies.			
42.03 Interact effectively with organizations, groups and regulatory agencies that affect the food products and processing industry.			
42.04 Explain the importance and usage of industry standards in food products and processing.			
42.05 Discuss the application of industry standards in the food products and processing industry.			
42.06 Prepare a plan for implementation of industry standards in food products and processing programs.			
43.0 Describe the economic and cultural impact of a global food market--The student will be able to:			
43.01 Analyze the influence of culture on American food preferences.			
43.02 Analyze national and international food preferences on food production in the United States.			
43.03 Explain the political nature of the world's food supply.			
43.04 Explain the relationships between global population growth and food supply needs.			
43.05 Discuss possible causes of world hunger.			
44.0 Discuss environmental issues impacting the production and processing of foods--The student will be able to:			
44.01 Describe the requirements of water used in food processing.			
44.02 Discuss methods used in food processing for disposing of solid wastes.			
44.03 Compare and contrast methods of wastewater management used in food processing.			
45.0 Demonstrate leadership, employability, communications and human relations skills--The student will be able to:			
45.01 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.			
45.02 Identify acceptable work habits and personal characteristics.			
45.03 Identify acceptable employee hygiene habits.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
45.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.			
45.05 Describe the importance of industry certifications.			
45.06 Conduct small informal and formal group meetings.			
46.0 Write lab reports to record, interpret and evaluate data--The student will be able to:			
46.05 Apply the steps of the scientific methods.			
46.06 Design and write reports of food science laboratory experiments including mathematical and statistical examples for evaluation of collected data.			
47.0 Explain the components of the American business system.—The student will be able to:			
47.01 Describe the five basic ways American business is organized.			
47.02 Distinguish and identify between the characteristics of each method of doing business.			
47.03 Evaluate the advantages and disadvantages provided by each business method.			
47.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.			
48.0 Investigate agricultural cooperatives structure and function.—The student will be able to:			
48.01 Explain the definition of a cooperative.			
48.02 Understand the history of cooperative principles and practices.			
48.03 Describe the five areas that classify cooperative structure.			
48.04 Distinguish and identify between the five types of cooperative structure and their functions.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Standards and benchmarks that are in italics are components in food safety certifications.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

Courses in this program satisfying equally rigorous science content are:

- Agriscience Foundations (8106810)

**Florida Department of Education
Curriculum Framework**

Course Title: Food Science Safety & Technology
Program Type: Non Career Preparatory
Career Cluster: Agriculture, Food, and Natural Resources

Secondary – Non Career Preparatory

Course Number	8500395
CIP Number	09200115PA
Grade Level	9-12, 30, 31
Standard Length	1 credit
Teacher Certification	FAM CON SC 1 AGRICULTUR 1 @2
CTSO	FCCLA; FFA
Facility Code	231 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

This course 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 food science sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction in the application of biological, chemical, and physical principles of converting raw agricultural products into processed forms for human consumption and safe food preparation, handling, packaging, food storage and distribution, and related aspects of human health and safety including toxicology and pathology.

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

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Food Science Safety & Technology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Food Science Safety & Technology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Food Science Safety & Technology.
- 04.0 Evaluate the significance and implications of changes and trends in the food products and processing industry
- 05.0 Analyze the dangers of food hazards
- 06.0 Apply safety and sanitation procedures in the handling, processing and storing of food products
- 07.0 Manage operational procedures and create equipment and facility maintenance plans
- 08.0 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.
- 09.0 Demonstrate worker safety procedures with food product and processing equipment and facilities.
- 10.0 Summarize the procedures for food service operations
- 11.0 Explain the daily operations of a food service facility
- 12.0 Identify and explain the effects of microorganisms on food
- 13.0 Compare and contrast the different methods of food preservation
- 14.0 Describe relationships between diet and a healthy body

**Florida Department of Education
Student Performance Standards**

Course Title: Food Science Safety & Technology
Course Number: 8500395
Course Credit: 1

Course Description:

This course prepares students in the application of biological, chemical, and physical principles of converting raw agricultural products into processed forms for human consumption and safe food preparation, handling, packaging, food storage and distribution, and related aspects of human health and safety including toxicology and pathology.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Food Science Safety & Technology.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Food Science Safety & Technology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge	
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing	
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Food Science Safety & Technology.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Evaluate the significance and implications of changes and trends in the food products and processing industry.—The student will be able to:			
04.01 Discuss the history and describe and explain the components. (e.g., processing, distribution, byproducts) of the food products and processing industry.)			
04.02 Evaluate changes and trends in the food products and processing industry.			
04.03 Predict trends and implications in the food products and processing industry.			
04.04 Identify and explain environmental and safety concerns about the food supply.			
04.05 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
04.06 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			
05.0 Analyze the dangers of food hazards.-- The student will be able to:			
05.01 Explain types of biological hazards.			
05.02 Explain types of chemical hazards.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
05.03 Explain types of physical hazards.			
05.04 Identify the roles food allergens play in food safety.			
06.0 Apply safety and sanitation procedures in the handling, processing and storing of food products. – The student will be able to:			
06.01 Explain techniques and procedures for the safe handling of food products.			
06.02 Evaluate food product handling procedures.			
06.03 Demonstrate approved food product handling techniques.			
06.04 Describe the importance of performing quality-assurance tests on food products.			
06.05 Perform quality-assurance tests on food products.			
06.06 Interpret quality-assurance test results and apply corrective procedures.			
06.07 Describe the effects food-borne pathogens have on food products and humans.			
06.08 Explain the importance of microbiological tests in food product preparation, listing common spoilage and pathogenic microorganisms.			
06.09 Conduct and interpret microbiological tests for food-borne pathogens and implement corrective procedures.			
06.10 Explain the importance of record keeping in a food products and processing system.			
06.11 Discuss documentation procedures in a food products and processing system.			
06.12 Demonstrate proper record keeping in a food products and processing system.			
07.0 Manage operational procedures and create equipment and facility maintenance plans.—The student will be able to:			
07.01 Explain the importance of developing and maintaining Sanitation Standard Operating Procedures (SSOP).			
07.02 Evaluate the SSOP of a food products and processing company.			
07.03 Develop SSOP for a food products and processing company.			
07.04 Explain the purpose of Good Manufacturing Practices (GMP).			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
07.05 Evaluate the GMP of a food products and processing company.			
07.06 Implement GMP for a food products and processing company.			
07.07 Identify reasons for using a planned maintenance program to maintain equipment and facilities.			
07.08 Develop a basic equipment and facility maintenance program.			
07.09 Perform basic equipment and facility maintenance in a food products and processing operation.			
08.0 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.			
08.01 Describe contamination hazards (physical, chemical and biological) associated with food products and processing.			
08.02 Outline procedures to eliminate possible contamination hazards associated with food products and processing.			
08.03 Analyze the effectiveness of a food products and processing company's Critical Control Point (CCP) procedures.			
08.04 Identify the seven principles of HACCP.			
08.05 Explain the implementation of the seven principles of HACCP.			
08.06 Implement an HACCP program for a food products and processing facility.			
09.0 Demonstrate worker safety procedures with food product and processing equipment and facilities. – The student will be able to:			
09.01 Explain safety standards that must be observed in facility design and equipment use.			
09.02 Outline guidelines for personnel safety in the food products and processing industry.			
09.03 Evaluate a facility to determine the implementation of safety procedures.			
10.0 Summarize the procedures for food service operations.—The student will be able to:			
10.01 Develop criteria for purchasing considerations.			
10.02 Develop criteria for receiving considerations			
10.03 Facilitate proper use of current general inspection guidelines.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
10.04 Select proper criteria for inspecting specific types of food.			
10.05 Explain general storage guidelines.			
10.06 Compare storage guidelines for specific types of food.			
10.07 Demonstrate proper food preparation techniques.			
10.08 Explain proper procedures for cook food. (See current Food Code for temperature information)			
10.09 Recommend proper cooling and reheating procedures for various food items. (See current Food Code for temperatures)			
10.10 Explain procedures for holding food for service.			
10.11 Demonstrate proper techniques in serving food.			
10.12 Develop a plan for offsite service handling of food.			
11.0 Explain the daily operations of a food service facility.—The student will be able to:			
11.01 Discuss proper use of food safety management systems.			
11.02 Determine procedures for active managerial control.			
11.03 Develop a plan for crisis management.			
11.04 Design a plan for operating safely.			
11.05 Explain considerations for other areas of the facility.			
11.06 Develop criteria for equipment selection.			
11.07 Describe procedures for installing and maintaining kitchen equipment.			
11.08 Describe the operations utilities structure.			
11.09 Demonstrate proper procedures for cleaning.			
11.10 Demonstrate proper procedures for sanitizing.			
11.11 Demonstrate proper procedures for dish washing.			
11.12 Demonstrate proper procedures for cleaning the premises.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
11.13 Develop a cleaning program.			
11.14 Explain the importance of (IPM) Integrated Pest Management programs.			
11.15 Identify pests.			
11.16 Explain the importance of working with a pest control operator.			
11.17 Describe pest treatments.			
11.18 Explain procedures for using and storing pesticides in the facility.			
12.0 Identify and explain the effects of microorganisms on food--The student will be able to:			
12.01 Compare the beneficial and detrimental effects of microorganisms on food.			
12.02 Identify the characteristic of selected microorganisms and related food borne diseases.			
12.03 Describe the environmental conditions necessary for the growth of selected microorganisms.			
12.04 Explain and demonstrate the cause and effect relationship between using accepted food handling procedures and preventing food borne diseases.			
12.05 Conduct and appraise scientific experimentation of the biological magnification of certain classified microorganisms, such as yeast, mold and bacteria.			
13.0 Compare and contrast the different methods of food preservation--The student will be able to:			
13.01 Describe and give methods of how fermentation is useful in preserving foods.			
13.02 Describe and give examples of how chemicals are useful in preserving foods.			
13.03 Describe and give examples of temperature-related methods used in preservation of foods.			
13.04 Conduct an experiment in fermentation, chemical, or temperature-related method of food preservation.			
14.0 Describe relationships between diet and a healthy body--The student will be able to:			
14.01 Describe the processes used by the body in utilization of the six basic nutrients.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.02 Define anabolism and catabolism as two opposing processes of metabolism.			
14.03 Analyze the relationship between food intake, energy use, and body weight.			
14.04 Explain the interrelationship between diet and individual medical conditions.			
14.05 Describe the characteristics of a healthy diet.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA and FCCLA are the appropriate career and technical student organizations for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Program Title: Floral Design and Marketing
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2011-2012 being the last cohort of students permitted to enroll in the program. After 2011-2012, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8818000
CIP Number	0201060800
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	RETAILING @7 G MKTG 1 DIST ED @7 TEACH CDE @7 MKTG MGMT @7G
CTSO	DECA & FFA
SOC Codes (all applicable)	53-3031 -Driver/Sales Workers 41-2031 - Retail Salespersons 43-5111 -Weighers, Measurers, Checkers, and Samplers, Recordkeeping 27-1023 - Floral Designers 41-1011 -First-Line Supervisors of Retail Sales Workers
Facility Code	223 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 floral design sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning and preparing floral designs, selling, buying, transporting, storing, advertising, displaying, and managing the floral goods and services industry.

Program Structure

This program is a planned sequence of instruction consisting of six courses and six occupational completion points.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8818010	Floral Design and Marketing 1	1 credit	53-3031	2
B	8818020	Floral Design and Marketing 2	1 credit	41-2031	2
C	8818030	Floral Design and Marketing 3	1 credit	43-5111	2
D	8818040	Floral Design and Marketing 4	1 credit	27-1023	2
E	8818050	Floral Design and Marketing 5	1 credit	27-1023	2
F	8818060	Floral Design and Marketing 6	1 credit	41-1011	2

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes

and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Floral Design and Marketing.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Floral Design and Marketing.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing.
- 04.0 Discuss the floral design and marketing industry.
- 05.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
- 06.0 Demonstrate effective communication skills.
- 07.0 Demonstrate knowledge and application of product and service technology.
- 08.0 Demonstrate distribution skills involved in floral marketing.
- 09.0 Perform merchandising operations unique to floral marketing.
- 10.0 Apply sales techniques and procedures to the marketing of floral products.
- 11.0 Identify factors for the promotion of floristry products and services.
- 12.0 Demonstrate knowledge of merchandising activities.
- 13.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Floral Design and Marketing.
- 14.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Floral Design and Marketing.
- 15.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing.
- 16.0 Demonstrate knowledge and application of post harvest physiological technology.
- 17.0 Identify procedures and create fresh and silk floral designs.
- 18.0 Create symmetrical and asymmetrical fresh and silk floral design.
- 19.0 Create fresh and/or permanent sympathy designs.
- 20.0 Create fresh and/or permanent wedding designs.
- 21.0 Apply sales promotion techniques and procedures to the marketing of floral products.
- 22.0 Demonstrate an understanding of the functions of management.
- 23.0 Identify factors to consider when opening/managing a floral business.

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing 1
Course Number: 8818010
Course Credit: 1

Course Description:

This course is designed to develop the fundamental competencies necessary for employment in the floral design and marketing industry. Topics include: introduction to the floral industry, human relations skills that are vital to employment in the field, communications and employability skills.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Floral Design and Marketing.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question	

Florida Standards		Correlation to CTE Program Standard #
	the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Floral Design and Marketing.	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	

Florida Standards		Correlation to CTE Program Standard #
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

CTE Standards and Benchmarks
04.0 Discuss the floral design and marketing industry--The student will be able to:
04.01 Identify careers in the floral design and marketing industry.
04.02 Describe trends in the floral design and marketing industry.
04.03 Explain floral services.
05.0 Demonstrate effective communication skills--The student will be able to:
05.01 Discuss the role of communications in marketing.
05.02 Demonstrate a proficiency in the effective use of speech and vocabulary.
05.03 Demonstrate effective written communication skills.
05.04 Demonstrate effective oral communication skills.
05.05 Demonstrate effective listening skills.
06.0 Demonstrate knowledge and application of product and service technology--The student will be able to:
06.01 Identify varieties of flowers and plants utilized in floral arrangements.
06.02 Perform specialized care and handling of flowers and plants utilized in floral arrangements.
06.03 Store plants, flowers, and prepared floral arrangements according to established procedures.

CTE Standards and Benchmarks

06.04 Perform "greening," prepare containers, and maintenance of fresh flowers.

07.0 Demonstrate distribution skills involved in floral marketing--The student will be able to:

07.01 Tag floral orders.

07.02 Package products.

07.03 Route and organize deliveries according to priority, location, time, and fuel consumption.

07.04 Make confirmation phone calls.

07.05 Apply techniques for correct loading of delivery trucks.

07.06 Solve delivery problems, such as wrong address, damaged merchandise, and inability to deliver.

07.07 Maintain general floral shop upkeep.

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing 2
Course Number: 8818020
Course Credit: 1

Course Description:

This course prepares the student in the skills of merchandising math, pricing, and selling. In addition the course includes skills for ordering fresh and silk flowers, maintaining stock, receiving and processing wholesale and retail sales orders, pricing stock, and utilizing appropriate sales techniques and customer relations.

Florida Standards	Correlation to CTE Program Standard #
01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Floral Design and Marketing.	
01.01 Key Ideas and Details	
01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure	
01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3 Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Floral Design and Marketing.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
03.04	Model with mathematics.	

Florida Standards		Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

CTE Standards and Benchmarks	
08.0 Demonstrate knowledge and application of product and service technology--The student will be able to:	
08.01 Identify types of floral arrangements.	
08.02 Utilize available resources to obtain product knowledge	
09.0 Perform merchandising operations unique to floral marketing--The student will be able to:	
09.01 Demonstrate correct procedures for handling customer sales transactions.	
09.02 Explain pricing policies.	
09.03 Calculate mark-up of floral products.	
09.04 Describe opening and closing procedures for a floral operation.	
10.0 Apply sales techniques and procedures to the marketing of floral products--The student will be able to:	
10.01 Demonstrate steps of a sale utilizing floral products.	
10.02 Perform telephone sales.	
10.03 Process orders using both telephone and computer wire services.	

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing 3
Course Number: 8818030
Course Credit: 1

Course Description:

This course prepares the student to use data entry and appropriate business software to complete weighers, measures, checkers, and samplers, recordkeeping (floral) SOC 43-5111.00 including weighing, measuring and checking materials, supplies, and equipment for the purpose of keeping relevant records. Content includes basic skills in accounts receivable, accounts payable, payroll, inventory control, wire service orders, collecting and keeping record of samples of products or materials and maintaining other financial records required for small business operations.

Florida Standards		Correlation to CTE Program Standard #
11.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Floral Design and Marketing.	
11.01	Key Ideas and Details	
11.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
11.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
11.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
11.02	Craft and Structure	
11.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
11.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
11.02.3	Analyze the author's purpose in providing an explanation, describing a	

Florida Standards		Correlation to CTE Program Standard #
	procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
11.03 Integration of Knowledge and Ideas		
11.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
11.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
11.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
11.04 Range of Reading and Level of Text Complexity		
11.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
11.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
12.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Floral Design and Marketing.		
12.01 Text Types and Purposes		
12.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
12.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
12.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
12.02 Production and Distribution of Writing		
12.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
12.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
12.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
12.03 Research to Build and Present Knowledge	
12.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
12.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
12.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
12.04 Range of Writing	
12.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
13.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing.	
13.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
13.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
13.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
13.04 Model with mathematics.	MAFS.K12.MP.4.1
13.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
13.06 Attend to precision.	MAFS.K12.MP.6.1
13.07 Look for and make use of structure.	MAFS.K12.MP.7.1
13.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

CTE Standards and Benchmarks	
14.0 Identify factors for the promotion of floristry products and services--The student will be able to:	
14.01 Identify the major classifications of retail flower operations.	
14.02 Describe product presentation and importance of window and store display.	
14.03 Identify primary goals of display.	
14.04 Identify types and functions of business records maintained.	
14.05 Develop a floor plan for a flower shop.	
15.0 Demonstrate knowledge of merchandising activities--The student will be able to:	
15.01 Explain the role of buying and purchasing in a retailing situation.	
15.02 Follow accepted procedures for inventory control.	
15.03 Demonstrate stock-keeping procedures.	

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing 4
Course Number: 8818040
Course Credit: 1

Course Description:

This course prepares the student with basic skills in making symmetrical and asymmetrical fresh and silk floral designs under the supervision of a designer. Students will copy designs, perform skills appropriate for an interior decorator's assist, a floral manufacturing assembly line worker, and/or a craft shop worker.

Florida Standards		Correlation to CTE Program Standard #
11.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Floral Design and Marketing.	
11.01	Key Ideas and Details	
11.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
11.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
11.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
11.02	Craft and Structure	
11.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
11.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
11.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved.	LAFS.1112.RST.2.6
11.03 Integration of Knowledge and Ideas		
11.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem.	LAFS.1112.RST.3.7
11.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	LAFS.1112.RST.3.8
11.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	LAFS.1112.RST.3.9
11.04 Range of Reading and Level of Text Complexity		
11.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
11.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently.	LAFS.1112.RST.4.10
12.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Floral Design and Marketing.		
12.01 Text Types and Purposes		
12.01.1	Write arguments focused on discipline-specific content.	LAFS.1112.WHST.1.1
12.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	LAFS.1112.WHST.1.2
12.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	LAFS.1112.WHST.1.3
12.02 Production and Distribution of Writing		
12.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
		LAFS.1112.WHST.2.4
12.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	LAFS.1112.WHST.2.5
12.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	LAFS.1112.WHST.2.6
12.03 Research to Build and Present Knowledge		
12.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	LAFS.1112.WHST.3.7
12.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	LAFS.1112.WHST.3.8
12.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	LAFS.1112.WHST.3.9
12.04 Range of Writing		
12.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	LAFS.1112.WHST.4.10
13.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Floral Design and Marketing.	
13.01	Make sense of problems and persevere in solving them.	MAFS.K12.MP.1.1
13.02	Reason abstractly and quantitatively.	MAFS.K12.MP.2.1
13.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
13.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
13.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
13.06 Attend to precision.	MAFS.K12.MP.6.1
13.07 Look for and make use of structure.	MAFS.K12.MP.7.1
13.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

CTE Standards and Benchmarks	
14.0	Demonstrate knowledge and application of post harvest physiological technology--The student will be able to:
14.01	Demonstrate operation of underwater floral cutting equipment.
14.02	Demonstrate use of electric floral stem stripper.
14.03	Apply knowledge in the use of floral preservatives and pre-hydrating solutions.
14.04	Demonstrate knowledge and application of refrigeration, sanitation, and ethylene control.
14.05	Identify grower-packaging quantities used for cut flowers and foliage.
14.06	Apply knowledge of specialized techniques for conditioning post-harvest plant material.
15.0	Identify procedures and create fresh and silk floral designs--The student will be able to:
15.01	Identify fundamentals of color and texture.
15.02	Identify mechanics, principles, and styles of design.
15.03	Apply fundamentals of creativity.
15.04	Maintain portfolios.
15.05	Identify and practice safety procedures.
15.06	Identify, use, and maintain hand tools and equipment.
15.07	Select appropriate containers.

CTE Standards and Benchmarks

15.08 Create circular designs.

15.09 Create triangular designs.

15.10 Apply horizontal and vertical design principles as appropriate.

15.11 Apply symmetrical and asymmetrical design principles as appropriate.

15.12 Create body flowers (boutonnieres, corsages, hairpieces, etc.) appropriate to designer's locale.

15.13 Construct dish gardens.

15.14 Decorate blooming plants.

15.15 Construct balloon bouquets.

15.16 Apply principles of mass production skills where and when appropriate.

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing 5
Course Number: 8818050
Course Credit: 1

Course Description:

This course provides advanced training for the student to utilize creative skills and previous experience to design appropriate floral arrangements according to customer requirements. Content includes creating advanced designs for symmetrical and asymmetrical silk and fresh floral arrangements, including seasonal periods, special events, banquet, sympathy, and wedding designs.

CTE Standards and Benchmarks	
16.0	Create symmetrical and asymmetrical fresh and silk floral designs--The student will be able to:
16.01	Create orchid corsages.
16.02	Create a nosegay and corsages.
16.03	Create seasonal/holiday designs.
16.04	Create pieces for religious events.
16.05	Create special event pieces: conventions, parties, banquets, showers, and receptions.
16.06	Create oriental style designs.
16.07	Create silk arrangements working with the limited use of acrylics/polymers.
16.08	Create designs for recipients in special care facilities (maternity, pediatrics, mental health, burns, general hospital, extended care, etc.).
16.09	Create period designs (southwest, colonial, country, European, etc.).
17.0	Create fresh and/or permanent sympathy designs--The student will be able to:
17.01	Create family pieces.
17.02	Create funeral baskets.
17.03	Create set pieces.

CTE Standards and Benchmarks

17.04 Create easel pieces.

17.05 Create interior lid pieces.

18.0 Create fresh and/or permanent wedding designs--The student will be able to:

18.01 Create designs for church/synagogue weddings.

18.02 Create designs for special weddings.

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing 6
Course Number: 8818060
Course Credit: 1

Course Description:

The course prepares students in the basic skills involved with marketing and management of a floral business. Content includes sales promotion and marketing techniques, entrepreneurship, and management functions.

CTE Standards and Benchmarks	
19.0	Apply sales promotion techniques and procedures to the marketing of floral products--The student will be able to:
19.01	Discuss the purposes of advertising, display, and public relations.
19.02	Explain the importance of sales promotion.
19.03	Identify various forms of advertising media including the Internet.
19.04	Conduct wedding consultations.
19.05	Conduct funeral consultations.
19.06	Conduct life events consultations.
19.07	Plan and conduct a sales promotion plan for a product.
20.0	Demonstrate an understanding of the functions of management--The student will be able to:
20.01	Identify and describe steps in the planning process.
20.02	Define Management by Objectives (MBO).
20.03	Develop an organizational chart to illustrate line and staff relationships.
20.04	Identify how to plan personnel needs and how to find employees for specific positions.
20.05	Describe the responsibilities for selecting, training, and appraising employees.

CTE Standards and Benchmarks

20.06	Identify steps for avoiding difficulties resulting from delegation.
20.07	Define the principles of “chain of command” and “span of control.”
20.08	Justify the importance of accountability.
20.09	Name and define the functions of management (planning, organizing, staffing, directing, controlling).
20.10	Discuss the importance of a manager’s philosophy of management in creating a work environment.
20.11	Analyze management techniques used by effective managers.
20.12	Explain how motivation, leadership, and communication influence people within an organization.
20.13	Describe methods used in training and development.
21.0	Identify factors to consider when opening/managing a floral business--The student will be able to:
21.01	Identify primary functions of a retail flower shop.
21.02	Explain the characteristics of store location options.
21.03	Characterize the principle responsibilities of employees.
21.04	Summarize the key management responsibilities required for a successful and profitable flower shop.

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA & DECA are the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1314.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

Equivalent Mathematics and Equally Rigorous Science Courses

Equally rigorous science courses are based upon levels of cognitive complexity of content specific benchmarks, depth and breadth of content focus, and required laboratory components.

**Florida Department of Education
Curriculum Framework**

Program Title: Land Resources Technology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

Program Number	8913000
CIP Number	0715059902
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 WSP OPER @7 G
CTSO	FFA
SOC Codes (all applicable)	17-3025 - Environmental Engineering Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 & 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 land resources sector of the Agriculture, Food & Natural Resources career cluster.

The content includes but is not limited to knowledge of federal, state, and local regulations; ecosystem awareness; problem recognition; water quality issues; solid and liquid waste management issues; air quality issues; managing hazardous materials; managing forests, wetlands, fisheries,

and wildlife; planning and administering land use; protecting resources; conducting site assessments; sampling procedures; safety procedures; compliance monitoring and quality assurance procedures; and instruction in environmental technology.

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 consisting of four courses and two occupational completion points.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8913010	Introduction to Environmental Technology	1 credit	17-3025	2
	8913020	Environmental Technology 2	1 credit		2
B	8913030	Land Resources 3	1 credit	17-3025	3
	8913040	Land Resources 4	1 credit		3

Academic Alignment Table

Some or all of the courses in this program have been academically aligned to the Florida Standards for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. The table below contains the results of the alignment efforts by both academic core and Career and Technical Education (CTE) professional educators. Data shown in the table includes the number of academic standards in the CTE course and the percentage of alignment to the CTE course.

Courses	Algebra 1	Algebra 2	Geometry	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Genetics	Marine Science 1 Honors	Physical Science	Physics 1
Introduction to Environmental Technology	^^	^^	^^	**	**	**	**	**	**	**	**	**
Environmental Technology 2	^^	^^	^^	**	**	**	**	**	**	**	**	**
Land Resources 3	^^	^^	^^	**	**	**	**	**	**	**	**	**
Land Resources 4	^^	^^	^^	**	**	**	**	**	**	**	**	**

^^ Alignment pending full implementation of the Florida Standards for Mathematics.

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Land Resources Technology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Land Resources Technology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.
- 04.0 Describe hydrology.
- 05.0 Practice safety skills and procedures.
- 06.0 Demonstrate sampling procedures.
- 07.0 Discuss related standards and regulations.
- 08.0 Conduct site assessment.
- 09.0 Describe related geologic principles.
- 10.0 Manage wetlands.
- 11.0 Manage wildlife.
- 12.0 Manage forests.
- 13.0 Identify career opportunities and organizational dynamics.
- 14.0 Describe water treatment techniques.
- 15.0 Describe stormwater systems.
- 16.0 Manage data and physical resources.
- 17.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
- 18.0 Manage hazardous materials.
- 19.0 Control incidents.
- 20.0 Prepare a plan.
- 21.0 Perform remediation.
- 22.0 Collect and dispose of solid waste.
- 23.0 Identify continuing education needs and opportunities.
- 24.0 Evaluate wetlands management practices.
- 25.0 Evaluate wildlife management procedures.
- 26.0 Evaluate forest management techniques.
- 27.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Land Resources Technology.
- 28.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Land Resources Technology.
- 29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.
- 30.0 Collect and dispose of solid waste.
- 31.0 Manage fires.

- 32.0 Manage pests.
- 33.0 Manage ecosystems.
- 34.0 Plan and administer land use.
- 35.0 Protect resources.
- 36.0 Demonstrate employability and human relation skills.
- 37.0 Discuss restoration ecology.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Environmental Technology
Course Number: 8913010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of hydrology, environmental standards and regulations, site assessment, geologic principles, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Land Resources Technology.	
01.01 Key Ideas and Details		
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure		
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Land Resources Technology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards		Correlation to CTE Program Standard #
	organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.	
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe hydrology--The student will be able to:			
04.01 Define basic hydrological terms.			
04.02 Explain surface water systems.			
04.03 Explain ground water systems.			
04.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.			
04.05 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.			
05.0 Practice safety skills and procedures--The student will be able to:			
05.01 Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment.			
05.02 Identify and utilize safe work practices.			
05.03 Identify physical, chemical, biological, and zoological hazards.			
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
Environmental Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Agency (OSHA), and Hazard Communication (HAZCOM) regulations.			
05.05 Determine, review, and follow regulations.			
05.06 Develop and maintain appropriate safety records.			
05.07 Identify and describe “on the job” hazards and risks including fire/explosive, lead asbestos, and weather hazards.			
05.08 Perform lifting activities safely.			
05.09 Identify ladder safety and fall protection.			
05.10 Become certified in first aid/CPR and describe First Responder responsibilities.			
06.0 Demonstrate sampling procedures--The student will be able to:			
06.01 Define sampling objectives and protocol.			
06.02 Operate, calibrate, and maintain sampling equipment.			
06.03 Develop sampling strategy.			
06.04 Perform applicable field measurements.			
06.05 Appropriately preserve, document, and dispose of samples.			
06.06 Identify cross-contamination and other risks associated with sampling.			
06.07 Describe, plan, and utilize quality assurance practices.			
06.08 Submit samples for analysis.			
06.09 Perform periodic follow-up sampling.			
07.0 Discuss related standards and regulations--The student will be able to:			
07.01 Explain the importance and impacts of local, state, and federal regulations and required documentation.			
07.02 Describe the Florida Administrative Code's (F.A.C.) impact on environmental issues.			
07.03 Discuss the Clean Water Act.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
07.04 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statutes.			
07.05 Research how rules and laws are made and mandated.			
07.06 Research and report how endangered species get listed.			
07.07 Describe permitting procedures.			
07.08 Identify regulation resources.			
07.09 Describe various licensing procedures.			
08.0 Conduct site assessment--The student will be able to:			
08.01 Identify the purposes of site assessment.			
08.02 Describe required documentation.			
08.03 Identify the phases of site assessment.			
08.04 Obtain background design information			
08.05 Verify blueprint accuracy.			
08.06 Conduct manual survey.			
08.07 Obtain physical and performance measurements.			
08.08 Determine system safety impacts.			
08.09 Determine possible nature and extent of exposure.			
08.10 Assess needed equipment and processes.			
08.11 Identify type of mechanical systems required.			
08.12 Determine operational criteria.			
08.13 Recommend corrective action.			
09.0 Describe related geologic principles--The student will be able to:			
09.01 Explain the geological history of Florida.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
09.02 Create a soil profile and describe the associated components.			
09.03 Evaluate soil profiles, land-capability classes, and soil conservation practices.			
09.04 Interpret legal descriptions of land.			
09.05 Identify mapping and surveying techniques and equipment.			
10.0 Manage wetlands--The student will be able to:			
10.01 Identify ecosystems.			
10.02 Discuss the structure and function of wetlands.			
10.03 Define limits of wetlands.			
10.04 Discuss habitat value.			
10.05 Identify fauna and flora.			
10.06 Determine desirable vs. nuisance plant and animal species.			
11.0 Manage wildlife--The student will be able to:			
11.01 Identify and compare wildlife species.			
11.02 Identify and describe life histories of game species.			
11.03 Identify and describe life histories of non-game species.			
11.04 Discuss urban wildlife management.			
11.05 Describe community ecology.			
11.06 Identify and practice wildlife techniques and principles.			
11.07 Discuss population dynamics.			
12.0 Manage forests--The student will be able to:			
12.01 Describe dendrology.			
12.02 Describe silviculture.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.03 Identify and demonstrate replanting techniques.			
12.04 Discuss harvesting techniques.			
12.05 Identify timber stand improvement.			
12.06 Identify timber and forest products.			
13.0 Identify career opportunities and organizational dynamics--The student will be able to:			
13.01 Identify careers and opportunities in the following fields: Surface/stormwater, drinking water, wastewater, groundwater, land resources, air quality, solid waste, and HAZMAT.			
13.02 Compare supervisory and administrative responsibilities.			
13.03 Identify organizational structures.			
13.04 Identify team building communication skills.			
13.05 Identify problem-solving techniques.			
13.06 Identify employee responsibility/benefits.			
13.07 Identify legal aspects of personnel relations.			
13.08 Communicate effectively in verbal, written, and nonverbal modes.			
13.09 Recognize and demonstrate good listening skills.			
13.10 Conduct small informal and formal group meetings.			
13.11 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.			

**Florida Department of Education
Student Performance Standards**

Course Title: Environmental Technology 2
Course Number: 8913020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of water treatment, stormwater systems, Geographic Informational and Global Positioning Systems, environmental standards and regulations, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Land Resources Technology	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	
	LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	
	LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	
	LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	
	LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.	
	LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Land Resources Technology	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content.	
	LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	
	LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	
	LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	

Florida Standards		Correlation to CTE Program Standard #
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Land Resources Technology		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.3.1
03.04 Model with mathematics.	MAFS.K12.MP.4.1
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06 Attend to precision.	MAFS.K12.MP.6.1
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.0 Practice safety skills and procedures--The student will be able to:			
14.01 Identify safety procedures for: Wells, pumps, electrical equipment, motor vehicles, buildings, and other necessary equipment.			
14.02 Handle compressed gasses, solids, and liquids safely.			
14.03 Summarize "Right of Access" law.			
14.04 Summarize "Confined Space" regulations.			
14.05 Identify Zero Tolerance policies.			
14.06 Identify employee limitations.			
14.07 Identify appropriate decontamination procedures.			
14.08 Identify principles of toxicology.			
14.09 Identify routes of exposure.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.10 Identify respirator safety procedures.			
14.11 Discuss history of hazardous materials and hazardous categories.			
14.12 Discuss common chemical compatibility.			
15.0 Discuss related standards and regulations--The student will be able to:			
15.01 Identify appropriate agencies and their functions			
15.02 Describe the role of environmental protection.			
15.03 Interpret the Regulatory File System.			
15.04 Create, evaluate and present a well-head protection plan.			
16.0 Identify career opportunities and organizational dynamics--The student will be able to:			
16.01 Recognize and demonstrate effective communications skills in the workplace.			
16.02 Design and conduct presentations.			
17.0 Describe water treatment techniques--The student will be able to:			
17.01 Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater.			
17.02 Describe disposal options.			
17.03 Identify septic tanks types and functions.			
18.0 Describe stormwater systems--The student will be able to:			
18.01 Research current construction trends and methods of stormwater systems.			
18.02 Define topography and its effects on stormwater.			
19.0 Manage data and physical resources--The student will be able to:			
19.01 Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, GIS, and security.			
19.02 Identify possible funding sources.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.03 Prepare budgets and purchase orders.			
19.04 Prepare a time management plan.			
19.05 Utilize information databases.			
19.06 Locate and interpret printed reference materials.			
19.07 Describe network opportunities.			
19.08 Maintain necessary/required record keeping practices and procedures.			
19.09 Keep inventory, time sheets, and equipment maintenance logs.			
19.10 Identify suppliers and technical resources.			
20.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems--The student will be able to:			
20.01 Define GIS and its function.			
20.02 Use GIS software.			
20.03 Learn GIS applications.			
20.04 Download LANDSTAT Satellite system into GIS.			
20.05 Develop a GIS model.			
20.06 Define GPS and its function.			
20.07 Collect GPS data and load on GIS.			
20.08 Research and identify other remote sensing tools.			
21.0 Manage hazardous materials--The student will be able to:			
21.01 Describe flow and life cycles of materials.			
21.02 Identify proper chemical handling and storage guidelines.			
21.03 Describe material management procedures.			
21.04 Identify waste minimization, pollution prevention and alternatives to disposal.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.05 Describe waste determination procedures.			
21.06 Describe storage tank procedures.			
21.07 Identify biochemical/medical waste.			
21.08 Describe shipping and transportation procedures of hazardous materials.			
21.09 Identify and interpret phase I and II audits.			
21.10 Interpret closure reports.			
21.11 Write contamination assessment reports.			
22.0 Control incidents--The student will be able to:			
22.01 Identify and describe reasons for controlling incidents.			
22.02 Describe levels of response.			
22.03 Determine and use proper chain of command.			
22.04 Determine methods of control.			
22.05 Demonstrate site access restriction methods.			
22.06 Identify appropriate authorities to be notified.			
22.07 Place equipment appropriately.			
22.08 Orient zones.			
22.09 Identify possible geographic hazards.			
22.10 Identify media protocol and procedures for communicating with the public.			
22.11 Prepare a press release for a mock incident			
23.0 Prepare a plan--The student will be able to:			
23.01 Describe the need for and types of pre-planning.			
23.02 Identify and select necessary agency involvement.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.03 Identify possible contamination zones.			
23.04 Create contention plans for hurricane, tornadoes, floods, fires, and nuclear accidents.			
23.05 Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act (EPCRA) regulations.			
23.06 Create plan for deployment.			
23.07 Evaluate contingency plans.			
23.08 Write a contingency plan.			
23.09 Conduct mock disaster activities.			
24.0 Perform remediation--The student will be able to:			
24.01 Research appropriate cleaning methods.			
24.02 Create a plan for a disaster clean up including needed materials and equipment.			
24.03 Conduct entry and closure methods.			
24.04 Identify contamination removal procedures.			
24.05 Design a site/system cleanliness verification procedure.			
24.06 Identify tear down and demobilization procedures.			
25.0 Collect and dispose of solid waste--The student will be able to:			
25.01 Describe history of solid waste disposal.			
25.02 Identify types of waste.			
25.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.)			
26.0 Identify continuing education needs and opportunities--The student will be able to:			
26.01 Determine continuing education needs/goals.			
26.02 Identify available educational and financial resources.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
26.03 Identify appropriate professional associations and attend meetings where applicable.			
26.04 Read and review trade journals.			

**Florida Department of Education
 Student Performance Standards**

Course Title: Land Resources 3
Course Number: 8913030
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of managing wetlands, wildlife, forest, fire, pests, and ecosystems, solid waste disposal, scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
27.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Land Resources Technology	
	27.01 Key Ideas and Details	
27.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
27.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
27.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	27.02 Craft and Structure	
27.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
27.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
27.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important	

Florida Standards		Correlation to CTE Program Standard #
	issues that remain unresolved. LAFS.1112.RST.2.6	
27.03 Integration of Knowledge and Ideas		
27.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
27.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
27.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
27.04 Range of Reading and Level of Text Complexity		
27.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
27.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
28.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Land Resources Technology		
28.01 Text Types and Purposes		
28.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
28.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
28.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
28.02 Production and Distribution of Writing		
28.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.WHST.2.4	
28.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	
	LAFS.1112.WHST.2.5	
28.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	
	LAFS.1112.WHST.2.6	
28.03 Research to Build and Present Knowledge		
28.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
	LAFS.1112.WHST.3.7	
28.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	
	LAFS.1112.WHST.3.8	
28.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	
	LAFS.1112.WHST.3.9	
28.04 Range of Writing		
28.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	
	LAFS.1112.WHST.4.10	
29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Land Resources Technology		
29.01	Make sense of problems and persevere in solving them.	
	MAFS.K12.MP.1.1	
29.02	Reason abstractly and quantitatively.	
	MAFS.K12.MP.2.1	
29.03	Construct viable arguments and critique the reasoning of others.	
	MAFS.K12.MP.3.1	
29.04	Model with mathematics.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.4.1
29.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
29.06 Attend to precision.	MAFS.K12.MP.6.1
29.07 Look for and make use of structure.	MAFS.K12.MP.7.1
29.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.0 Evaluate wetlands management practices--The student will be able to:			
30.01 Research control treatments for undesirable plants.			
30.02 Discuss mitigation techniques			
30.03 Evaluate impacts on wetlands.			
31.0 Evaluate wildlife management procedures--The student will be able to:			
31.01 Discuss basic mammalogy.			
31.02 Discuss basic ornithology.			
31.03 Discuss basic herpetology.			
31.04 Use a dichotomous key.			
31.05 Conduct experimental design and statistical analysis.			
31.06 Conduct biological data collection.			
31.07 Interpret data.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.08 Investigate system evolution.			
31.09 Identify common wildlife diseases and parasites.			
32.0 Evaluate forest management techniques--The student will be able to:			
32.01 Identify surveying techniques.			
32.02 Perform timber cruising activity.			
32.03 Perform a pacing exercise.			
32.04 Calculate area using chains.			
32.05 Calculate timber volumes using a Biltmore stick.			
32.06 Identify and discuss Forestry Best Management Practices (BMP).			
32.07 Research forestry/nursery production practices.			
32.08 Discuss marketability of forests.			
32.09 Identify timber marketing strategies.			
32.10 Identify related forestry equipment.			
33.0 Collect and dispose of solid waste--The student will be able to:			
33.01 Demonstrate the construction of artificial reefs.			
33.02 Identify disposal methods of hazardous and biomedical waste.			
33.03 Describe recycling methods.			
33.04 Visit a Materials Recycling Facility.			
34.0 Manage fires--The student will be able to:			
34.01 Describe the history of fire usage in Florida.			
34.02 Discuss the effects of prescribed burns and wildfires on communities in Florida.			
34.03 Identify and discuss safety equipment and practices related to fire management.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
34.04 Identify and discuss wildfire suppression techniques.			
34.05 Describe prescribed burn techniques.			
34.06 Evaluate site for prescribed burn.			
34.07 Discuss fire weather behavior.			
34.08 Discuss seasonal ecological effects of burning.			
34.09 Write a prescription for a prescribed burn.			
34.10 Visit a prescribed burn site.			
34.11 Evaluate the burn.			
35.0 Manage pests--The student will be able to:			
35.01 Discuss botany and plant taxonomy.			
35.02 Discuss common pests.			
35.03 Classify insects using a dichotomous key			
35.04 Describe life cycles of common pests.			
35.05 Describe biological, chemical, and cultural methods of managing plant pests.			
35.06 Identify and select an appropriate control for each type of pest and/or weed.			
35.07 Describe the principles and benefits of integrated pest management.			
36.0 Manage ecosystems--The student will be able to:			
36.01 Identify habitat types of Florida.			
36.02 Identify archeological and historical perspectives of ecosystems.			
36.03 Describe specific species associations for habitats.			
36.04 Describe how ecosystems interrelate.			
36.05 Research associated species.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
36.06 Identify management techniques.			
37.0 Plan and administer land use--The student will be able to:			
37.01 Discuss the geography of the area.			
37.02 Review historical information of the area.			
37.03 Review section, township, and range maps.			
37.04 Review aerial maps.			
37.05 Interpret topographical and flood plain maps.			
37.06 Forecast demographic patterns.			
37.07 Discuss population dynamics.			
37.08 Conduct population studies.			
37.09 Discuss growth management.			
37.10 Discuss coastal management issues.			
37.11 Describe special protection zones.			
37.12 Research per capita land consumption			
37.13 Compare consumptive and non-consumptive land uses.			
37.14 Describe and compare land uses including commercial, residential, recreational and agricultural uses.			
37.15 Design a balanced land use plan.			
38.0 Protect resources--The student will be able to:			
38.01 Identify and discuss archeological sites.			
38.02 Describe Endangered Species Act.			
38.03 Research regulations regarding protection of wildlife resources.			
38.04 Research wetland protection practices.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
38.05 Identify soil protection practices.			
38.06 Identify related law enforcement careers and responsibilities.			
38.07 Identify personal and of jurisdictional rights of landowners.			
39.0 Demonstrate employability and human relation skills--The student will be able to:			
39.01 Enhance oral communications and presentation skills.			
39.02 Demonstrate interpersonal (nonverbal) communication skills.			
39.03 Demonstrate good listening skills.			
39.04 Discuss media relations.			
39.05 Create a media campaign for an environmental issue.			
39.06 Develop audience appropriate communications.			

**Florida Department of Education
Student Performance Standards**

Course Title: Land Resources 4
Course Number: 8913040
Course Credit: 1

Course Description:

This course is designed to develop competencies in the management of pests and ecosystems, planning and administering land usage, ecology restoration, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
27.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Land Resources Technology	
27.01 Key Ideas and Details		
27.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
27.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
27.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
27.02 Craft and Structure		
27.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
27.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
27.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
27.03 Integration of Knowledge and Ideas		
27.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
27.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
27.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
27.04 Range of Reading and Level of Text Complexity		
27.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
27.04.2		
28.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Land Resources Technology	
28.01 Text Types and Purposes		
28.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
28.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
28.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	

Florida Standards		Correlation to CTE Program Standard #
28.02	Production and Distribution of Writing	
28.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
28.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
28.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
28.03	Research to Build and Present Knowledge	
28.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
28.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
28.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
28.04	Range of Writing	
28.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
29.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.	
29.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
29.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
29.03 Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
29.04 Model with mathematics.	MAFS.K12.MP.4.1
29.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
29.06 Attend to precision.	MAFS.K12.MP.6.1
29.07 Look for and make use of structure.	MAFS.K12.MP.7.1
29.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
40.0 Manage pests--The student will be able to:			
40.01 Discuss urban entomology.			
40.02 Assess environmental impact of pests.			
40.03 Conduct pest population studies.			
40.04 Discuss pesticide safety/regulations.			
40.05 Discuss basic toxicology.			
40.06 Identify chemicals used in pest management.			
40.07 Collect biological data.			
41.0 Manage ecosystems--The student will be able to:			
41.01 Describe political, biological, economical, and sociological impacts on managing ecosystems.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
41.02 Describe the effects of manipulation of species composition.			
41.03 Compare population dynamics.			
41.04 Discuss the effects of genetic isolation.			
41.05 Discuss bio-diversity.			
41.06 Evaluate how external factors affect communities.			
41.07 Research public use.			
41.08 Identify remote sensing techniques.			
41.09 Identify vegetative monitoring techniques			
41.10 Conduct vegetation analysis.			
41.11 Perform sampling, management, and analysis of data.			
41.12 Practice ecological ethics.			
42.0 Plan and administer land use--The student will be able to:			
42.01 Conduct an environmental assessment for a specific site.			
42.02 Conduct a property title search.			
42.03 Describe different kinds of acquisitions.			
42.04 Discuss concurrency management system.			
42.05 Research service comprehensive plans.			
42.06 Audit conservation as a means to protect and restore.			
42.07 Discuss the effects of drainage on resources.			
42.08 Discuss unique environmental features.			
42.09 Analyze sanitary sewer, water supply, and sewer needs.			
42.10 Discuss the need for inter-group coordination activities.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.11 Conduct a compatibility analysis.			
42.12 Prepare and write a conservation plan for a specific parcel of land.			
42.13 Write a capital improvement plan.			
42.14 Project maintenance management costs.			
43.0 Demonstrate employability and human relation skills--The student will be able to:			
43.01 Write a communication plan.			
43.02 Research ecotourism opportunities.			
43.03 Design an ecotour for an environmental area in the community.			
43.04 Perform public awareness activities.			
43.05 Design educational materials.			
44.0 Discuss restoration ecology--The student will be able to:			
44.01 Review geology, pedology, and hydrology.			
44.02 Research of vegetation dynamics.			
44.03 Determine requirements for preserving plant viability.			
44.04 Propagate and grow plants through sexual and/or asexual reproduction.			
44.05 Select and prepare plants for transporting and transplanting.			
44.06 Install plant materials.			
44.07 Describe restoration techniques.			
44.08 Research wetlands reclamation and uplands restoration.			
44.09 Diagnose restoration from a systems approach.			
44.10 Discuss mine reclamation.			
44.11 Identify related equipment.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
44.12 Research applicable monitoring techniques.			

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

**Florida Department of Education
Curriculum Framework**

Program Title: Water Resources Technology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2011-2012 being the last cohort of students permitted to enroll in the program. After 2011-2012, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

Secondary – Career Preparatory

Program Number	8916000
CIP Number	0715059904
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 WSP OPER @7 G
CTSO	FFA
SOC Codes (all applicable)	17-3025 - Environmental Engineering Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 & 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 land resources sector of the Agriculture, Food & Natural Resources career cluster.

The content includes but is not limited to knowledge of federal, state, and local regulations; ecosystem awareness; problem recognition; water quality issues; solid and liquid waste management issues; air quality issues; managing hazardous materials; managing forests, wetlands, fisheries, and wildlife; planning and administering land use; protecting resources; conducting site assessments; sampling procedures; safety procedures; compliance monitoring and quality assurance procedures; and instruction in environmental technology.

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 consisting of four courses and two occupational completion points.

The following table illustrates the secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level
A	8913010	Introduction to Environmental Technology	1 credit	17-3025	2
	8913020	Environmental Technology 2	1 credit		2
B	8916010	Water Quality Resources 3	1 credit	17-3025	3
	8916020	Water Quality Resources 4	1 credit		3

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for Mathematics & Language Arts (FS-M/LA)

Some or all of the courses in this program have been aligned to the Florida Standards for Mathematics and Language Arts used in core academic classes. Data shown in the framework table (column ‘FS-M/LA’) contains the results of these alignment efforts.

Next Generation Sunshine State Standards (NGSSS) - Science

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards (NGSSS) for Science. These standards are listed next to the content standards.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. 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://www.ffa.org/thecouncil/Documents/finalafnrstandardsv324609withisbn_000.pdf

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:

- 01.0 Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Land Resources Technology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Land Resources Technology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.
- 04.0 Describe hydrology.
- 05.0 Practice safety skills and procedures.
- 06.0 Demonstrate sampling procedures.
- 07.0 Discuss related standards and regulations.
- 08.0 Conduct site assessment.
- 09.0 Describe related geologic principles.
- 10.0 Manage wetlands.
- 11.0 Manage wildlife.
- 12.0 Manage forests.
- 13.0 Identify career opportunities and organizational dynamics.
- 14.0 Describe water treatment techniques.
- 15.0 Describe stormwater systems.
- 16.0 Manage data and physical resources.
- 17.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
- 18.0 Manage hazardous materials.
- 19.0 Control incidents.
- 20.0 Prepare a plan.
- 21.0 Perform remediation.
- 22.0 Collect and dispose of solid waste.
- 23.0 Identify continuing education needs and opportunities.
- 24.0 Evaluate wetlands management practices.
- 25.0 Evaluate wildlife management procedures.
- 26.0 Evaluate forest management techniques.
- 27.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Land Resources Technology.
- 28.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Land Resources Technology.
- 29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.
- 30.0 Discuss hydrology.
- 31.0 Conduct water sampling.

- 32.0 Discuss geology principles of water resources.
- 33.0 Explain water treatment techniques.
- 34.0 Discuss stormwater systems.
- 35.0 Describe water distribution.
- 36.0 Demonstrate the management and environmentally sound use of water resources.
- 37.0 Manage fisheries.
- 38.0 Maintain water treatment equipment and facilities.
- 39.0 Inspect and maintain drainage systems.
- 40.0 Describe the nature and origin of and career opportunities in aquaculture, mariculture and other hydrological industries.
- 41.0 Identify career opportunities and organizational dynamics in water resources.
- 42.0 Demonstrate water treatment techniques.
- 43.0 Compliance monitoring/inspection.
- 44.0 Discuss comprehensive quality assurance plan.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Environmental Technology
Course Number: 8913010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of hydrology, environmental standards and regulations, site assessment, geologic principles, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Land Resources Technology.	
01.01 Key Ideas and Details		
01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02 Craft and Structure		
01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03 Integration of Knowledge and Ideas		
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04 Range of Reading and Level of Text Complexity		
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Land Resources Technology.		
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.910.WHST.1.3	
02.02 Production and Distribution of Writing		
02.02.1	Produce clear and coherent writing in which the development,	

Florida Standards	Correlation to CTE Program Standard #
<p>organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4</p>	
<p>02.02.2 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5</p>	
<p>02.02.3 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6</p>	
02.03 Research to Build and Present Knowledge	
<p>02.03.1 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7</p>	
<p>02.03.2 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8</p>	
<p>02.03.3 Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9</p>	
02.04 Range of Writing	
<p>02.04.1 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10</p>	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.	
<p>03.01 Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1</p>	
<p>03.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1</p>	
<p>03.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1</p>	

Florida Standards		Correlation to CTE Program Standard #
03.04	Model with mathematics.	MAFS.K12.MP.4.1
03.05	Use appropriate tools strategically.	MAFS.K12.MP.5.1
03.06	Attend to precision.	MAFS.K12.MP.6.1
03.07	Look for and make use of structure.	MAFS.K12.MP.7.1
03.08	Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

CTE Standards and Benchmarks	
04.0	Describe hydrology--The student will be able to:
04.01	Define basic hydrological terms.
04.02	Explain surface water systems.
04.03	Explain ground water systems.
04.04	Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
04.05	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.
05.0	Practice safety skills and procedures--The student will be able to:
05.01	Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment.
05.02	Identify and utilize safe work practices.
05.03	Identify physical, chemical, biological, and zoological hazards.
05.04	Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Agency (OSHA), and Hazard Communication (HAZCOM) regulations.
05.05	Determine, review, and follow regulations.
05.06	Develop and maintain appropriate safety records.
05.07	Identify and describe "on the job" hazards and risks including fire/explosive, lead asbestos, and weather hazards.

CTE Standards and Benchmarks

05.08 Perform lifting activities safely.

05.09 Identify ladder safety and fall protection.

05.10 Become certified in first aid/CPR and describe First Responder responsibilities.

06.0 Demonstrate sampling procedures--The student will be able to:

06.01 Define sampling objectives and protocol.

06.02 Operate, calibrate, and maintain sampling equipment.

06.03 Develop sampling strategy.

06.04 Perform applicable field measurements.

06.05 Appropriately preserve, document, and dispose of samples.

06.06 Identify cross-contamination and other risks associated with sampling.

06.07 Describe, plan, and utilize quality assurance practices.

06.08 Submit samples for analysis.

06.09 Perform periodic follow-up sampling.

07.0 Discuss related standards and regulations--The student will be able to:

07.01 Explain the importance and impacts of local, state, and federal regulations and required documentation.

07.02 Describe the Florida Administrative Code's (F.A.C.) impact on environmental issues.

07.03 Discuss the Clean Water Act.

07.04 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statutes.

07.05 Research how rules and laws are made and mandated.

07.06 Research and report how endangered species get listed.

07.07 Describe permitting procedures.

07.08 Identify regulation resources.

CTE Standards and Benchmarks

07.09	Describe various licensing procedures.
08.0	Conduct site assessment--The student will be able to:
08.01	Identify the purposes of site assessment.
08.02	Describe required documentation.
08.03	Identify the phases of site assessment.
08.04	Obtain background design information
08.05	Verify blueprint accuracy.
08.06	Conduct manual survey.
08.07	Obtain physical and performance measurements.
08.08	Determine system safety impacts.
08.09	Determine possible nature and extent of exposure.
08.10	Assess needed equipment and processes.
08.11	Identify type of mechanical systems required.
08.12	Determine operational criteria.
08.13	Recommend corrective action.
09.0	Describe related geologic principles--The student will be able to:
09.01	Explain the geological history of Florida.
09.02	Create a soil profile and describe the associated components.
09.03	Evaluate soil profiles, land-capability classes, and soil conservation practices.
09.04	Interpret legal descriptions of land.
09.05	Identify mapping and surveying techniques and equipment.
10.0	Manage wetlands--The student will be able to:

CTE Standards and Benchmarks

10.01	Identify ecosystems.
10.02	Discuss the structure and function of wetlands.
10.03	Define limits of wetlands.
10.04	Discuss habitat value.
10.05	Identify fauna and flora.
10.06	Determine desirable vs. nuisance plant and animal species.
11.0	Manage wildlife--The student will be able to:
11.01	Identify and compare wildlife species.
11.02	Identify and describe life histories of game species.
11.03	Identify and describe life histories of non-game species.
11.04	Discuss urban wildlife management.
11.05	Describe community ecology.
11.06	Identify and practice wildlife techniques and principles.
11.07	Discuss population dynamics.
12.0	Manage forests--The student will be able to:
12.01	Describe dendrology.
12.02	Describe silviculture.
12.03	Identify and demonstrate replanting techniques.
12.04	Discuss harvesting techniques.
12.05	Identify timber stand improvement.
12.06	Identify timber and forest products.
13.0	Identify career opportunities and organizational dynamics--The student will be able to:

CTE Standards and Benchmarks

13.01	Identify careers and opportunities in the following fields: Surface/stormwater, drinking water, wastewater, groundwater, land resources, air quality, solid waste, and HAZMAT.
13.02	Compare supervisory and administrative responsibilities.
13.03	Identify organizational structures.
13.04	Identify team building communication skills.
13.05	Identify problem-solving techniques.
13.06	Identify employee responsibility/benefits.
13.07	Identify legal aspects of personnel relations.
13.08	Communicate effectively in verbal, written, and nonverbal modes.
13.09	Recognize and demonstrate good listening skills.
13.10	Conduct small informal and formal group meetings.
13.11	Identify the opportunities for leadership development available through an appropriate student and/or professional organization.

**Florida Department of Education
Student Performance Standards**

Course Title: Environmental Technology 2
Course Number: 8913020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of water treatment, stormwater systems, Geographic Informational and Global Positioning Systems, environmental standards and regulations, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Land Resources Technology	
	01.01 Key Ideas and Details	
	01.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure	
	01.02.1 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.RST.2.5	
01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	
	LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas	
01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	
	LAFS.910.RST.3.7	
01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	
	LAFS.910.RST.3.8	
01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	
	LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity	
01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently.	
	LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Land Resources Technology	
02.01	Text Types and Purposes	
02.01.1	Write arguments focused on discipline-specific content.	
	LAFS.910.WHST.1.1	
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	
	LAFS.910.WHST.1.2	
02.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.	
	LAFS.910.WHST.1.3	
02.02	Production and Distribution of Writing	

Florida Standards		Correlation to CTE Program Standard #
02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03 Research to Build and Present Knowledge		
02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04 Range of Writing		
02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Land Resources Technology		
03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
03.03	Construct viable arguments and critique the reasoning of others.	

Florida Standards		Correlation to CTE Program Standard #
	MAFS.K12.MP.3.1	
03.04 Model with mathematics.	MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1	
03.06 Attend to precision.	MAFS.K12.MP.6.1	
03.07 Look for and make use of structure.	MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1	

CTE Standards and Benchmarks	
14.0 Practice safety skills and procedures--The student will be able to:	
14.01 Identify safety procedures for: Wells, pumps, electrical equipment, motor vehicles, buildings, and other necessary equipment.	
14.02 Handle compressed gasses, solids, and liquids safely.	
14.03 Summarize "Right of Access" law.	
14.04 Summarize "Confined Space" regulations.	
14.05 Identify Zero Tolerance policies.	
14.06 Identify employee limitations.	
14.07 Identify appropriate decontamination procedures.	
14.08 Identify principles of toxicology.	
14.09 Identify routes of exposure.	
14.10 Identify respirator safety procedures.	
14.11 Discuss history of hazardous materials and hazardous categories.	
14.12 Discuss common chemical compatibility.	
15.0 Discuss related standards and regulations--The student will be able to:	
15.01 Identify appropriate agencies and their functions	

CTE Standards and Benchmarks

15.02	Describe the role of environmental protection.
15.03	Interpret the Regulatory File System.
15.04	Create, evaluate and present a well-head protection plan.
16.0	Identify career opportunities and organizational dynamics--The student will be able to:
16.01	Recognize and demonstrate effective communications skills in the workplace.
16.02	Design and conduct presentations.
17.0	Describe water treatment techniques--The student will be able to:
17.01	Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater.
17.02	Describe disposal options.
17.03	Identify septic tanks types and functions.
18.0	Describe stormwater systems--The student will be able to:
18.01	Research current construction trends and methods of stormwater systems.
18.02	Define topography and its effects on stormwater.
19.0	Manage data and physical resources--The student will be able to:
19.01	Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, GIS, and security.
19.02	Identify possible funding sources.
19.03	Prepare budgets and purchase orders.
19.04	Prepare a time management plan.
19.05	Utilize information databases.
19.06	Locate and interpret printed reference materials.
19.07	Describe network opportunities.
19.08	Maintain necessary/required record keeping practices and procedures.
19.09	Keep inventory, time sheets, and equipment maintenance logs.

CTE Standards and Benchmarks

19.10 Identify suppliers and technical resources.

20.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems--The student will be able to:

20.01 Define GIS and its function.

20.02 Use GIS software.

20.03 Learn GIS applications.

20.04 Download LANDSTAT Satellite system into GIS.

20.05 Develop a GIS model.

20.06 Define GPS and its function.

20.07 Collect GPS data and load on GIS.

20.08 Research and identify other remote sensing tools.

21.0 Manage hazardous materials--The student will be able to:

21.01 Describe flow and life cycles of materials.

21.02 Identify proper chemical handling and storage guidelines.

21.03 Describe material management procedures.

21.04 Identify waste minimization, pollution prevention and alternatives to disposal.

21.05 Describe waste determination procedures.

21.06 Describe storage tank procedures.

21.07 Identify biochemical/medical waste.

21.08 Describe shipping and transportation procedures of hazardous materials.

21.09 Identify and interpret phase I and II audits.

21.10 Interpret closure reports.

21.11 Write contamination assessment reports.

22.0 Control incidents--The student will be able to:

CTE Standards and Benchmarks

22.01	Identify and describe reasons for controlling incidents.
22.02	Describe levels of response.
22.03	Determine and use proper chain of command.
22.04	Determine methods of control.
22.05	Demonstrate site access restriction methods.
22.06	Identify appropriate authorities to be notified.
22.07	Place equipment appropriately.
22.08	Orient zones.
22.09	Identify possible geographic hazards.
22.10	Identify media protocol and procedures for communicating with the public.
22.11	Prepare a press release for a mock incident
23.0	Prepare a plan--The student will be able to:
23.01	Describe the need for and types of pre-planning.
23.02	Identify and select necessary agency involvement.
23.03	Identify possible contamination zones.
23.04	Create contention plans for hurricane, tornadoes, floods, fires, and nuclear accidents.
23.05	Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act (EPCRA) regulations.
23.06	Create plan for deployment.
23.07	Evaluate contingency plans.
23.08	Write a contingency plan.
23.09	Conduct mock disaster activities.
24.0	Perform remediation--The student will be able to:
24.01	Research appropriate cleaning methods.

CTE Standards and Benchmarks

24.02	Create a plan for a disaster clean up including needed materials and equipment.
24.03	Conduct entry and closure methods.
24.04	Identify contamination removal procedures.
24.05	Design a site/system cleanliness verification procedure.
24.06	Identify tear down and demobilization procedures.
25.0	Collect and dispose of solid waste--The student will be able to:
25.01	Describe history of solid waste disposal.
25.02	Identify types of waste.
25.03	Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.)
26.0	Identify continuing education needs and opportunities--The student will be able to:
26.01	Determine continuing education needs/goals.
26.02	Identify available educational and financial resources.
26.03	Identify appropriate professional associations and attend meetings where applicable.
26.04	Read and review trade journals.

**Florida Department of Education
 Student Performance Standards**

Course Title: Water Quality Technology 3
Course Number: 8916010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas hydrology, geology principles, water treatment techniques, stormwater systems, water distribution, management of water resources, management of fisheries, drainage systems, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
27.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Land Resources Technology	
	27.01 Key Ideas and Details	
27.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
27.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
27.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	27.02 Craft and Structure	
27.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
27.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
27.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
27.03 Integration of Knowledge and Ideas		
27.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
27.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
27.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
27.04 Range of Reading and Level of Text Complexity		
27.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
27.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
28.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Land Resources Technology	
28.01 Text Types and Purposes		
28.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
28.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
28.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	
28.02 Production and Distribution of Writing		

Florida Standards		Correlation to CTE Program Standard #
28.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
28.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
28.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
28.03 Research to Build and Present Knowledge		
28.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
28.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
28.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
28.04 Range of Writing		
28.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Land Resources Technology		
29.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
29.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
29.03	Construct viable arguments and critique the reasoning of others.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.3.1
29.04 Model with mathematics.	MAFS.K12.MP.4.1
29.05 Use appropriate tools strategically.	MAFS.K12.MP.5.1
29.06 Attend to precision.	MAFS.K12.MP.6.1
29.07 Look for and make use of structure.	MAFS.K12.MP.7.1
29.08 Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

CTE Standards and Benchmarks	
30.0	Discuss hydrology--The student will be able to:
30.01	Identify alternative sources of water.
30.02	Identify soil conditions as they relate to water quality.
30.03	Research and explain saltwater intrusion.
30.04	Research governmental regulation authorities associate with Florida's water sources.
30.05	Identify limnology systems.
31.0	Conduct water sampling--The student will be able to:
31.01	Discuss water testing lab criteria.
31.02	Collect and analyze water samples: grab and otherwise.
31.03	Record data into identified database program.
31.04	Interpret lab results.
31.05	Evaluate data.
31.06	Measure well volumes.
31.07	Describe organism sampling techniques.
32.0	Discuss geology principles of water resources--The student will be able to:

CTE Standards and Benchmarks

32.01	Analyze local mineral resources.
32.02	Describe lithological descriptions of local units/formations.
32.03	Describe Florida aquifer system.
32.04	Perform aquifer performance tests.
32.05	Discuss basic groundwater chemistry.
32.06	Describe basic geographic techniques.
32.07	Describe local geology related problems.
33.0	Explain water treatment techniques--The student will be able to:
33.01	Describe drinking water treatments.
33.02	Identify water treatment recommendations for fish hatcheries.
33.03	Identify and describe the qualities water should possess for use in aquaculture.
33.04	Explain how changes in water affect aquatic life.
33.05	Explain, monitor, and maintain freshwater/salt water quality standards for the production of desirable species.
33.06	Calculate volume in circular, rectangular and irregular shaped water structures.
33.07	List and explain sources of aquaculture pollution and methods of preventing and/or correcting these pollution problems.
34.0	Discuss stormwater systems--The student will be able to:
34.01	Determine boundaries of watersheds.
34.02	Identify runoff coefficients.
34.03	Identify the relationship between construction sites and stormwater systems.
34.04	Research rules and regulations in regards to stormwater systems.
34.05	Contact local municipalities to determine stormwater regulations.
35.0	Describe water distribution--The student will be able to:
35.01	Identify backflow testing procedures.

CTE Standards and Benchmarks

35.02	Identify necessary equipment for water distribution purposes.
35.03	Read and maintain meters.
35.04	Identify maintenance requirements for fire hydrants, pipes, and valves.
35.05	Identify proper procedures for operation and maintenance of lift stations.
36.0	Demonstrate the management and environmentally sound use of water resources--The student will be able to:
36.01	Determine quality of groundwater and surface water.
36.02	Identify solids found in water.
36.03	Identify primary and secondary contaminants.
36.04	Identify unregulated organic compounds.
37.0	Manage fisheries--The student will be able to:
37.01	List and explain the meaning of morphology, anatomy and physiology in relation to Ichthyology.
37.02	List and describe the physiology of aquatic animals.
37.03	Identify and describe the basic structures and external anatomy of crustaceans.
37.04	Identify and describe the basic structure and internal anatomy of an oyster or a mussel.
37.05	Identify and describe the external and internal anatomy of fish.
37.06	Identify and describe the basic morphology of aquatic macroalgae and microalgae.
37.07	Determine why aquatic crops may be more productive than terrestrial crops.
37.08	List and describe important characteristics in choosing a species.
37.09	Develop an information file in aquaculture species.
37.10	List and describe the major factors in the growth of aquatic fauna and flora.
37.11	Identify aquaculture/mariculture species of commercial importance in your area.
38.0	Maintain water treatment equipment and facilities--The student will be able to:
38.01	Research water treatment equipment and facility components.

CTE Standards and Benchmarks

38.02	Identify appropriate temperatures and other external conditions.
38.03	Identify the effect of weather conditions and changes.
38.04	Describe appropriate flow rates and tank levels.
38.05	Create a checklist and/or policies of necessary procedures to handle daily conditions, hazards and/or malfunctions.
38.06	Describe maintenance procedures and techniques of filters, pipes, generators, meters, motors, valves, instruments, injectors, storage basins etc.
39.0	Inspect and maintain drainage systems--The student will be able to:
39.01	Research Best Management Procedures.
39.02	Demonstrate proper ditch, pond, culvert, and manhole inspection techniques.
39.03	Demonstrate proper ditch, pond, culvert, and manhole maintenance techniques
39.04	Develop storm cleanup and prevention plan.
39.05	Recognize pollutants, illegal dumping and discharge and demonstrate appropriate handling procedures.
39.06	Clean outfall structures, inlets, and treatment systems.
39.07	Demonstrate the procedures to clean and televise pipes.
39.08	Mow ditch banks and right of ways.
39.09	Maintain, repair and replace pipe sections.
40.0	Describe the nature and origin of and career opportunities in aquaculture, mariculture and other hydrological industries--The students will be able to:
40.01	Identify related associated professional associations.
40.02	List and describe the nature of five areas of aquaculture occupations.
40.03	List and describe the careers associated with water treatment, distribution, and management.
40.04	Determine the educational requirements and experience needed to enter and advance in aquaculture/mariculture occupations

**Florida Department of Education
Student Performance Standards**

Course Title: Water Quality Technology 4
Course Number: 8916020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas water treatment techniques, stormwater systems, water distribution, management of water resources, management of fisheries, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. 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.

Florida Standards		Correlation to CTE Program Standard #
27.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Land Resources Technology	
	27.01 Key Ideas and Details	
	27.01.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	27.01.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	27.01.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	27.02 Craft and Structure	
	27.02.1 Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	27.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards		Correlation to CTE Program Standard #
27.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
27.03 Integration of Knowledge and Ideas		
27.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
27.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
27.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
27.04 Range of Reading and Level of Text Complexity		
27.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
27.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
28.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Land Resources Technology	
28.01 Text Types and Purposes		
28.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
28.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
28.01.3	Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. LAFS.1112.WHST.1.3	

Florida Standards		Correlation to CTE Program Standard #
28.02	Production and Distribution of Writing	
28.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
28.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
28.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
28.03	Research to Build and Present Knowledge	
28.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
28.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
28.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
28.04	Range of Writing	
28.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
29.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Land Resources Technology.	
29.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
29.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards		Correlation to CTE Program Standard #
29.03	Construct viable arguments and critique the reasoning of others.	MAFS.K12.MP.3.1
29.04	Model with mathematics.	MAFS.K12.MP.4.1
29.05	Use appropriate tools strategically.	MAFS.K12.MP.5.1
29.06	Attend to precision.	MAFS.K12.MP.6.1
29.07	Look for and make use of structure.	MAFS.K12.MP.7.1
29.08	Look for and express regularity in repeated reasoning.	MAFS.K12.MP.8.1

CTE Standards and Benchmarks	
41.0	Identify career opportunities and organizational dynamics in water resources--The student will be able to:
41.01	Research and create a presentation about aquaculture occupations and opportunities.
41.02	Research and create a presentation about mariculture occupations and opportunities.
41.03	Determine the educational requirements and experience needed to enter and advance in aquaculture/mariculture occupations.
41.04	Prepare a resume.
42.0	Demonstrate water treatment techniques--The student will be able to:
42.01	Determine soil types, land slope, and other factors to consider in choosing a location for a manmade pond or other aquaculture operation.
42.02	Identify/explain environmentally safe methods of aquaculture wastewater disposal.
42.03	Identify and consult agencies regulating water quality standards in order to prevent compliance problems.
42.04	Observe different stages of construction of ponds and/or other aquaculture production facilities.
43.0	Manage fisheries--The student will be able to:
43.01	Use dichotomous keys to identify fish and other aquatic species.
43.02	Discuss disease and parasites related to fish and other aquatic plants and animals.
43.03	Discuss habitat improvement for aquatic animals.

CTE Standards and Benchmarks

43.04	Identify aquaculture and mariculture practices.
43.05	Identify hatchery management.
43.06	Identify monitoring practices.
43.07	Discuss harvesting techniques.
43.08	Describe population dynamics.
43.09	Describe fisheries and marine resources and regulations.
43.10	Design an aquaculture/mariculture system
43.11	Conduct statistical analysis.
43.12	Interpret related data.
44.0	Compliance monitoring/inspection--The student will be able to:
44.01	Trace lines.
44.02	Survey business and industry.
44.03	Conduct pretreatment sampling.
44.04	Analyze data and document reports.
44.05	Design monitoring plan.
44.06	Monitor sites.
45.0	Discuss comprehensive quality assurance plan--The student will be able to:
45.01	Discuss quality assurance rules.
45.02	Write of follow standard operating procedures.
45.03	Describe preventative maintenance techniques.
45.04	Describe cleaning/decontamination techniques.
45.05	Determine accuracy and precision of sampling techniques.

CTE Standards and Benchmarks

45.06 Discuss need for corrective action.

45.07 Document Quality Assurance.

Additional Information

Laboratory Activities

Laboratory investigations, including the use of scientific research, measurement, and laboratory technologies are an integral part of this course. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Bright Futures/Gold Seal Scholarship

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx.

Fine Arts/Practical Arts Credit

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation (<http://www.fldoe.org/articulation/CCD/files/pacourses1213.pdf>). A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Veterinary Assisting
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	A010512
CIP Number	0151080810
Grade Level	30, 31
Standard Length	750 hours
Teacher Certification	AGRICULTUR 1 @2 AGRI @2 AG SUPPLI @7 G
CTSO	N/A
SOC Codes (all applicable)	31-9096 - Veterinary Assistants and Laboratory Animal Caretakers 29-2056 Veterinary Technologists and Technicians
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics:9 Language:9 Reading: 9

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 veterinary assisting industry within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the veterinary assisting industry: planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues. The program also provides supplemental training for persons previously or currently employed as veterinary assistants.

Program Structure

This program is a planned sequence of instruction consisting three postsecondary adult courses that comprise three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the PSAV program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	ATE0006	Veterinary Assistants and Laboratory Animal Caretakers 1	450 hours	31-9096
B	ATE0070	Veterinary Assistants and Laboratory Animal Caretakers 2	150 hours	31-9096
C	ATE0072	Veterinary Assistant	150 hours	29-2056

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:

- 01.0 Describe veterinary science and the role of animals in society.
- 02.0 Describe the socioeconomic role of veterinary sciences on the companion animal livestock industries.
- 03.0 Discuss the human-animal bond and its effects on human health.
- 04.0 Demonstrate the proper use of veterinary science terminology.
- 05.0 Identify careers in the animal industry.
- 06.0 Practice safety.
- 07.0 Recognize normal and abnormal animal behaviors.
- 08.0 Restrain and control companion and livestock animals.
- 09.0 Identify common breeds of companion animals.
- 10.0 Investigate the common husbandry practices and daily care of several species of animals.
- 11.0 Demonstrate basic first aid for companion and livestock animals.
- 12.0 Demonstrate the use of tools, equipment and instruments in the veterinary science and companion animal industry.
- 13.0 Demonstrate proper techniques in taking vital signs.
- 14.0 Identify common breeds of livestock animals.
- 15.0 Identify parts and functions of various systems of selected animals.
- 16.0 Investigate the common husbandry practices and daily care of companion animals and exotic animals and fish.
- 17.0 Explain the various methods of animal identification.
- 18.0 Demonstrate knowledge of animal control and animal welfare organizations.
- 19.0 Describe the problems, causes, and solutions of animal overpopulation.
- 20.0 Locate and interpret animal-related laws.
- 21.0 Identify the different digestive systems of animals and the nutritional requirements of selected species.
- 22.0 Explain the reproductive system and breeding of selected animals.
- 23.0 Identify common species and/or breeds of exotic animals.
- 24.0 Demonstrate human-relations, communications, leadership and employability skills.
- 25.0 Describe the importance of professional ethics and legal responsibilities.
- 26.0 Differentiate between animal welfare and animal rights.
- 27.0 Explain the role of animals in research.
- 28.0 Maintain and analyze records.
- 29.0 Demonstrate knowledge of preventive medicine and disease control.
- 30.0 Explain diagnostic testing.
- 31.0 Describe internal and external parasites and control methods.
- 32.0 Groom selected companion and livestock animals.
- 33.0 Describe exotic animals and the effects of captivity on them.
- 34.0 Assess techniques used in surgical assisting and surgical preparation.
- 35.0 Demonstrate knowledge of pharmacology.
- 36.0 Explain proper methods of syringe and hypodermic needle use.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Veterinary Assisting
PSAV Number: A010512

Standards and benchmarks in **bold** are skills required for industry certification.

Course Number: ATE0006
Occupational Completion Point: A
Veterinary Assistants and Laboratory Animal Caretakers 1– 450 Hours – SOC Code 31-9096

01.0 Describe veterinary science and the role of animals in society--The students will be able to:

01.01 Define veterinary science.

01.02 Identify key components in the domestication of animals.

01.03 Choose current issues facing the animal industry today and describe the effect of each on society.

02.0 Describe the socioeconomic role of veterinary sciences on the companion animal and livestock industries--The students will be able to:

02.01 Summarize the history of the veterinary sciences, companion animal and livestock industry.

02.02 Assess the impact of companion animals on the veterinary science industry.

02.03 Discuss the role of the animal industry in the interaction of population, food, energy, and the environment.

03.0 Discuss the human-animal bond and its effects on human health--The students will be able to:

03.01 **Demonstrate appropriate understanding and respect for the human-animal bond and its influence on veterinary care.**

03.02 **Explain the different types of human-animal bonds, how they vary between clients and how to interact with each type of client and their animal**

03.03 **Explain the different types of human-animal bonds for companion animals versus working animals and livestock.**

03.04 Discuss the positive health effects on people resulting from their interaction with animals.

03.05 Discuss programs that use human-animal interaction as a therapy tool.

03.06 Describe the characteristics of animals used in the animal-facilitated therapy programs.

03.07 Describe national and local programs that use animal-facilitated therapy.

03.08	Discuss grief-response and emotional impact of animal loss.
04.0	Demonstrate the proper use of veterinary science terminology--The students will be able to:
04.01	Define common veterinary and medical terms.
04.02	Compile a list of prefixes, suffixes, and root words for veterinary medical terminology.
04.03	Categorize gender and species-related terminology.
04.04	List common medical and veterinary abbreviations
04.05	Illustrate terms lateral, medial, dorsal, ventral, sterna, rostral, and caudal
05.0	Identify careers in the animal industry--The students will be able to:
05.01	Compile a list of major animal-industry careers.
05.02	Describe training requirements for entry and advancement in animal-industry careers.
05.03	Identify professional organizations and trade journals in the animal industry.
05.04	Investigate career opportunities in the veterinary science, companion animal, and large animal industry; also identify educational experiences needed to prepare for those careers.
05.05	Using Florida Veterinary Medical Association (FVMA) as a reference, distinguish between a Veterinary Assistant, Certified Veterinary Assistant, Veterinary Technician, Certified Veterinary Technician, and Veterinary Technologist.
05.06	Investigate requirements necessary for recertification.
06.0	Practice safety--The students will be able to:
06.01	Recognize and avoid potential safety hazards (physical, chemical, biological and zoonotic).
06.02	Utilize proper safety precautions and procedures when working in the hospital (laboratory, kennel, surgery/prep area, treatment, and exam room).
06.03	Demonstrate knowledge on how to use personal protective equipment- PPE (wears gloves, goggles, face mask, ear plugs, apron, gown, cap, and shoe covers when needed)
06.04	Locate and demonstrates use of an eye wash solution or station
06.05	Locate first aid kit and fire extinguisher
06.06	Explain emergency procedures, locates emergency contact phone numbers and veterinary hospital safety plans for emergency situations such as fire, severe weather, evacuations, etc.
06.07	Explain OSHA (Occupational Safety and Health Act) and its regulations pertaining to a veterinary practice, including sanitation, safety of employees and the employee's right to know of potential work place hazards through MSDS (Material Safety Data Sheets) and the written hazard communication plan

06.08	Demonstrate knowledge of OSHA regulations regarding the handling, placement and disposition of sharps and bio-hazardous material
06.09	Handle and uses disposable “sharps” containers in a safe manner
06.10	Explain correct labeling of secondary containers with appropriate safety information
06.11	Recognize allergic reactions and toxicity.
06.12	Control minor hemorrhage and/or trauma.
06.13	Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation
06.14	List the most common causes of animal related accidents.
06.15	Practice safety precautions around animals.
06.16	Discuss the impact of unsafe procedures.
07.0	Recognize normal and abnormal animal behaviors--The students will be able to:
07.01	Distinguish between instinctive and learned behaviors.
07.02	Recognize normal and abnormal behavioral characteristics of animals through observations.
07.03	Recognize signs of aggressive animal behaviors.
07.04	Identify behavioral problems.
07.05	Describe behavioral changes due to aging.
08.0	Restrain and control companion and livestock animals--The students will be able to:
08.01	Trainee demonstrates knowledge of the proper method for placing large animals in a stall, paddock, and trailer.
08.02	Safely handle and restrain dogs, cats, and other animals for exams, procedures, and treatment by currently accepted standards to prevent undue stress or harm to either animals or humans
08.03	Demonstrate verbal and physical restraint of animals
08.04	Demonstrate how to match appropriate level of restraint for an individual animal’s level of resistance and situation
08.05	Demonstrate the proper method for placing a lead on a dog -slip lead and standard leash
08.06	Utilize currently accepted standards for lifting, positioning, and restraining animals

08.07	Demonstrate positioning an animal in sternal, dorsal, and lateral recumbency
08.08	Demonstrate restraint of a small dog on an exam table
08.09	Demonstrate restraint of a cat on an exam table
08.10	Demonstrate restraint of a large dog on an exam table, lift table, and on the floor
08.11	10. Explain appropriate methods for placing and removing animals from kennels
08.12	Identify the following venipuncture sites and accepted restraint for each; cephalic vein (cat & dog), jugular vein (cat & dog), femoral vein (cat), saphenous vein (dog)
08.13	Demonstrate use of restraint muzzle on a dog using commercial, leash, catch/restraint pole and gauze muzzles of appropriate size
08.14	Demonstrate currently accepted standards for restraint of the cat including towels, scruff technique, commercial muzzles, cat bags, pillow cases, leather gloves, and the squeeze cage
08.15	Explain commonly accepted standards of restraint for exotic and avian
08.16	Identify the appropriate restraining methods for the following: <ul style="list-style-type: none"> • Halter, tie and lead horses and cattle • Apply twitch, nose tongs • Restrain sheep and swine • Load large animals
08.17	Discuss chemical restraints of animals.
09.0	Identify common breeds of companion animals--The students will be able to:
09.01	Identify canine breeds and list breed characteristics.
09.02	Identify feline breeds and list breed characteristics.
09.03	Identify breeds of rabbits and list their primary use.
10.0	Investigate the common husbandry practices and daily care of several species of animals--The students will be able to:
10.01	Describe husbandry and care of canine breeds.
10.02	Describe husbandry and care of feline breeds.
10.03	Describe husbandry and care of rabbits.

10.04	Describe husbandry and care of rodents.
10.05	Describe husbandry and care of bovine.
10.06	Describe husbandry and care of ovine.
10.07	Describe husbandry and care of caprine.
10.08	Describe husbandry and care of porcine.
10.09	Describe husbandry and care of equine.
10.10	Describe husbandry and care of poultry.
10.11	Demonstrate knowledge of basic pet care for puppies/kittens; including advice on house-breaking or litter box use, puppy/kitten-proofing the house, health care, vaccination schedules, intestinal parasite prevention, flea and tick control, feeding, training, and spaying/neutering
10.12	Explain common diseases of the canine and feline and current recommendations for disease prevention
10.13	List benefits of spaying and neutering pets including health benefits as well as population control
11.0	Demonstrate basic first aid for companion and livestock animals--The students will be able to:
11.01	Recognize emergency health (physical and behavioral) status.
11.02	Describe procedures to restrain and move injured animals.
11.03	Demonstrate hemorrhage control.
11.04	Dress wounds and punctures.
11.05	Demonstrate the correct emergency procedures for shock, burns, heatstroke, and fractures.
11.06	Describe and access up-to-date information on animal health.
11.07	Demonstrate animal CPR.
12.0	Demonstrate the use of tools, equipment, and instruments in the veterinary science and companion animal industry--The students will be able to:
12.01	Identify and select the proper tools, equipment, and instruments for a specific job.
12.02	Describe the principles of selected mechanical applications as it relates to large animal restraint equipment (e.g., levers, pulleys, hydraulics).

12.03	Demonstrate the ability to use an equipment or instrument manual.
12.04	Demonstrate the use of selected tools, equipment, and instruments.
12.05	Service, maintain, and store tools, equipment, instruments, and supplies.
12.06	Demonstrate the proper placement of a slide in the microscope and focus on 100X and 400X magnification
12.07	Explain appropriate materials for cleaning the microscope
12.08	Demonstrate the centrifugation of a sample
12.09	Explain the purpose of the blood analyzer machine.
13.0	Demonstrate proper techniques in taking vital signs.—The student will be able to:
13.01	Obtain and record the TPR (temperature, pulse, and respiratory rate) with minimal discomfort to pet.
13.02	Demonstrate how to use, clean, and store thermometers.
13.03	Appropriately identify and record the MM (mucus membrane color).
13.04	Appropriately obtain and record the CRT (capillary refill time).
13.05	Identify normal and abnormal range for each parameter (TPR, MM, and CRT).
14.0	Identify common breeds of livestock animals--The students will be able to:
14.01	Identify bovine breed and their characteristics.
14.02	Identify ovine breed and their characteristics.
14.03	Identify caprine breed and their characteristics.
14.04	Identify porcine breed and their characteristics.
14.05	Identify equine breed and their characteristics.
14.06	Identify poultry breed and their characteristics.
15.0	Identify parts and functions of various systems of selected animals--The students will be able to:
15.01	Identify internal and external anatomy of selected animals.
15.02	Identify parts of the skeletal system of selected animals.

15.03	Compare the human skeletal system to that of other animals.
15.04	Identify parts and functions of the following systems of animals using correct terminology:
15.04.01	Identify the general function of the respiratory system and the major organs
15.04.02	Identify the general function of the skeletal system and the major bones of the axial and appendicular skeleton
15.04.03	Identify the general function of the muscular system and major groups of muscles
15.04.04	Identify the general function of the digestive system and the major organs
15.04.05	Identify the general function of the cardiovascular system and the major organs
15.04.06	Identify the general function of the respiratory system and the major organs
15.04.07	Identify the general function of the endocrine and the major organs
15.04.08	Identify the general function of the urinary system and the major organs
15.04.09	Identify the general function of the reproductive system and both male and female organs
15.04.10	Identify the general function of the nervous system and the major organs
15.04.11	Identify the general function of the integumentary system and the major organs
15.04.12	Explain the species differences in species of the digestive tracks of ruminates monogastric non-ruminants, and hindgut fermenters
15.04.13	Explain the differences in the teeth and eating habits for omnivores, carnivores and herbivores
16.0	Investigate the common husbandry practices and daily care of companion animals and exotic animals and fish—The students will be able to:
16.01	Describe husbandry and care of guinea pigs.
16.02	Describe husbandry and care of chinchillas and degus.
16.03	Describe husbandry and care of ferrets.
16.04	Describe husbandry and care of amphibians.
16.05	Describe husbandry and care of reptiles.
16.06	Describe husbandry and care of birds.
16.07	Describe husbandry and care of fish.

17.0	Explain the various methods of animal identification.-- The student will be able to:
17.01	Explain types of identification tags and their use.
17.02	Explain the use of microchips for animal identification.
17.03	Explain types of tattoos for animals and the use in both companion and production animals.
17.04	Explain the types of ear tags and their use in production animals.
17.05	Explain types of ear notching and use for identification.

Course Number: ATE0070
Occupational Completion Point: B
Veterinary Assistants and Laboratory Animal Caretakers 2– 150 Hours – SOC Code 31-9096

18.0	Demonstrate knowledge of animal control and animal welfare organizations--The students will be able to:
18.01	Differentiate between animal control agencies and animal welfare organizations.
18.02	Describe the responsibilities and goals of animal control agencies and animal welfare organizations
18.03	Identify and locate local animal control agencies and animal welfare organizations.
19.0	Describe the problems, causes, and solutions of animal overpopulation--The students will be able to:
19.01	Explain the cause and effect of overpopulation in animals.
19.02	Define euthanasia and describe its role in animal overpopulation.
19.03	Identify organizations involved in the public education of animal overpopulation.
19.04	Explain the pet owners' and society's responsibilities concerning animal overpopulation.
19.05	Discuss the medical benefits of spaying and neutering.
20.0	Locate and interpret animal-related laws--The students will be able to:
20.01	Describe local animal control laws.
20.02	Describe permitting requirements for exotic and wildlife animals.
20.03	Demonstrate knowledge of local and state animal regulations.
20.04	Determine the legal limitations of duties of an employee in the animal services industry.

20.05	Identify when an Animal Health Certificate is required.
20.06	Explain the laws governing the sale of animals and the disposal of animals.
20.07	List the options for euthanasia.
20.08	List the options for disposal of the pet's body.
21.0	Identify the different digestive systems of animals and the nutritional requirements of selected species--The students will be able to:
21.01	Differentiate between ruminants and non-ruminants(monogastric and hind gut fermentors) .
21.02	Differentiate the teeth and eating habits of omnivorous, carnivores, and herbivores.
21.03	Describe the basic nutritional requirements of selected species.
21.04	Analyze different feed labels and identify feed ingredients.
21.05	Differentiate animal food products for healthy and ill animals.
21.06	Explain the appropriate storage for dry and canned dog or cat food.
21.07	Identify the date code for dry and canned dog or cat food and appropriate disposal if out of date.
21.08	Identify the feeding guide for dry and canned dog or cat food and appropriate measuring cup or device.
21.09	Demonstrate knowledge of nutritional based on life stage and size of animal and chooses appropriate food and amount for specific animals for general care.
21.10	Demonstrate ability to follow oral or written instructions for therapeutic pet food including type, amount, and frequency.
21.11	Explain potential problems with feeding therapeutic foods incorrectly or to the wrong patient .
21.12	Monitor and record in the medical record food and water intake for each patient .
21.13	Notify supervisors of vomiting, diarrhea, lack of eating, lack of drinking or any other abnormalities with food and water intake.
22.0	Explain the reproductive system and breeding of selected animals--The students will be able to:
22.01	Describe the male and female reproductive systems.
22.02	Determine sex of animals.
22.03	Determine appropriate age for breeding.
22.04	Identify gestation length.

22.05	Describe estrous cycle.
22.06	Describe breeding techniques.
22.07	Select male and female for breeding.
22.08	Care of breeding stock.
22.09	Care of newborn.
22.10	Explain the differences and similarities between reproduction in different animal species.
23.0	Identify common species and/or breeds of exotic animals--The students will be able to:
23.01	Identify common avian species/breed and their characteristics.
23.02	Identify common reptile species/breed and their characteristics.
23.03	Identify common exotic mammal species/breed and their characteristics.
23.04	Identify common pet fish species/breed and their characteristics.
24.0	Demonstrate human-relations, communications, leadership and employability skills--The students will be able to:
24.01	Demonstrate acceptable work habits and attitudes.
24.02	Follow oral and written directions with understanding; ask questions that clarify directions, as needed.
24.03	Communicate effectively in verbal, written, and nonverbal modes; demonstrate effective telephone skills.
24.04	Recognize and demonstrate listening skills and assertive communications skills in the workplace.
24.05	Conduct small, informal, formal, and group meetings.
24.06	Identify the opportunities for leadership development available through an appropriate students and/or professional organization.
24.07	Demonstrate acceptable employee hygiene habits.
24.08	Demonstrate appropriate responses to criticism from employer, supervisor, and peers.
24.09	Complete pertinent forms for employment, such as a resume, a job application, a W-4 form.
24.10	Demonstrate job interview techniques.
24.11	Trainee avoids misrepresentation, slander, violating client confidentiality, substandard patient care, substance abuse, or animal abuse/neglect.

24.12	Demonstrates acceptable work habits and attitude
24.13	Explains the veterinarian-client-patient relationships
24.14	Recognizes the importance of keeping their credentials current with continuing education credits
24.15	Recognizes and adheres to the governing laws for veterinary medicine in Florida.
24.16	Conforms to safety and professional dress code by dressing in well- fitting scrubs or uniforms, closed- toed shoes, avoids excessive or loose jewelry, or excessive and visible body-piercings or tattoos, avoids long or fake nails, and keeps hair short or tied back.
24.17	Actively observe his/her working environment and animals promptly reporting observations and concerns to the veterinary technician or veterinarian as needed.
24.18	Demonstrate initiative to complete tasks as delegated.
24.19	Accurately follow both oral and written instructions.
24.20	Resolve complaints or conflicts with either pet owners/clients or co-workers in a professional manner.
24.21	Explain the forms of communication including verbal-spoken; nonverbal- body language, and written.
24.22	Utilize appropriate communication skills including courtesy, kindness, patience, tactfulness, sympathy, empathy, and active listening skills.
25.0	Differentiate between animal welfare and animal rights--The students will be able to:
25.01	Define animal welfare and animal rights.
25.02	Compare and contrast between animal welfare and animal rights.
25.03	Identify animal welfare and animal rights advocate groups.
25.04	Debate current events concerning animal welfare and animal rights.
25.05	Describe animal cruelty and the consequences of cruel treatment of animals.
26.0	Explain the role of animals in research--The students will be able to:
26.01	Describe the history of the role of animals in research.
26.02	Discuss medical advances made possible through the use of animals in research.
26.03	Define USDA and explain its roles in using animals for research.
26.04	Describe the role of the Institutional Animal Care and Use Committee (IACUC) with regard to animal research facilities.

26.05	Explain the controversy over using animals in research.
26.06	Identify organizations that are in favor of and those that are against the use of animals in research.
26.07	Develop a personal position on the use of animals in research and support that position.
26.08	Explain how biotechnology has affected animal research.
26.09	Debate the use of cloning for research purposes.
27.0	Maintain and analyze records--The students will be able to:
27.01	Maintain and analyze animal records.
27.02	Discuss the legal requirements of maintaining animal health records, and maintain and analyze animal health records.
27.03	Maintain and analyze basic business records (inventory, depreciation, receipts, expenses), using computer applications.
27.04	Demonstrate knowledge of and ability to schedule appointments.
27.05	Demonstrate knowledge of admissions and discharges for boarders or non-medical cases.
27.06	Demonstrate filing and retrieving of records from both numerical and alphabetical filing systems.
27.07	Demonstrate knowledge of computer and keyboarding skills.
27.08	Demonstrate knowledge of data collection from organized records.
27.09	Recognize that medical records are legal documents and must meet the following legal requirements: (1)establish veterinarian-client-patient relationship, (2)contain owner and patient information, (3)contain patient history, and (4) contain contemporaneously written medical procedures
27.10	Demonstrate knowledge of proper telephone skills.
27.11	Demonstrate the ability to follow oral and written directions.
27.12	Describe the duties of an office or hospital staff member as outlined by NAVTA which includes: <ul style="list-style-type: none"> • Greet pet owner/client, identifies his/herself by name and as veterinary assistant in a professional manner • Obtain or confirm pet owner/client and pet information including pet owner/client's name, address and phone numbers; pet's name, species, breed, color, sex and neutered/not neutered, and age or birth date • Discuss process for recording new information and/or confirms existing information on medical record using appropriate medical terminology and concise notations. Include current date and reason for appointment. • Obtain and record the pet's vital signs (TPR, MM, & CRT) and weight with minimal restraint to the pet. • Leave the exam room courteously indicating the veterinarian will be right in.
27.13	Explain the importance of client/patient confidentiality.

27.14	Generalize the basic use of practice management software.
28.0	Demonstrate knowledge of preventive medicine and disease control--The students will be able to:
28.01	Describe the importance of preventive medicine for animal health.
28.02	Differentiate between healthy and sick animals.
28.03	Describe common infectious and noninfectious diseases of animals to include bacterial, viral, fungal, prion and zoonotic.
28.04	Describe vaccinations available for disease prevention and vaccination procedures.
28.05	Describe isolation or quarantine procedures for new or sick animals. <ul style="list-style-type: none"> Describe methods of preventive medicine and quarantine for disease control in a kennel, cattery, paddock, rabbitry, and zoo.
28.06	Discuss the terms immunology and active and passive immunity as it applies to disease and vaccination.
28.07	Describe concepts for periodic health check-up.
28.08	List and discuss common zoonotic diseases.
28.09	Demonstrate proper sanitation techniques for an examination room, hospital facilities, surgical suites, kennel, cattery, paddock, rabbit hutch, and zoo.
28.09.01	Keep assigned work areas clean and organized
28.09.02	Explain sanitary procedures including physical cleaning, disinfecting, and sterilizing
28.09.03	Demonstrate proper cleaning protocols for kennels, runs, and enclosures including cleaning and disinfecting all sides of the kennel (floor, ceiling, walls, & door) and all items in the kennel (bowls, blankets, toys, etc)
28.09.04	List precautions to take when mixing or using multiple cleaning and disinfecting agents i.e. NEVER mix bleach with ammonia containing cleaners or disinfectants
28.09.05	Change bedding materials in a timely and efficient manner.
28.09.06	Demonstrate of the proper disposal of bedding and waste materials.
28.09.07	Notify supervisor of needed repair or maintenance on cages, kennels, or stalls
28.10	Determine containment procedure and treatment for an epidemic.
29.0	Explain diagnostic testing--The students will be able to:
29.01	Explain diagnostic blood tests including: obtaining a blood sample and blood chemistry profiles (to monitor organ function).
29.02	Explain a urinalysis including:

29.02.01	List methods for urine collection commonly used in the veterinary practice
29.02.02	Collect a free-caught urine sample using proper techniques for dogs
29.02.03	Identify time and storage parameters for urine samples
29.02.04	List precautions and safety factors in handling urine samples including personal protection equipment
29.03	Explain fecal test including:
29.03.01	Explain methods of collecting fecal samples.
29.03.02	Identify time and storage parameters for fecal samples.
29.03.03	Identify appropriate volume of feces for each method of testing.
29.03.04	Demonstrate the correct technique for handling and preparing the fecal samples for analysis by flotation, sedimentation, and direct smear.
29.03.05	Explain appropriate method of placing sample on microscope slide or cover slip.
29.03.06	List precautions and safety factors in handling fecal samples including personal protection equipment.
29.04	Summarize procedures necessary for completing a skin scrapping, cytology, and gram stain.
29.05	Examine radiology, electrocardiogram and ultrasound imaging techniques and safety.
29.05.01	Discuss restrictions from radiation exposure for pregnant women and minors.
29.05.02	Explain what a dosimeter badge does and who wears it and when.
29.05.03	Demonstrate the area of exposure in the radiology room including direct beam and scatter radiation.
29.05.04	Explain the correct use of personal protection equipment including lead-shielded gowns, lead gloves, lead thyroid shield, lead glasses, and other lead protective wear.
29.05.05	Explain methods of restraint for positioning for radiographs including no-hold positioning.
29.05.06	Explain the proper handling of radiographic film including safe light use.
29.05.07	Demonstrate the appropriate labeling of a radiograph including date, patient. name, view or side of patient, machine calibrations, and film developing
29.05.08	Maintain radiograph log and filing of films.
29.05.09	Explain how digital radiography differs from film.
29.06	Explain a necropsy and discuss disposal of dead animal- esp. how to handle rabies suspect.

29.06.01	List the common species which may transmit rabies to humans.
29.06.02	Explain the methods of transmission of rabies to animals and humans.
29.06.03	List the symptoms associated with rabies.
29.06.04	Explain the proper safety measures to follow when handling an animal suspected of having rabies.
29.06.05	Explain the procedure for euthanasia suitable as an explanation for a pet owner.
29.06.06	Discuss the grief process that an owner may experience on the loss of the pet.
29.06.07	Discuss the importance of presenting the body of the pet in a respectful and empathetic way.
30.0	Describe internal and external parasites and control methods--The students will be able to:
30.01	Set up fecal flotations or centrifuged fecal samples
30.02	Identify ectoparasites fleas, ticks, lice, and mites and explain the life cycle and treatment and prevention methods
30.03	Identify ova of endoparasites roundworms, hookworms, whipworms, strongyles and explain the life cycle and treatment and prevention methods
30.04	Identify adult endoparasites roundworms, hookworms, whipworms, strongyles and heartworms
30.05	Identify giardia and coccidia in fecal samples
30.06	Identify tapeworm segments in fecal sample or on pet
30.07	Understand and accurately describe route of transmission, parasite vectors, and zoonotic potential.

Course Number: ATE0072
Occupational Completion Point: C
Veterinary Assistant -150 Hours – SOC Code 29-2056

31.0	Groom selected companion and livestock animals--The students will be able to:
31.01	Demonstrate a basic knowledge of using a variety of brushes, combs, flea combs, mat splitters, undercoat rakes, etc to groom animal hair/fur as needed for both cosmetic and therapeutic reasons.
31.02	Demonstrate a basic knowledge of using clippers to cut animal hair/fur as needed for both cosmetic and therapeutic reasons.
31.03	Explain the necessity of following written and oral instructions and all label directions regarding shampoos for bathing and therapeutic or flea rinses (dips).

31.04	List precautions in bathing and dipping including avoiding soap or chemicals in the eyes, lathering the entire body, timing the shampoo application according to directions, and towel or blow drying.
31.05	Identify the area of blood and nerve supply of the nail in the dog and cat and common pets such as rabbits and ferrets.
31.06	Identify appropriate instrument or nail trimmer for small and large dogs and cats.
31.07	Demonstrate comfortable handling of paw or limb during nail trim for dog and cat.
31.08	Explain methods for hemostasis if nail is accidentally trimmed too short.
31.09	Notify supervisor of abnormalities including in-grown nails and abnormal growth or shape.
31.10	Describe the steps in expressing anal sacs using the external method.
31.11	Discuss proper hoof care and hoof trimming needs.
32.0	Describe exotic animals and the effects of captivity on them--The students will be able to:
32.01	Define exotic animal, zoo animal, invasive and native animals.
32.02	Identify exotic animals native and invasive to Florida.
32.03	Explain the effects of urbanization on the wildlife population.
32.04	Describe the roles of the Florida Fish and Wildlife Conservation Commission in wildlife management.
32.05	Explain the effects of state, national, and international laws on the domestication of the exotic animals.
33.0	Assess techniques used in surgical assisting and surgical preparation--The students will be able to:
33.01	Prepare and sterilize surgical equipment and supplies. <ul style="list-style-type: none"> • Explain standard procedure for cleaning and lubricating all stainless steel instruments. • Explain appropriate use of ultrasonic instrument cleaning and proper solutions. • Explain cold sterilization trays and appropriate solutions. • Demonstrate assembly and wrapping of surgical packs for sterilization. • Demonstrate folding and wrapping a surgical gown for sterilization. • Explain proper procedure for sterilizations methods including the autoclave and gas sterilization (ethylene oxide) including safety precautions with each.
33.02	Describe components of surgical assisting. <ul style="list-style-type: none"> • Explain aseptic protocol for maintaining sterility of the surgical field • Demonstrate what can and cannot be touched when assisting in a surgical environment. • Demonstrate how suture material might be removed from its outer packaging and passed to the surgeon while maintaining sterility

33.03	Summarize procedures necessary of patient preparation. <ul style="list-style-type: none"> • Explain reason for pre-surgical fasting and appropriate time interval • List methods to identify animal for surgery and confirm identity. • Demonstrate dorsal and sternal recumbancy positioning and securing animal in each on the surgery table under anesthesia as instructed by the veterinary technician or veterinarian. • Demonstrate clipping or shaving surgical field as instructed by the veterinary technician or veterinarian. • Demonstrate cleaning and disinfecting the surgical field using currently accepted standards for aseptic technique and surgical scrub.
33.04	Identify proper post-surgical care techniques. <ul style="list-style-type: none"> • List parameters to monitor during recovery and signs of distress in the recovery period. • Explain the swallow reflex and the appropriate time and method for endotracheal tube removal. • Explain appropriate transfer of animal from surgery to recovery kennel, positioning in kennel, and precautions in kennel. • Confirm “No food or water” or similar instructions on recovery kennel.
34.0	Demonstrate knowledge of pharmacology--The students will be able to:
34.01	Identify forms of medication including tablet, capsule, liquid, powder, granules, topical creams, liquids, and gels.
34.02	Explain the application of topical flea medication which is absorbed through the skin and precautions for safety of pets and humans.
34.03	Demonstrate the reconstitution of vaccine using appropriate diluents and amounts of diluents.
34.04	Demonstrate administration of a tablet or capsule to a cat and to a dog.
34.05	Demonstrate the administration of a liquid to a cat and to a dog.
34.06	Explain <i>per os</i>, oral, topical, parenteral, and injectable in terms of administering pharmaceuticals.
34.07	Demonstrate the ability to follow oral and written instructions on medication, form of medication, amount of medication, and route of administration of medication.
34.08	List the components that must be present on a prescription label.
34.09	Observe and understand controlled substances logs and security
34.10	Inventory pharmacy supplies and notify supervisor of low supplies
34.11	Identify expiration date on labels and notify supervisor of expired drugs
34.12	Maintain clean shelves and storage areas for pharmaceuticals
34.13	Describe the process for administering medications by injection, oral, nasal and topical.
34.14	Describe the procedure for safe disposal of medications.

34.15	Determine methods to observe animals for medicine side effects or allergies.
35.0	Explain proper methods of syringe and hypodermic needle use. – The student will be able to:
35.01	Identify and give the correct alignment from smallest to largest of hypodermic needles including 12 g, 18g, 20 g, 22 g and 25 g.
35.02	Identify specified needle gauge and length when requested.
35.03	Identify and align from smallest to largest commonly used syringes including 3cc, 6cc, 12cc, 20cc, 35cc, 60cc and 1cc tuberculin or insulin syringe.
35.04	Identify specified syringe size when requested.
35.05	Demonstrate the ability to read the precise volume of medication in a syringe and to fill a syringe with medication to a specified volume when requested.
35.06	Describe appropriate SQ, IM, and IV injection sites.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Benchmarks that appear in bold within the framework are skills or competencies that have been taken directly from the FVMA Skills Competency Validation list.

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.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

The PSAV component of this program has no statewide articulation agreement approved by the Florida State Board of Education. However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

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

PSAV	
Program Number	A010615
CIP Number	0101060502
Grade Level	30, 31
Standard Length	900 hours
Teacher Certification	AGRICULTUR 1 @2 AGRI @2 HORTICULT @7 G
CTSO	N/A
SOC Codes (all applicable)	37-3011 - Landscaping and Groundskeeping Workers 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers 17-1012 - Landscape Architects
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: 9 Language: 9 Reading: 9

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 horticulture and landscape industries within 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.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

When offered at the postsecondary adult career and technical level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	ORH0885	Landscape Specialist	300 hours	37-3011
B	ORH0886	First-line Supervisors/ Managers of Landscaping, Lawn Service and Groundskeeping Workers 1	450 hours	37-1012
C	ORH0887	Landscape Contractor	150 hours	17-1012

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:

- 01.0 Describe the horticulture industry.
- 02.0 Identify safety procedures in the workplace.
- 03.0 Identify and classify plants.
- 04.0 Propagate plants.
- 05.0 Identify growing media and apply fertilizers.
- 06.0 Apply irrigation skills for plants and turf.
- 07.0 Describe integrated pest management approaches.
- 08.0 Describe the principles and requirements for plant growth.
- 09.0 Apply best management practices in horticulture industry.
- 10.0 Identify principles of landscape design.
- 11.0 Apply principles of landscape design and maintenance.
- 12.0 Harvest, transport, and install plant materials.
- 13.0 Operate, repair, and maintain tools and equipment.
- 14.0 Identify emerging technologies in the horticulture industry.
- 15.0 Demonstrate leadership, employability, communications, and human relations skills.
- 16.0 Demonstrate language arts knowledge and skills.
- 17.0 Demonstrate mathematics knowledge and skills.
- 18.0 Demonstrate science knowledge and skills.
- 19.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas.
- 20.0 Solve problems using critical thinking skills, creativity and innovation.
- 21.0 Use information technology tools.
- 22.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
- 23.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 24.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
- 25.0 Describe the importance of professional ethics and legal responsibilities.
- 26.0 Explain the importance of employability skill and entrepreneurship skills.

**Florida Department of Education
Student Performance Standards**

Program Title: Landscape Management
PSAV Number: A010615

Course Number: ORH0885
Occupational Completion Point: A
Landscape Specialist – 300 Hours – SOC Code 37-3011

01.0 Describe the horticulture industry--The student will be able to:

01.01 Describe the importance of horticulture to the American and global economies.

01.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.

01.03 Describe the importance of horticulture to the environment, including sustainability practices

01.04 Identify professional organizations and certifications for the horticultural industry.

02.0 Identify safety procedures in the workplace--The student will be able to:

02.01 Identify the common causes of accidents in the horticulture industry.

02.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.

02.03 Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OHSA) Regulations.

02.04 Identify proper disposal of hazardous waste materials and biohazards specific to the horticulture industry.

02.05 Describe emergency procedures in the horticulture workplace.

02.06 Create preventive measures to avoid hazardous situations.

02.07 Apply problem solving skills to correct a hazardous situation.

03.0 Identify and classify plants--The student will be able to:

03.01 Identify plants by scientific and common names.

03.02 Classify plants botanically.

03.03	Write scientific names for plants.
03.04	Describe principles of plant biology and growth.
03.05	Explain the role of plants in the ecosystem.
03.06	Describe the major classifications of plants based on life cycle.
03.07	Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.
03.08	Demonstrate proper use of scientific names.
04.0	Propagate plants--The student will be able to:
04.01	Identify propagating and growing facilities and structures.
04.02	Prepare propagation media.
04.03	Select and collect propagation materials.
04.04	Demonstrate propagation by sexual and asexual methods.
04.05	Demonstrate environmental controls for propagation materials.
04.06	Identify and select proper rooting hormones based on plant characteristics.
05.0	Identify growing media and apply fertilizers--The student will be able to:
05.01	Identify soil and media materials.
05.02	Identify nutritional needs of plants.
05.03	Identify symptoms of nutritional deficiencies and toxicities of plants.
05.04	Identify types and kinds of fertilizers.
05.05	Identify methods of distributing fertilizers.
05.06	Interpret information on a label of fertilizer used in Florida.
05.07	Apply information on a label of fertilizer used in Florida.
05.08	Apply fertilizer and soil amendments.
05.09	Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.

05.10	Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.
05.11	Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.
05.12	Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.
06.0	Apply irrigation skills for plants and turf.--The student will be able to:
06.01	Identify water needs of plants.
06.02	Irrigate plants at recommended rates.
06.03	Identify the symptoms of excessive water and water stress in plants.
06.04	Describe the basic irrigation systems and principles used in the landscape and nursery.
07.0	Demonstrate Integrated Pest Management approaches--The student will be able to:
07.01	Identify common pests of plants.
07.02	Describe life cycles of common pests of plants.
07.03	Recognize signs of damage from pests.
07.04	Classify insects according to feeding habits.
07.05	Describe biological, chemical, and cultural methods of controlling plant pests.
07.06	Diagnose and outline a plan for controlling pests on a horticultural crop.
07.07	Describe methods of controlling nematode pests on ornamental plants.
07.08	Develop a pest control program for a horticultural crop using Integrated Pest Management.
08.0	Describe the principles and requirements of plant growth--The student will be able to:
08.01	Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis.
08.02	Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature
08.03	Explain the process of respiration and the flow of energy in plants.
08.04	Describe the influence of light and temperature on plant growth including photo tropism.
08.05	Demonstrate methods of pruning plants.

08.06	Identify appropriate time to prune plants.
08.07	Identify and select pruning tools.
08.08	Demonstrate proper use of pruning tools and care.
08.09	Identify Plant Growth Regulators and their use on horticulture and landscape plants.
08.10	Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.
08.11	Identify specific cultural, mechanical, chemical, and biological methods of weed management.
09.0	Apply best management practices in the horticulture industry--The student will be able to:
09.01	Identify and apply Best Management Practices to reduce pollution and conserve water.
09.02	Identify and apply Best Management Practices on fertilizer recommendations for Florida plants and turf.
09.03	Identify and apply Best Management Practices on the management and handling of pesticides.
09.04	Identify and apply Best Management Practices for the design and installation of landscapes.
10.0	Identify principles of landscape design --The student will be able to:
10.01	Compare and contrast the use of line, form, texture and color in designing landscapes.
10.02	Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.
10.03	Identify points of emphasis and major design areas in the residential landscape.
10.04	Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.
10.05	Read and interpret a landscape plan.
10.06	Develop skills for drawing and identifying symbols.
10.07	Draw and design a landscape plan for a small garden.
10.08	Construct a landscape display.
11.0	Apply principles of landscape design and maintenance--The student will be able to:
11.01	Demonstrate the use of line, form, texture and color in designing landscapes.
11.02	Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.

11.03	Apply points of emphasis and major design areas in the commercial landscape.
11.04	Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.
11.05	Create a landscape plan for a residential or commercial property.
11.06	Calculate materials needed according to the identified landscape plan.
11.07	Identify factors in selecting turf for landscape installation.
12.0	Harvest, transport, and install plant materials--The student will be able to:
12.01	Determine requirements for preserving plant viability.
12.02	Demonstrate proper landscape plant establishment techniques.
12.03	Select and prepare plants for transporting and transplanting.
12.04	Select horticultural products according to Florida grades and standards.
13.0	Operate, repair, and maintain tools and equipment--The student will be able to:
13.01	Perform equipment pre-operational check.
13.02	Identify, maintain, and operate hand tools and power tools.
14.0	Identify emerging technologies in the horticulture industry--The student will be able to:
14.01	Investigate DNA and genetics applications in horticulture including the theory of probability.
14.02	Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).

Course Number: ORH0886

Occupational Completion Point: B

First-line Supervisors/ Managers of Landscaping, Lawn Service and Groundskeeping Workers 1– 450 Hours – SOC Code 37-1012

15.0	Maintain tools and equipment--The student will be able to:
15.01	Maintain oil level in engines of power equipment.
15.02	Check and maintain tire air pressure on equipment.
15.03	Maintain fuel levels using proper fuel or fuel mixtures.

15.04	Operate manual transmissions.
15.05	Identify, operate, and maintain tractor and power equipment.
15.06	Service and maintain battery and electrical systems.
15.07	Perform minor tune-up on engines.
15.08	Load, secure, and transport equipment.
15.09	Demonstrate safety precautions while working with tools and equipment.
16.0	Apply chemical and calibrate spray equipment--The student will be able to:
16.01	Select, mix, and apply a non-restricted chemical according to the label and local, state, federal, and EPA regulations.
16.02	Calibrate spray and spread equipment.
16.03	Identify and report insect and disease damage.
16.04	Determine chemical compatibility.
16.05	Determine appropriate time frequency and method of chemical application.
17.0	Classify plants and turfgrass--The student will be able to:
17.01	Classify plants as monocots or dicots.
17.02	Classify plants and turfgrass as annuals, biennials, and perennials.
17.03	Identify plants and turfgrass that are specific to a region.
17.04	Classify plants and turfgrass according to growth habit.
17.05	Identify poisonous plants.
18.0	Demonstrate fertilization skills--The students will be able to:
18.01	Develop a fertilization schedule.
18.02	Determine rate of fertilizer application and calibration equipment.
18.03	Calibrate fertilizer equipment.
19.0	Irrigate plants and turf--The student will be able to:

19.01	Identify various types of irrigation systems.
19.02	Install and maintain piping and water distribution components.
19.03	Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.
19.04	Check and evaluate irrigation system performance.
19.05	Maintain irrigation system.
20.0	Layout and install landscape and/or interiorscape--The student will be able to:
20.01	Prepare final grade.
20.02	Layout plants based on a landscape plan.
20.03	Plant site using sound cultural practices.
20.04	Install mulch and perform final cleanup.
21.0	Maintain landscape--The student will be able to:
21.01	Perform maintenance inspection of the project.
21.02	Determine water requirements and apply at proper rates.
21.03	Identify weeds and apply herbicides safely.
21.04	Determine fertilization requirements and apply at proper rates.
21.05	Identify plant pest and disease problems and apply corrective measures.
21.06	Trim and prune landscape plants.
21.07	Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash.
21.08	Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.
21.09	Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.
21.10	Cultivate and mulch plants.
21.11	Prune trees based on ANSI (American National Standard Institute) standards.
21.12	Provide protection for plants from adverse weather conditions.

21.13	Comply with local, state, and federal regulations regarding landscape maintenance and pesticide applications.
21.14	Demonstrate sanitation and safety practices when maintaining landscape.
22.0	Maintain customer relations and observe follow-up procedures--The student will be able to:
22.01	Conduct walk-through of project with client to assure satisfaction.
22.02	Identify current and future maintenance requirements.
22.03	Analyze project records for profitability and employee performance.

Course Number: ORH0887
Occupational Completion Point: C
Landscape Architects – 150 Hours – SOC Code 17-1012

23.0	Analyze and design landscape--The student will be able to:
23.01	Analyze and interpret plans, specifications, and environmental conditions of the project.
23.02	Design the project.
23.03	Identify and locate project materials.
23.04	Determine personnel and equipment needs and safety requirements for the project.
23.05	Establish project schedule.
24.0	Prepare estimates, contracts, and presentation--The student will be able to:
24.01	Determine costs of materials, equipment, and labor.
24.02	Prepare a price for the project and terms of contract.
24.03	Prepare written contract, using standard rules of English, including punctuation, spelling, sentence structure and references.
24.04	Prepare and give oral presentation of the project design using standard rules of English, including punctuation and sentence structure.
24.05	Maintain job records, daily log sheets, and inventory.
25.0	Lay out and install landscape and turf.--The student will be able to:
25.01	Locate existing utilities and secure a permit.

25.02	Prepare and rough grade the site.
25.03	Determine procedures for installation of large materials.
25.04	Install and test irrigation system.
25.05	Describe procedures for constructing hardscape (walls, walks, patios, drives, etc.).
26.0	Conduct final walk-through of landscape installation--The student will be able to:
26.01	Conduct walk-through of installation project with client to assure customer satisfaction.
26.02	Analyze project records for profitability and employee performance.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

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.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program A010615 has a statewide articulation agreement approved by the Florida State Board of Education:

Landscape and Horticulture Technology (0101060500) – 6 credits

Students must hold the Certified Horticulture Professional industry certification to be eligible for this articulation agreement.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Nursery Management
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	A010616
CIP Number	0101060602
Grade Level	30, 31
Standard Length	900 hours
Teacher Certification	AGRICULTUR 1 @2 AGRI @2 HORTICULT @7 G
CTSO	N/A
SOC Codes (all applicable)	45-2092 - Farmworkers and Laborers, Crop, Nursery, and Greenhouse 11-9013 - Farmers, Ranchers, and Other Agricultural Managers
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: 9 Language: 9 Reading: 9

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 horticulture and landscape industries within 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.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

When offered at the postsecondary adult career and technical level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	ORH0862	Nursery Workers	300 hours	45-2092
B	ORH0863	Nursery and Greenhouse Managers 1	450 hours	11-9013
C	ORH0864	Nursery and Greenhouse Managers 2	150 hours	11-9013

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:

- 01.0 Describe the horticulture industry.
- 02.0 Identify safety procedures in the workplace.
- 03.0 Identify and classify plants.
- 04.0 Propagate plants.
- 05.0 Identify growing media and apply fertilizers.
- 06.0 Apply irrigation skills for plants and turf.
- 07.0 Demonstrate integrated pest management approaches.
- 08.0 Describe the principles and requirements for plant growth.
- 09.0 Apply best management practices in horticulture industry.
- 10.0 Identify principles of landscape design.
- 11.0 Apply principles of landscape design and maintenance.
- 12.0 Harvest, transport, and install plant materials.
- 13.0 Operate, repair, and maintain tools and equipment.
- 14.0 Identify emerging technologies in the horticulture industry.
- 15.0 Apply knowledge to identify and classify plants.
- 16.0 Control pests.
- 17.0 Operate tools and equipment.
- 18.0 Prepare growing media.
- 19.0 Irrigate plants.
- 20.0 Demonstrate proper fertilizing techniques.
- 21.0 Demonstrate abilities to maintain and analyze records
- 22.0 Develop irrigation and drainage plan.
- 23.0 Raise crop to point of sale.
- 24.0 Prune and shape nursery stock.
- 25.0 Harvest, process, and ship nursery stock.
- 26.0 Market nursery stock.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Nursery Management
PSAV Number: A010616

Course Number: ORH0862
Occupational Completion Point: A
Nursery Workers – 300 Hours – SOC Code 45-2092

01.0 Describe the horticulture industry--The student will be able to:

01.01 Describe the importance of horticulture to the American and global economies.

01.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.

01.03 Describe the importance of horticulture to the environment, including sustainability practices

01.04 Identify professional organizations and certifications for the horticultural industry.

02.0 Identify safety procedures in the workplace--The student will be able to:

02.01 Identify the common causes of accidents in the horticulture industry.

02.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.

02.03 Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OHSA) Regulations.

02.04 Identify proper disposal of hazardous waste materials and biohazards specific to the horticulture industry.

02.05 Describe emergency procedures in the horticulture workplace.

02.06 Create preventive measures to avoid hazardous situations.

02.07 Apply problem solving skills to correct a hazardous situation.

03.0 Identify and classify plants--The student will be able to:

03.01 Identify plants by scientific and common names.

03.02 Classify plants botanically.

03.03	Write scientific names for plants.
03.04	Describe principles of plant biology and growth.
03.05	Explain the role of plants in the ecosystem.
03.06	Describe the major classifications of plants based on life cycle.
03.07	Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.
03.08	Demonstrate proper use of scientific names.
04.0	Propagate plants--The student will be able to:
04.01	Identify propagating and growing facilities and structures.
04.02	Prepare propagation media.
04.03	Select and collect propagation materials.
04.04	Demonstrate propagation by sexual and asexual methods.
04.05	Demonstrate environmental controls for propagation materials.
04.06	Identify and select proper rooting hormones based on plant characteristics.
05.0	Identify growing media and apply fertilizers--The student will be able to:
05.01	Identify soil and media materials.
05.02	Identify nutritional needs of plants.
05.03	Identify symptoms of nutritional deficiencies and toxicities of plants.
05.04	Identify types and kinds of fertilizers.
05.05	Identify methods of distributing fertilizers.
05.06	Interpret information on a label of fertilizer used in Florida.
05.07	Apply information on a label of fertilizer used in Florida.
05.08	Apply fertilizer and soil amendments.
05.09	Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.

05.10	Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.
05.11	Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.
05.12	Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.
06.0	Apply irrigation skills for plants and turf.--The student will be able to:
06.01	Identify water needs of plants.
06.02	Irrigate plants at recommended rates.
06.03	Identify the symptoms of excessive water and water stress in plants.
06.04	Describe the basic irrigation systems and principles used in the landscape and nursery.
07.0	Demonstrate Integrated Pest Management approaches--The student will be able to:
07.01	Identify common pests of plants.
07.02	Describe life cycles of common pests of plants.
07.03	Recognize signs of damage from pests.
07.04	Classify insects according to feeding habits.
07.05	Describe biological, chemical, and cultural methods of controlling plant pests.
07.06	Diagnose and outline a plan for controlling pests on a horticultural crop.
07.07	Describe methods of controlling nematode pests on ornamental plants.
07.08	Develop a pest control program for a horticultural crop using Integrated Pest Management.
08.0	Describe the principles and requirements of plant growth--The student will be able to:
08.01	Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis.
08.02	Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature
08.03	Explain the process of respiration and the flow of energy in plants.
08.04	Describe the influence of light and temperature on plant growth including photo tropism.
08.05	Demonstrate methods of pruning plants.

08.06	Identify appropriate time to prune plants.
08.07	Identify and select pruning tools.
08.08	Demonstrate proper use of pruning tools and care.
08.09	Identify Plant Growth Regulators and their use on horticulture and landscape plants.
08.10	Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.
08.11	Identify specific cultural, mechanical, chemical, and biological methods of weed management.
09.0	Apply best management practices in the horticulture industry--The student will be able to:
09.01	Identify and apply Best Management Practices to reduce pollution and conserve water.
09.02	Identify and apply Best Management Practices on fertilizer recommendations for Florida plants and turf.
09.03	Identify and apply Best Management Practices on the management and handling of pesticides.
09.04	Identify and apply Best Management Practices for the design and installation of landscapes.
10.0	Identify principles of landscape design --The student will be able to:
10.01	Compare and contrast the use of line, form, texture and color in designing landscapes.
10.02	Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.
10.03	Identify points of emphasis and major design areas in the residential landscape.
10.04	Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.
10.05	Read and interpret a landscape plan.
10.06	Develop skills for drawing and identifying symbols.
10.07	Draw and design a landscape plan for a small garden.
10.08	Construct a landscape display.
11.0	Apply principles of landscape design and maintenance--The student will be able to:
11.01	Demonstrate the use of line, form, texture and color in designing landscapes.
11.02	Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.

11.03	Apply points of emphasis and major design areas in the commercial landscape.
11.04	Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.
11.05	Create a landscape plan for a residential or commercial property.
11.06	Calculate materials needed according to the identified landscape plan.
11.07	Identify factors in selecting turf for landscape installation.
12.0	Harvest, transport, and install plant materials--The student will be able to:
12.01	Determine requirements for preserving plant viability.
12.02	Demonstrate proper landscape plant establishment techniques.
12.03	Select and prepare plants for transporting and transplanting.
12.04	Select horticultural products according to Florida grades and standards.
13.0	Operate, repair, and maintain tools and equipment--The student will be able to:
13.01	Perform equipment pre-operational check.
13.02	Identify, maintain, and operate hand tools and power tools.
14.0	Identify emerging technologies in the horticulture industry--The student will be able to:
14.01	Investigate DNA and genetics applications in horticulture including the theory of probability.
14.02	Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).

Course Number: ORH0863
Occupational Completion Point: B
Nursery and Greenhouse Managers 1– 450 Hours – SOC Code 45-2092

15.0	Apply knowledge to identify and classify plants.--The student will be able to:
15.01	Classify plants as monocots or dicots.
15.02	Classify plants as annuals, biennials, and perennials.
15.03	Identify plants appropriate to a region.

15.04	Classify plants according to growth habit.
15.05	Prepare propagation materials (seeds, cuttings, etc.) for planting.
15.06	Apply growth stimulants to propagation materials.
15.07	Demonstrate sanitation and safety practices when propagating.
15.08	Prepare flats and seedbeds and plant seeds.
16.0	Control pests--The student will be able to:
16.01	Report insect and disease damage.
16.02	Identify chemical spray damage.
16.03	Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.
16.04	Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.
17.0	Operate tools and equipment--The student will be able to:
17.01	Identify, operate, and maintain tractor and power equipment.
17.02	Load, secure, and transport equipment.
18.0	Prepare growing media--The student will be able to:
18.01	Sterilize rooting, potting, and growing media.
18.02	Adjust pH and nutritional levels of media.
18.03	Fill and level benches and pots with media.
18.04	Demonstrate sanitation practices when handling and storing plant media materials.
19.0	Irrigate plants--The student will be able to:
19.01	Set up an irrigation system for a propagation area.
19.02	Set up an irrigation system for a growing structure.
19.03	Set up an irrigation system for a retail display.
19.04	Maintain and repair an irrigation system.

19.05	Identify and use various types of irrigation systems (low volume, ebb and flow, drip, mat, recirculating, etc.).
20.0	Demonstrate proper fertilizing techniques.--The student will be able to:
20.01	Collect soil and leaf tissue samples for analysis.
20.02	Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.
20.03	Demonstrate proper handling and storage of fertilizers, observing safety precautions.
20.04	Evaluate, operate, and maintain fertilizer distribution equipment.
20.05	Develop a fertilization schedule for various plant species.
20.06	Determine rate of fertilizer application.
21.0	Demonstrate abilities to maintain and analyze records--The student will be able to:
21.01	Analyze and maintain production and sales records.
21.02	Determine plant production costs.
21.03	Prepare a budget.
21.04	Prepare and maintain financial records using computer software.
21.05	Maintain current plant inventory.
21.06	Maintain job records, daily log sheets, and inventory.

Course Number: ORH0864
Occupational Completion Point: C
Nursery and Greenhouse Managers 2– 150 Hours – SOC Code 11-9013

22.0	Develop irrigation and drainage plan--The student will be able to:
22.01	Identify drainage components for different types of drainage systems.
22.02	Install irrigation systems with control valves and clocks.
22.03	Set up an irrigation system for a growing area.
22.04	Comply with local, state and federal conservation guidelines.

23.0	Raise crop too point of sale--The student will be able to:
23.01	Choose plant, container, media, and growing structure.
23.02	Apply sound cultural practices.
23.03	Use chemicals to raise crop (i.e. fertilizer, growth retardants, pesticides).
23.04	Schedule crop for sale.
23.05	Maintain production records
24.0	Prune and shape nursery stock--The student will be able to:
24.01	Prune plants to achieve desired growth and shape.
24.02	Select and use chemical growth regulators.
24.03	Identify techniques for pruning specialty items (topiary, bonsai).
24.04	Set up an irrigation system for a growing area.
25.0	Harvest, process, and ship nursery stock--The student will be able to:
25.01	Determine customer needs per landscape plan.
25.02	Grade and harvest field-grown plants (ball, burlap, bare-root, "grow bags").
25.03	Identify mechanical techniques for harvesting field-grown plants (tree spade and mechanical digger).
25.04	Select and assemble container-grown plants using industry-accepted grades and standards.
25.05	Prepare for shipment, loading, and transporting harvested plant materials.
25.06	Comply with regulations regarding the inspection and movement of plant materials.
25.07	Demonstrate safety practices when harvesting, processing, and shipping nursery stock.
25.08	Determine proper shipping environment.
26.0	Market nursery stock--The student will be able to:
26.01	Label and merchandise plants including plant care tags, bar codes, and shipping instructions.
26.02	Maintain clean and attractive merchandising and display areas safely.

26.03	Use various advertising methods to promote sales.
26.04	Take telephone orders.
26.05	Use sales catalog.
26.06	Greet customers and close sales.
26.07	Describe care and use of plants and related products to customers.
26.08	Handle customer complaints and problems.
27.0	Operate, repair, and maintain nursery equipment and facilities--The student will be able to:
27.01	Determine equipment needs for the job.
27.02	Order parts and supplies.
27.03	Perform simple electrical repairs.
27.04	Build or repair frames, benches, and other greenhouse or nursery facilities.
27.05	Demonstrate safety practices when working with equipment and facilities.
28.0	Identify business principles--The student will be able to:
01.01	Describe principles of business management.
01.02	Describe business organizational structures.
01.03	Cite financial management methods.
01.04	Interpret laws, regulations, and codes pertinent to the nursery industry.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

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

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.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with

their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program A010616 has a statewide articulation agreement approved by the Florida State Board of Education:

Landscape and Horticulture Technology (0101060500) – 6 credits

Students must hold the Certified Horticulture Professional industry certification to be eligible for this articulation agreement.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Agriculture, Food, and Natural Resources Cooperative Education OJT
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	A019999
CIP Number	01019999CP
Grade Level	30, 31
Standard Length	Multiple hours
Teacher Certification	AGRICULTUR 1 @2 AGRI @2 †ANY AG ED G
CTSO	N/A

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 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 cluster.

Each student job placement must be related to the job preparatory program in which the student is enrolled or has completed.

The purpose of this course is to provide the on-the-job training component when the **cooperative method of instruction** is appropriate. Whenever the cooperative method is offered, the following is required for each student: a training agreement; a training plan signed by the student, teacher and employer, including instructional objectives; a list of on-the-job and in-school learning experiences; a workstation which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal; and a site supervisor with a working knowledge of the selected occupation. The workstation may be in an industry setting or in a virtual learning environment. The student **must be compensated** for work performed.

The teacher/coordinator must meet with the site supervisor a minimum of once during each grading period for the purpose of evaluating the student's progress in attaining the competencies listed in the training plan.

Agriculture, Food, and Natural Resources Cooperative Education OJT may be taken by a student for one or more semesters. A student may earn multiple credits in this course. The specific student performance standards which the student must achieve to earn credit are specified in the Cooperative Education - OJT Training Plan.

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:

- 01.0 Perform designated job skills.
- 02.0 Demonstrate work ethics.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Agriculture, Food, and Natural Resources Cooperative Education OJT
PSAV Number: A020019

01.0	Perform designated job skills--The student will be able to:
01.01	Perform tasks as outlined in the training plan.
01.02	Demonstrate job performance skills.
01.03	Demonstrate safety procedures on the job.
01.04	Maintain appropriate records.
01.05	Attain an acceptable level of productivity.
01.06	Demonstrate appropriate dress and grooming habits.
02.0	Demonstrate work ethics--The student will be able to:
02.01	Follow directions.
02.02	Demonstrate good human relations skills on the job.
02.03	Demonstrate good work habits.
02.04	Demonstrate acceptable business ethics.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

There is a **Cooperative Education Manual** available online that has guidelines for students, teachers, employers, parents and other administrators and sample training agreements. It can be accessed on the DOE website at <http://www.fldoe.org/workforce/dwdframe/pdf/STEPS-Manual.pdf>

Career and Technical Student Organization (CTSO)

FFA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education.

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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Sports and Recreational Turf Management
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	A020607
CIP Number	0101060702
Grade Level	30, 31
Standard Length	900 hours
Teacher Certification	AGRICULTUR 1 @2 AGRI @2 HORTICULT @7 G
CTSO	N/A
SOC Codes (all applicable)	37-3011 - Landscaping and Groundskeeping Workers 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: 9 Language: 9 Reading: 9

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 horticulture and landscape industries within 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.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

When offered at the postsecondary adult career and technical level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	ORH0885	Landscape Specialist	300 hours	37-3011
B	ORH0886	First-line Supervisors/Managers of Landscaping, Lawn Service and Groundskeeping Workers 1	450 hours	37-1012
C	ORH0897	First-line Supervisors/Managers of Landscaping, Lawn Service and Groundskeeping Workers 2	150 hours	37-1012

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:

- 01.0 Describe the horticulture industry.
- 02.0 Identify safety procedures in the workplace.
- 03.0 Identify and classify plants.
- 04.0 Propagate plants.
- 05.0 Identify growing media and apply fertilizers.
- 06.0 Apply irrigation skills for plants and turf.
- 07.0 Demonstrate integrated pest management approaches.
- 08.0 Describe the principles and requirements for plant growth.
- 09.0 Apply best management practices in horticulture industry.
- 10.0 Identify principles of landscape design.
- 11.0 Apply principles of landscape design and maintenance.
- 12.0 Harvest, transport, and install plant materials.
- 13.0 Operate, repair, and maintain tools and equipment.
- 14.0 Identify emerging technologies in the horticulture industry.
- 15.0 Maintain tools and equipment.
- 16.0 Maintain greens and tees.
- 17.0 Maintain fairways, roughs, and traps.
- 18.0 Fertilize turf.
- 19.0 Establish turfgrass.
- 20.0 Apply chemical and calibrate spray equipment.
- 21.0 Maintaining athletic fields.
- 22.0 Develop recreational areas.
- 23.0 Demonstrate fertilization skills.
- 24.0 Irrigate plants and turf.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Sports and Recreational Turf Management

PSAV Number: A020607

Course Number: ORH0885

Occupational Completion Point: A

Landscape Specialist – 300 Hours – SOC Code 37-3011

01.0 Describe the horticulture industry--The student will be able to:

01.01 Describe the importance of horticulture to the American and global economies.

01.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.

01.03 Describe the importance of horticulture to the environment, including sustainability practices

01.04 Identify professional organizations and certifications for the horticultural industry.

02.0 Identify safety procedures in the workplace--The student will be able to:

02.01 Identify the common causes of accidents in the horticulture industry.

02.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.

02.03 Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OHSA) Regulations.

02.04 Identify proper disposal of hazardous waste materials and biohazards specific to the horticulture industry.

02.05 Describe emergency procedures in the horticulture workplace.

02.06 Create preventive measures to avoid hazardous situations.

02.07 Apply problem solving skills to correct a hazardous situation.

03.0 Identify and classify plants--The student will be able to:

03.01 Identify plants by scientific and common names.

03.02 Classify plants botanically.

03.03	Write scientific names for plants.
03.04	Describe principles of plant biology and growth.
03.05	Explain the role of plants in the ecosystem.
03.06	Describe the major classifications of plants based on life cycle.
03.07	Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.
03.08	Demonstrate proper use of scientific names.
04.0	Propagate plants--The student will be able to:
04.01	Identify propagating and growing facilities and structures.
04.02	Prepare propagation media.
04.03	Select and collect propagation materials.
04.04	Demonstrate propagation by sexual and asexual methods.
04.05	Demonstrate environmental controls for propagation materials.
04.06	Identify and select proper rooting hormones based on plant characteristics.
05.0	Identify growing media and apply fertilizers--The student will be able to:
05.01	Identify soil and media materials.
05.02	Identify nutritional needs of plants.
05.03	Identify symptoms of nutritional deficiencies and toxicities of plants.
05.04	Identify types and kinds of fertilizers.
05.05	Identify methods of distributing fertilizers.
05.06	Interpret information on a label of fertilizer used in Florida.
05.07	Apply information on a label of fertilizer used in Florida.
05.08	Apply fertilizer and soil amendments.
05.09	Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.

05.10	Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.
05.11	Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.
05.12	Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.
06.0	Apply irrigation skills for plants and turf.--The student will be able to:
06.01	Identify water needs of plants.
06.02	Irrigate plants at recommended rates.
06.03	Identify the symptoms of excessive water and water stress in plants.
06.04	Describe the basic irrigation systems and principles used in the landscape and nursery.
07.0	Demonstrate Integrated Pest Management approaches--The student will be able to:
07.01	Identify common pests of plants.
07.02	Describe life cycles of common pests of plants.
07.03	Recognize signs of damage from pests.
07.04	Classify insects according to feeding habits.
07.05	Describe biological, chemical, and cultural methods of controlling plant pests.
07.06	Diagnose and outline a plan for controlling pests on a horticultural crop.
07.07	Describe methods of controlling nematode pests on ornamental plants.
07.08	Develop a pest control program for a horticultural crop using Integrated Pest Management.
08.0	Describe the principles and requirements of plant growth--The student will be able to:
08.01	Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis.
08.02	Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature
08.03	Explain the process of respiration and the flow of energy in plants.
08.04	Describe the influence of light and temperature on plant growth including photo tropism.
08.05	Demonstrate methods of pruning plants.

08.06	Identify appropriate time to prune plants.
08.07	Identify and select pruning tools.
08.08	Demonstrate proper use of pruning tools and care.
08.09	Identify Plant Growth Regulators and their use on horticulture and landscape plants.
08.10	Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.
08.11	Identify specific cultural, mechanical, chemical, and biological methods of weed management.
09.0	Apply best management practices in the horticulture industry--The student will be able to:
09.01	Identify and apply Best Management Practices to reduce pollution and conserve water.
09.02	Identify and apply Best Management Practices on fertilizer recommendations for Florida plants and turf.
09.03	Identify and apply Best Management Practices on the management and handling of pesticides.
09.04	Identify and apply Best Management Practices for the design and installation of landscapes.
10.0	Identify principles of landscape design --The student will be able to:
10.01	Compare and contrast the use of line, form, texture and color in designing landscapes.
10.02	Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.
10.03	Identify points of emphasis and major design areas in the residential landscape.
10.04	Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.
10.05	Read and interpret a landscape plan.
10.06	Develop skills for drawing and identifying symbols.
10.07	Draw and design a landscape plan for a small garden.
10.08	Construct a landscape display.
11.0	Apply principles of landscape design and maintenance--The student will be able to:
11.01	Demonstrate the use of line, form, texture and color in designing landscapes.
11.02	Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.

11.03	Apply points of emphasis and major design areas in the commercial landscape.
11.04	Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.
11.05	Create a landscape plan for a residential or commercial property.
11.06	Calculate materials needed according to the identified landscape plan.
11.07	Identify factors in selecting turf for landscape installation.
12.0	Harvest, transport, and install plant materials--The student will be able to:
12.01	Determine requirements for preserving plant viability.
12.02	Demonstrate proper landscape plant establishment techniques.
12.03	Select and prepare plants for transporting and transplanting.
12.04	Select horticultural products according to Florida grades and standards.
13.0	Operate, repair, and maintain tools and equipment--The student will be able to:
13.01	Perform equipment pre-operational check.
13.02	Identify, maintain, and operate hand tools and power tools.
14.0	Identify emerging technologies in the horticulture industry--The student will be able to:
14.01	Investigate DNA and genetics applications in horticulture including the theory of probability.
14.02	Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).

Course Number: ORH0866

Occupational Completion Point: B

First-line Supervisors/Managers of Landscaping, Lawn Service and Groundskeeping Workers 1– 450 Hours – SOC Code 37-1012

15.0	Maintain tools and equipment--The student will be able to:
15.01	Maintain oil level in engines of power equipment.
15.02	Check and maintain tire air pressure on equipment.
15.03	Maintain fuel levels using proper fuel or fuel mixtures.

15.04	Operate manual transmissions.
15.05	Identify, operate, and maintain tractor and power equipment.
15.06	Service and maintain battery and electrical systems.
15.07	Perform minor tune-up on engines.
15.08	Load, secure, and transport equipment.
15.09	Demonstrate safety precautions while working with tools and equipment.
16.0	Maintain and analyze records--The student will be able to:
16.01	Prepare and maintain records using computer software.
16.02	Locate and interpret MSDS information.
16.03	Maintain chemical logs.
16.04	Record information on repair and maintenance logs.
17.0	Maintain greens and tees--The student will be able to:
17.01	Mow greens.
17.02	Mow collars.
17.03	Mow aprons.
17.04	Relocate cups.
17.05	Replace and relocate markers.
17.06	Irrigate greens.
17.07	Verticut turf.
17.08	Aerate turf.
17.09	Repair ball marks on greens.
18.0	Maintain fairways, roughs, and traps--The student will be able to:
18.01	Mow roughs.

18.02	Irrigate fairways.
18.03	Repair divots.
18.04	Add sand to traps.
18.05	Rake and trim sand traps.
18.06	Mow fairways.
18.07	Edge sand traps.
18.08	Operate blower, sweeper, verticutter, and aerifier.
19.0	Fertilize turf--The student will be able to:
19.01	Apply top dressing.
19.02	Apply grass seed.
19.03	Apply fertilizer to fairways.
20.0	Establish turfgrass--The student will be able to:
20.01	Level seedbed.
20.02	Plant grass seed.
20.03	Establish sod by plugging.
20.04	Establish sod by sodding.
20.05	Cut sod.
21.0	Maintaining athletic fields—The student will be able to:
21.01	Apply proper line marks for athletic field.
21.02	Painting fields (school logos or names)
21.03	Apply proper techniques for clay maintenance.
21.04	Mow grass to appropriate height for field use.

Course Number: ORH0897**Occupational Completion Point: C****First-line Supervisors/Managers of Landscaping, Lawn Service and Groundskeeping Workers 2– 150 Hours – SOC Code 37-1012**

22.0 Apply chemical and calibrate spray equipment--The student will be able to:

22.01 Select, mix, and apply a nonrestricted chemical according to the label and local, state, federal, and EPA regulations.

22.02 Calibrate spray and spread equipment.

22.03 Identify and report insect and disease damage.

22.04 Determine chemical compatibility.

22.05 Determine appropriate time frequency and method of chemical application.

23.0 Develop recreational areas--The student will be able to:

23.01 Establish plant beds with annuals, biennials, and perennials.

23.02 Plant accent trees and shrubs in a recreational area.

23.03 Establish sports turf.

23.04 Identify poisonous plants.

24.0 Demonstrate fertilization skills--The students will be able to:

24.01 Develop a fertilization schedule.

24.02 Determine rate of fertilizer application and calibration equipment.

24.03 Calibrate fertilizer equipment.

25.0 Irrigate plants and turf--The student will be able to:

25.01 Identify various types of irrigation systems.

25.02 Install and maintain piping and water distribution components.

25.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.

25.04 Check and evaluate irrigation system performance.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Extended Student Supervision

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

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.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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.

Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program A010607 has a statewide articulation agreement approved by the Florida State Board of Education:

Landscape and Horticulture Technology (0101060500) – 6 credits

Students must hold the Certified Horticulture Professional industry certification to be eligible for this articulation agreement.

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Floral Design and Marketing
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	A120100
CIP Number	0201060801
Grade Level	30, 31
Standard Length	600 hours
Teacher Certification	AGRICULTUR 1 @2 RETAILING @7 7G MKTG 1
CTSO	Delta Epsilon Chi
SOC Codes (all applicable)	41-2031- Retail Salespersons 27-1023 - Floral Designers 41-1011 - First-Line Supervisors of Retail Sales Workers
Facility Code	223 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: 9 Language: 9 Reading: 9

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 floral design sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning and preparing floral designs, selling, buying, transporting, storing, advertising, displaying, and managing the floral goods and services industry.

See the Appendix for additional information relevant to Career and Technical Education (CTE) program implementation.

Program Structure

This program is a planned sequence of instruction consisting of 4 courses and 3 occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	ORH0042	Introduction to Floral Design	150 hours	27-1023
	ORH0043	Floral Design	150 hours	
B	ORH0612	Floral Retail Sales & Service	150 hours	41-2031
C	ORH0622	Floral Design & Management	150 hours	41-1011

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:

- 01.0 Discuss the floral design and marketing industry.
- 02.0 Demonstrate the application of post-harvest care and handling of floral products.
- 03.0 Identify procedures for creating floral designs.
- 04.0 Identify mechanical components of floral design.
- 05.0 Demonstrate knowledge in non-floral and gift packaging.
- 06.0 Demonstrate effective communication skills.
- 07.0 Identify procedures and create fresh and permanent floral designs.
- 08.0 Apply techniques for post-harvest care and handling of floral products.
- 09.0 Create fresh and permanent floral designs
- 10.0 Demonstrate order processing skills.
- 11.0 Perform merchandising operations unique to floral marketing.
- 12.0 Apply sales techniques and procedures to the marketing of floral products.
- 13.0 Create designs for live plants.
- 14.0 Identify factors for the promotion of floristry products and services.
- 15.0 Demonstrate knowledge of merchandising activities.
- 16.0 Apply sales promotion techniques and procedures to the marketing of floral products.
- 17.0 Create fresh and permanent special occasion floral pieces
- 18.0 Create fresh and/or permanent sympathy designs.
- 19.0 Create fresh and/or permanent wedding designs.
- 20.0 Demonstrate distribution skills involved in floral marketing.
- 21.0 Identify factors to consider when opening/managing a floral business.
- 22.0 Demonstrate an understanding of the functions of management.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Floral Design and Marketing
PSAV Number: A120100

Course Number: ORH0042
Occupational Completion Point: A
Introduction to Floral Design – 150 Hours – SOC Code 27-1023

01.0 Discuss the floral design and marketing industry--The student will be able to:

01.01 Identify careers in the floral design and marketing industry.

01.02 Describe trends in the floral design and marketing industry.

01.03 Explain floral services.

01.04 Discuss global floral sourcing.

02.0 Demonstrate the application of post-harvest care and handling of floral products--The student will be able to:

02.01 Identify safety procedures.

02.02 Identify varieties of flowers and plants utilized in floral arrangements.

02.03 Perform specialized care and handling of flowers and plants utilized in floral arrangements.

02.04 Store plants, flowers, and prepared floral arrangements according to established procedures.

02.05 Demonstrate maintenance of fresh flowers and foliage.

03.0 Identify procedures and creating floral designs--The student will be able to:

03.01 Identify and practice safety procedures.

03.02 Identify fundamentals of the elements of design.

03.03 Identify principles of design.

03.04 Apply fundamentals of creativity.

03.05 Identify, use, and maintain hand tools and equipment.

03.06	Select appropriate containers based on mechanics of design.
04.0	Identify mechanical components of floral design—The student will be able to:
04.01	Demonstrate proper wiring techniques.
04.02	Demonstrate appropriate use of floral oasis.
04.03	Create different types of bows.
04.04	Select containers for specific designs.
04.05	Demonstrate proper use of a helium tank.
05.0	Demonstrate knowledge in non-floral and gift packaging.—The student will be able to:
05.01	Create balloon arrangements.
05.02	Identify mechanics of gift baskets.
05.03	Construct presentation of non-floral and packaging items.
05.04	Create a non-floral product.
06.0	Identify procedures and create fresh and permanent floral designs.—The student will be able to:
06.01	Create geometric designs.
06.02	Create horizontal and vertical designs.
06.03	Create symmetrical and asymmetrical designs.
06.04	Create personal flowers to wear.
06.05	Apply principles of mass production skills.
07.0	Demonstrate effective communication skills--The student will be able to:
07.01	Discuss the role of communications in marketing.
07.02	Demonstrate a proficiency in the effective use of speech and vocabulary.
07.03	Demonstrate effective written communication skills.
07.04	Demonstrate effective oral communication skills.

07.05 Demonstrate effective listening skills.

Course Number: ORH0043
Occupational Completion Point: A
Floral Design- 150 Hours – SOC Code 27-1023

08.0 Apply techniques for post-harvest care and handling of floral products--The student will be able to:

08.01 Discuss operation of underwater floral cutting equipment.

08.02 Discuss use of electric floral stem stripper.

08.03 Apply knowledge in the use of floral preservatives and pre-hydrating solutions.

08.04 Demonstrate knowledge and application of refrigeration, sanitation, and ethylene control.

08.05 Identify grower-packaging quantities used for cut flowers and foliage.

08.06 Apply knowledge of specialized techniques for conditioning post-harvest plant material.

08.07 Discuss the benefits of chain of life.

09.0 Create fresh and permanent floral designs--The student will be able to:

09.01 Identify and create advanced geometric designs.

09.02 Identify design styles.

09.03 Apply knowledge of the color wheel.

09.04 Apply use of color harmonies.

09.05 Describe differences in period design.

09.06 Create seasonal arrangements.

10.0 Demonstrate order processing skills—The student will be able to:

10.01 Tag floral orders.

10.02 Package products.

10.03	Price orders.
11.0	Perform merchandising operations unique to floral marketing--The student will be able to:
11.01	Demonstrate correct procedures for handling customer sales transactions.
11.02	Explain pricing policies.
11.03	Calculate mark-up of floral products.
11.04	Describe opening and closing procedures for a floral operation.
12.0	Apply sales techniques and procedures to the marketing of floral products--The student will be able to:
12.01	Demonstrate steps of a sale utilizing floral products.
12.02	Perform telephone sales.
12.03	Distinguish between a local, incoming, and outgoing order.
12.04	Demonstrate the process of using both telephone and computer wire service.

Course Number: ORH0612
Occupational Completion Point: B
Floral Retail Sales & Service 150 Hours – SOC Code 41-2031

13.0	Create designs for live plants. The student will be able to:
13.01	Construct dish gardens
13.02	Decorate blooming plants.
14.0	Identify factors for the promotion of florist store products and services--The student will be able to:
14.01	Identify the major classifications of retail flower operations.
14.02	Describe product presentation and importance of window and store display.
14.03	Identify primary goals of display.
15.0	Demonstrate knowledge of merchandising activities--The student will be able to:

15.01	Explain the role of buying and purchasing in a retailing situation.
15.02	Follow accepted procedures for inventory control.
15.03	Demonstrate stock-keeping procedures.
15.04	Operate appropriate weighing and measuring devices for floral products and materials.
16.0	Apply sales promotion techniques and procedures to the marketing of floral products--The student will be able to:
16.01	Discuss the purposes of advertising, display, and public relations.
16.02	Explain the importance of sales promotion.
16.03	Identify various forms of advertising media including the Internet
16.04	Plan and present a sales promotion for a product.

Course Number: ORH0622
Occupational Completion Point: C
Floral Design and Management - 150 Hours – SOC Code 41-1011

17.0	Create fresh and permanent special occasion floral pieces.—The student will be able to:
17.01	Create unique corsages & boutonnieres.
17.02	Create seasonal/holiday designs.
17.03	Create special event pieces: conventions, parties, banquets, showers, and receptions.
18.0	Create fresh and/or permanent sympathy designs--The student will be able to:
18.01	Create a casket spray.
18.02	Create funeral baskets.
18.03	Create set pieces (using manufactured form).
18.04	Create easel pieces.
18.05	Create interior lid pieces.
18.06	Create a non-traditional memorial design.
18.07	Conduct a funeral consultation.

19.0	Create fresh and/or permanent wedding designs--The student will be able to:
19.01	Create designs for church/synagogue weddings.
19.02	Create designs for theme weddings.
19.03	Create designs for wedding receptions.
19.04	Design a bridal bouquet.
19.05	Create designs for wedding party members.
19.06	Conduct a wedding consultation.
20.0	Demonstrate distribution skills involved in floral marketing--The student will be able to:
20.01	Route and organize deliveries according to priority, location, and time.
20.02	Make confirmation phone calls.
20.03	Maintain general floral shop upkeep.
21.0	Identify factors to consider when opening/managing a floral business--The student will be able to:
21.01	Identify primary functions of a retail flower shop.
21.02	Explain the characteristics of store location options.
21.03	Characterize the principle responsibilities of employees.
21.04	Summarize the key management responsibilities required for a successful and profitable flower shop.
22.0	Demonstrate an understanding of the functions of management--The student will be able to:
22.01	Identify and describe steps in the planning process.
22.02	Define Management by Objectives (MBO).
22.03	Develop an organizational chart to illustrate line and staff relationships.
22.04	Describe the responsibilities for selecting, training, and appraising employees.
22.05	Define the principles of "chain of command" and "span of control."
22.06	Justify the importance of accountability.

22.07 Name and define the functions of management (planning, organizing, staffing, directing, controlling).

22.08 Explain how motivation, leadership, and communication influence people within an organization.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Delta Epsilon Chi is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education.

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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program has no statewide articulation agreement approved by the Florida State Board of Education. However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Advanced Floral Design and Management
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	A120200
CIP Number	0201060803
Grade Level	30, 31
Standard Length	600 hours
Teacher Certification	AGRICULTUR 1 @2 RETAILING @7 7G MKTG 1
CTSO	Delta Epsilon Chi
SOC Codes (all applicable)	41-4012 - Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products 27-1023 - Floral Designers 41-1011 - First-Line Supervisors of Retail Sales Workers
Facility Code	223 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: 9 Language: 9 Reading: 9

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 floral design sector of the Agriculture, Food and Natural Resources career cluster. This program prepares students for a career in floral design.

The content includes but is not limited to planning and preparing floral designs, selling, buying, transporting, storing, advertising, displaying, and managing the floral goods and services industry.

See the Appendix for additional information relevant to Career and Technical Education (CTE) program implementation.

Program Structure

This program is a planned sequence of instruction consisting of three courses and three occupational completion points..

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	ORH0044	Advanced Floral Design	300 hours	27-1023
B	ORH0614	Advanced Floral Sales	150 hours	41-4012
C	ORH0624	Advanced Floral Shop Manager	150 hours	41-1011

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:

- 01.0 Discuss the floral design and marketing industry.
- 02.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
- 03.0 Demonstrate distribution skills in floral marketing.
- 04.0 Perform merchandising operations unique to floral marketing.
- 05.0 Demonstrate proper care and handling of product and service technology.
- 06.0 Identify advanced components of floral design.
- 07.0 Identify botanical components of floral design.
- 08.0 Demonstrate maintenance of fresh flowers and foliage.
- 09.0 Create advanced fresh and permanent floral designs.
- 10.0 Create fresh and/or permanent sympathy designs.
- 11.0 Create fresh and/or permanent wedding designs.
- 12.0 Identify factors for the promotion of floristry products and services.
- 13.0 Demonstrate knowledge of merchandising activities.
- 14.0 Apply sales techniques and procedures to the marketing of floral products.
- 15.0 Apply sales promotion techniques and procedures to the marketing of floral products.
- 16.0 Identify, classify, and demonstrate management activities.
- 17.0 Identify factors to consider when opening/managing a floral business.
- 18.0 Supervise and manage the operation, maintenance, and repair of equipment.
- 19.0 Select sources and methods of financing operations
- 20.0 Perform accounting activities.
- 21.0 Observe local, state, and federal rules and regulations.
- 22.0 Solve problems using critical thinking skills, creativity and innovation.
- 23.0 Explain the importance of employability skill and entrepreneurship skills.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Advanced Floral Design and Management
PSAV Number: A120200

Course Number ORH0044
Occupational Completion Point: A
Advanced Floral Design – 300 Hours – SOC Code 27-1023

01.0 Discuss the floral design industry--The student will be able to:

01.01 Identify professional organizations in the floral design industry.

01.02 Describe trends in the floral design and marketing industry.

01.03 Describe how professional organizations and certifications can benefit your business.

01.04 Describe the benefits to having local, state, and national professional organizations.

02.0 Demonstrate distribution skills involved in floral marketing--The student will be able to:

02.01 Package products.

02.02 Route and organize deliveries according to priority, location, time, and fuel consumption.

02.03 Make confirmation phone calls.

02.04 Apply techniques for correct loading of delivery trucks.

02.05 Solve delivery problems, such as wrong address, damaged merchandise, and inability to deliver.

02.06 Maintain general floral shop upkeep.

03.0 Perform merchandising operations unique to floral marketing--The student will be able to:

03.01 Demonstrate correct procedures for handling customer sales transactions.

03.02 Explain pricing policies.

03.03 Calculate mark-up of floral products.

03.04 Describe opening and closing procedures for a floral operation.

04.0	Demonstrate proper care and handling of product and service technology--The student will be able to:
04.01	Perform specialized care and handling of flowers and plants utilized in floral arrangements.
04.02	Store plants, flowers, and prepared floral arrangements according to established procedures.
04.03	Identify water components and how the product will react.
04.04	Describe the relationship between pH levels and commercial conditioning practices.
04.05	Describe the effects of temperature, light, and humidity on various floral products.
04.06	Discuss the origins of ethylene gas or carbon monoxide and their effect on the floral product.
05.0	Identify advanced components of floral design.—The student will be able to:
05.01	Compare and contrast design styles and their characteristics.
05.02	Compare and contrast elements of floral design.
05.03	Compare and contrast principles of floral design.
05.04	Compare and contrast design techniques and applications.
06.0	Identify botanical components of floral design.-- The student will be able to:
06.01	Identify common flowers used in arrangements.
06.02	Demonstrate appropriate use of botanical terminology.
07.0	Demonstrate maintenance of fresh flowers and foliage.-- The student will be able to:
07.01	Perform greening techniques.
07.02	Prepare containers.
07.03	Perform specialized care and handling of flowers and plants used in floral arrangements.
08.0	Create advanced fresh and permanent floral designs--The student will be able to:
08.01	Create unique corsages.
08.02	Create seasonal/holiday designs.
08.03	Create pieces for religious events.

08.04	Create special event pieces: conventions, parties, banquets, showers, and receptions.
08.05	Create Asian influenced style designs.
08.06	Discuss designs for recipients in special care facilities (maternity, pediatrics, mental health, burns, general hospital, extended care, etc.).
08.07	Create period designs (southwest, colonial, country, European, etc.).
09.0	Create fresh and/or permanent sympathy designs--The student will be able to:
09.01	Create casket sprays.
09.02	Create funeral baskets.
09.03	Create set pieces.
09.04	Create easel pieces.
09.05	Create interior lid pieces.
09.06	Create non-traditional memorial designs.
09.07	Conduct a funeral consultation.
10.0	Create fresh and/or permanent wedding designs--The student will be able to:
10.01	Create designs for church/synagogue weddings.
10.02	Create designs for theme weddings.
10.03	Create bridal bouquets.
10.04	Create center pieces.
10.05	Create bridal party bouquets and personal flowers for wear.
10.06	Create floral garland.
10.07	Conduct a wedding consultation.
11.0	Demonstrate effective communication skills--The student will be able to:
11.01	Discuss the role of communications in marketing.
11.02	Demonstrate a proficiency in the effective use of speech and vocabulary.

11.03	Demonstrate effective written communication skills.
11.04	Demonstrate effective oral communication skills.
11.05	Demonstrate effective listening skills.

Course Number ORH614
Occupational Completion Point: B
Advanced Floral Sales – 150 Hours – SOC Code 41-4012

12.0	Identify factors for the promotion of floristry products and services--The student will be able to:
12.01	Identify the major classifications of retail flower operations.
12.02	Apply knowledge of product presentation and importance of window and store display.
12.03	Identify primary goals of display.
12.04	Apply knowledge of display record keeping.
13.0	Demonstrate knowledge of merchandising activities--The student will be able to:
13.01	Explain the role of buying and purchasing in a retailing situation.
13.02	Compare and contrast the difference between wholesale and retail products and pricing.
13.03	Develop procedures for inventory control.
13.04	Demonstrate stock-keeping procedures.
13.05	Operate appropriate measuring devices for floral products and materials.
13.06	Store received floral products according to the manufacturer's specifications.
13.07	Describe inventory rotation.
14.0	Apply sales techniques and procedures for the sale of floral products--The student will be able to:
14.01	Demonstrate steps of a sale utilizing floral products.
14.02	Perform telephone sales.

14.03	Perform face to face sales.
14.04	Compare telephone and computer wire services.
14.05	Process orders using both telephone and computer wire services.
14.06	Perform pricing techniques to give a customer quote.
14.07	Deliver floral orders.
14.08	Analyze marketing and pricing alternatives.
14.09	Determine customer needs and wants.
14.10	Demonstrate effective sales principles and techniques.
14.11	Process customer complaints.
15.0	Apply sales promotion techniques and procedures to the marketing of floral products--The student will be able to:
15.01	Discuss the purposes of advertising, display, and public relations.
15.02	Explain the importance of sales promotion.
15.03	Identify various forms of advertising media including the Internet.
15.04	Plan and present a sales promotion plan for a product.
15.05	Use social media to conduct a marketing plan.

Course Number ORH00624
Occupational Completion Point: C
Advanced Floral Shop Manager– 150Hours – SOC Code 41-1011

16.0	Identify, classify and demonstrate management activities--The student will be able to:
16.01	Compare management styles.
16.02	Identify the major functions of management.
16.03	Demonstrate understanding of basic management concepts such as authority, responsibility, delegation, empowerment, and hiring and firing.

16.04	Demonstrate knowledge of the relationship between authority and responsibility to task accomplishment.
16.05	Select the most effective communication systems.
16.06	Identify problems and make appropriate decisions.
16.07	Demonstrate understanding of organizational culture and its impact on communication.
16.08	Identify and discuss current management issues in business and other organizations.
16.09	Describe activities associated with the management functions of planning, organizing, staffing, leading and controlling.
16.10	Manage and supervise labor
16.11	Develop labor supply plan.
16.12	Hire and dismiss employees.
16.13	Establish and record pay scale and benefits.
16.14	Train workers using demonstration performance method.
16.15	Develop employee work schedules
16.16	Prepare payroll records.
16.17	Define the principles of "chain of command" and "span of control."
16.18	Justify the importance of accountability.
16.19	Name and define the functions of management (planning, organizing, staffing, directing, controlling).
16.20	Discuss the importance of a manager's philosophy of management in creating a work environment.
16.21	Analyze management techniques used by effective managers.
16.22	Explain how motivation, leadership, and communication influence people within an organization.
16.23	Create an employee handbook.
16.24	Describe methods used in training and development.
16.25	Develop and demonstrate the unique human relations skills needed for success in the business sector.
16.26	Recognize different personality styles and how to interact effectively with them in the workplace.

16.27	Differentiate between an acceptable and unacceptable code of ethical conduct in business.
16.28	Discuss how values and attitudes influence behavior.
16.29	Explain how understanding of self-concept and self-esteem impacts human relations skills.
16.30	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
17.0	Identify factors to consider when opening/managing a floral business--The student will be able to:
17.01	Identify primary functions of a retail flower shop.
17.02	Explain the characteristics of store location options.
17.03	Characterize the principle responsibilities of employees.
17.04	Summarize the key management responsibilities required for a successful and profitable flower shop.
18.0	Supervise and manage the operation, maintenance and repair of equipment--The student will be able to:
18.01	Develop budgets for changing the machinery and equipment program.
18.02	Obtain machinery and equipment by purchase, rent, lease or trade.
18.03	Develop plan for machinery and equipment maintenance program.
19.0	Select sources and methods of financing operation--The student will be able to:
19.01	Interpret a real estate legal description.
19.02	Identify major elements in lease agreements.
19.03	Identify major elements in contracts.
19.04	Secure legal services.
19.05	Analyze contracts, leases and other legal documents.
20.0	Perform accounting activities--The student will be able to:
20.01	Record and post transactions in a general journal.
20.02	Prepare an income statement and payroll records.
20.03	Prepare a balance sheet.

20.04	Prepare a cash flow statement.
20.05	Journalize and post-closing entries.
20.06	Demonstrate knowledge of petty case records.
20.07	Demonstrate knowledge of checking account records and bank reconciliation.
20.08	Interpret financial statements.
20.09	Demonstrate knowledge of the accounting cycle.
20.10	Demonstrate knowledge of budget principles and interpret budgets.
20.11	Demonstrate accounting operations on a computer.
20.12	Calculate and record depreciation, net worth, and income.
20.13	Complete a comparative trend analysis table.
20.14	Complete a profit and loss statement.
20.15	Calculate and record capital gains and losses, monthly/yearly receipts, operating expenses.
20.16	Balance bank statement.
20.17	Develop plan for bestowing the estate.
20.18	Complete IRS income or loss schedule, Capital gains and losses schedule, Investment credit schedule, 1040 schedule.
21.0	Observe local, state, and federal rules and regulations--The student will be able to:
21.01	Identify current basic government agricultural programs.
21.02	Maintain licensing, inspection, and government-record requirements.
21.03	Maintain state and federal tax records.
21.04	Identify the governmental and regulatory agencies related to agribusiness and explain their impact on agribusiness.
21.05	Identify the sources of technical assistance available from private and government

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Delta Epsilon Chi (postsecondary) is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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.

Basic Skills (if applicable)

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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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program has no statewide articulation agreement approved by the Florida State Board of Education. However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

**Florida Department of Education
Curriculum Framework**

Program Title: Floral Design and Marketing
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2011-2012 being the last cohort of students permitted to enroll in the program. After 2011-2012, no new students may be enrolled in this program. Students already enrolled in the program may, at the District's discretion, continue taking courses in the program until completion.

PSAV	
Program Number	M805030
CIP Number	0201060800
Grade Level	30, 31
Standard Length	900 hours
Teacher Certification	RETAILING @7 7G MKTG 1 DIST ED @7 TEACH CDE @7 MKTG MGMT 7@7G
CTSO	Delta Epsilon Chi
SOC Codes (all applicable)	53-3031 -Driver/Sales Workers 41-2031 - Retail Salespersons 43-5111 -Weighers, Measurers, Checkers, and Samplers, Recordkeeping 27-1023 - Floral Designers 41-1011 -First-Line Supervisors of Retail Sales Workers
Facility Code	223 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: 9

PSAV	
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Language:	9
Reading:	9

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 floral design sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning and preparing floral designs, selling, buying, transporting, storing, advertising, displaying, and managing the floral goods and services industry.

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 consisting of six courses and six occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	ORH0060	Delivery Person (Floral)	150 hours	53-3031
B	ORH0061	Retail Sales (Floral)	150 hours	41-2031
C	ORH0062	Weighers, Measurers, Checkers, Samplers and Recordkeeping	150 hours	43-5111
D	ORH0063	Floral Design (Assistant)	150 hours	27-1023
E	ORH0064	Floral Designer	150 hours	27-1023
F	ORH0065	Retail Manager (Floral)	150 hours	41-1011

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:

- 01.0 Discuss the floral design and marketing industry.
- 02.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
- 03.0 Demonstrate effective communication skills.
- 04.0 Demonstrate knowledge and application of product and service technology.
- 05.0 Demonstrate distribution skills involved in floral marketing.
- 06.0 Perform merchandising operations unique to floral marketing.
- 07.0 Apply sales techniques and procedures to the marketing of floral products.
- 08.0 Identify factors for the promotion of floristry products and services.
- 09.0 Demonstrate knowledge of merchandising activities.
- 10.0 Demonstrate knowledge and application of post harvest physiological technology.
- 11.0 Identify procedures and create fresh and silk floral designs.
- 12.0 Create symmetrical and asymmetrical fresh and silk floral design.
- 13.0 Create fresh and/or permanent sympathy designs.
- 14.0 Create fresh and/or permanent wedding designs.
- 15.0 Apply sales promotion techniques and procedures to the marketing of floral products.
- 16.0 Demonstrate an understanding of the functions of management.
- 17.0 Demonstrate personal money-management concepts, procedures, and strategies.
- 18.0 Identify factors to consider when opening/managing a floral business.
- 19.0 Describe the importance of professional ethics and legal responsibilities.

**Florida Department of Education
Student Performance Standards**

Program Title: Floral Design and Marketing
PSAV Number: M805030

Course Number: ORH0060
Occupational Completion Point: A
Delivery Person (Floral) – 150 Hours – SOC Code 53-3031

01.0 Discuss the floral design and marketing industry--The student will be able to:

01.01 Identify careers in the floral design and marketing industry.

01.02 Describe trends in the floral design and marketing industry.

01.03 Explain floral services.

02.0 Demonstrate effective communication skills--The student will be able to:

02.01 Discuss the role of communications in marketing.

02.02 Demonstrate a proficiency in the effective use of speech and vocabulary.

02.03 Demonstrate effective written communication skills.

02.04 Demonstrate effective oral communication skills.

02.05 Demonstrate effective listening skills.

03.0 Demonstrate knowledge and application of product and service technology--The student will be able to:

03.01 Identify varieties of flowers and plants utilized in floral arrangements.

03.02 Perform specialized care and handling of flowers and plants utilized in floral arrangements.

03.03 Store plants, flowers, and prepared floral arrangements according to established procedures.

03.04 Perform "greening," prepare containers, and maintenance of fresh flowers.

04.0 Demonstrate distribution skills involved in floral marketing--The student will be able to:

04.01 Tag floral orders.

04.02	Package products.
04.03	Route and organize deliveries according to priority, location, time, and fuel consumption.
04.04	Make confirmation phone calls.
04.05	Apply techniques for correct loading of delivery trucks.
04.06	Solve delivery problems, such as wrong address, damaged merchandise, and inability to deliver.
04.07	Maintain general floral shop upkeep.

Course Number: ORH0061
Occupational Completion Point: B
Retail Salesperson (Floral) – 150 Hours – SOC Code 41-2031

05.0	Demonstrate knowledge and application of product and service technology--The student will be able to:
05.01	Identify types of floral arrangements.
05.02	Utilize available resources to obtain product knowledge.
06.0	Perform merchandising operations unique to floral marketing--The student will be able to:
06.01	Demonstrate correct procedures for handling customer sales transactions.
06.02	Explain pricing policies.
06.03	Calculate mark-up of floral products.
06.04	Describe opening and closing procedures for a floral operation.
07.0	Apply sales techniques and procedures to the marketing of floral products--The student will be able to:
07.01	Demonstrate steps of a sale utilizing floral products.
07.02	Perform telephone sales.
07.03	Process orders using both telephone and computer wire services.

Course Number: ORH0062
Occupational Completion Point: C
Weighers, Measurers, Checkers, Samplers and Recordkeeping (Floral) – 150 Hours – SOC Code 43-5111

08.0 Identify factors for the promotion of floristry products and services--The student will be able to:

08.01 Identify the major classifications of retail flower operations.

08.02 Describe product presentation and importance of window and store display.

08.03 Identify primary goals of display.

08.04 Identify types and functions of business records maintained.

11.05 Develop a floor plan for a flower shop.

09.0 Demonstrate knowledge of merchandising activities--The student will be able to:

09.01 Explain the role of buying and purchasing in a retailing situation.

09.02 Follow accepted procedures for inventory control.

09.03 Demonstrate stock-keeping procedures.

09.04 Operate appropriate weighing and measuring devices for floral products and materials.

Course Number: ORH0063
Occupational Completion Point: D
Floral Design (Assistant) – 150 Hours – SOC Code 27-1023

10.0 Demonstrate knowledge and application of post harvest physiological technology--The student will be able to:

10.01 Demonstrate operation of underwater floral cutting equipment.

10.02 Demonstrate use of electric floral stem stripper.

10.03 Apply knowledge in the use of floral preservatives and pre-hydrating solutions.

10.04 Demonstrate knowledge and application of refrigeration, sanitation, and ethylene control.

10.05 Identify grower-packaging quantities used for cut flowers and foliage.

10.06 Apply knowledge of specialized techniques for conditioning post harvest plant material.

11.0 Identify procedures and create fresh and silk floral designs--The student will be able to:

11.01	Identify fundamentals of color and texture.
11.02	Identify mechanics, principles, and styles of design.
11.03	Apply fundamentals of creativity.
11.04	Maintain portfolios.
11.05	Identify and practice safety procedures.
11.06	Identify, use, and maintain hand tools and equipment.
11.07	Select appropriate containers.
11.08	Create circular designs.
11.09	Create triangular designs.
11.10	Apply horizontal and vertical design principles as appropriate.
11.11	Apply symmetrical and asymmetrical design principles as appropriate.
11.12	Create body flowers (boutonnieres, corsages, hairpieces, etc.) appropriate to designer's locale.
11.13	Construct dish gardens.
11.14	Decorate blooming plants.
11.15	Construct balloon bouquets.
11.16	Apply principles of mass production skills where and when appropriate.

Course Number: ORH0064
Occupational Completion Point: E
Floral Designer – 150 – SOC Code 27-1023

12.0 Create symmetrical and asymmetrical fresh and silk floral designs--The student will be able to:

12.01 Create orchid corsages.

12.02 Create a nosegay and corsages.

12.03 Create seasonal/holiday designs.

12.04	Create pieces for religious events.
12.05	Create special event pieces: conventions, parties, banquets, showers, and receptions.
12.06	Create oriental style designs.
12.07	Create silk arrangements working with the limited use of acrylics/polymers.
12.08	Create designs for recipients in special care facilities (maternity, pediatrics, mental health, burns, general hospital, extended care, etc.).
12.09	Create period designs (southwest, colonial, country, European, etc.).
13.0	Create fresh and/or permanent sympathy designs--The student will be able to:
13.01	Create family pieces.
13.02	Create funeral baskets.
13.03	Create set pieces.
13.04	Create easel pieces.
13.05	Create interior lid pieces.
14.0	Create fresh and/or permanent wedding designs--The student will be able to:
14.01	Create designs for church/synagogue weddings.
14.02	Create designs for special weddings.
14.03	Create designs for wedding receptions.
14.04	Create designs for wedding party members.

Course Number: ORH0065
Occupational Completion Point: F
Retail Manager (Floral) – 150 Hours – SOC Code 41-1011

15.0	Apply sales promotion techniques and procedures to the marketing of floral products--The student will be able to:
15.01	Discuss the purposes of advertising, display, and public relations.
15.02	Explain the importance of sales promotion.
15.03	Identify various forms of advertising media including the Internet.

15.04	Conduct wedding consultations.
15.05	Conduct funeral consultations.
15.06	Conduct life events consultations.
15.07	Plan and conduct a sales promotion plan for a product.
16.0	Demonstrate an understanding of the functions of management--The student will be able to:
16.01	Identify and describe steps in the planning process.
16.02	Define Management by Objectives (MBO).
16.03	Develop an organizational chart to illustrate line and staff relationships.
16.04	Identify how to plan personnel needs and how to find employees for specific positions.
16.05	Describe the responsibilities for selecting, training, and appraising employees.
16.06	Identify steps for avoiding difficulties resulting from delegation.
16.07	Define the principles of "chain of command" and "span of control."
16.08	Justify the importance of accountability.
16.09	Name and define the functions of management (planning, organizing, staffing, directing, controlling).
16.10	Discuss the importance of a manager's philosophy of management in creating a work environment.
16.11	Analyze management techniques used by effective managers.
16.12	Explain how motivation, leadership, and communication influence people within an organization.
16.13	Describe methods used in training and development.
17.0	Identify factors to consider when opening/managing a floral business--The student will be able to:
17.01	Identify primary functions of a retail flower shop.
17.02	Explain the characteristics of store location options.
17.03	Characterize the principle responsibilities of employees.
17.04	Summarize the key management responsibilities required for a successful and profitable flower shop.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

DECA is the appropriate career and technical student organization for 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

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.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education.

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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program has no statewide articulation agreement approved by the Florida State Board of Education. However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to http://www.fl DOE.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Water Treatment Technologies
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	P150507
CIP Number	0715050603
Grade Level	30, 31
Standard Length	405 hours
Teacher Certification	WSP OPER 7G
CTSO	N/A
SOC Codes (all applicable)	51-8031 - Water and Wastewater Treatment Plant and System Operators
Facility Code	263 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: N/A Language: N/A Reading: N/A

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 career Agriculture, Food and Natural Resources 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 Water Treatment sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to source water or influent characteristics; treatment facility unit processes and operational techniques; water quality and identification; identifying treatment goals and measuring their achievement; disinfection; process control techniques; sampling, testing, and laboratory analysis; supervision; operation maintenance and inspection of facility equipment; application of current DEP regulations and standards; facility administration and management techniques; and troubleshooting operational control problems. The emphasis is on skills that are needed for effective treatment process control and troubleshooting.

See the Appendix for additional information relevant to Career and Technical Education (CTE) program implementation.

Program Structure

This program is a planned sequence of instruction consisting of 3 occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	EVS0133	Water Treatment Plant Operator C	155 hours	51-8031
B	EVS0143	Water Treatment Plant Operator B	130 hours	51-8031
C	EVS0153	Water Treatment Plant Operator A	120 hours	51-8031

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:

- 01.0 Identify professions related to the water technology field.
- 02.0 Identify scientific concepts common in water and wastewater treatment.
- 03.0 Identify safety hazards associated with water technologies.
- 04.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 05.0 Solve basic math problems common to water technologies.
- 06.0 Define pumping and basic hydraulic principles.
- 07.0 Define principles of disinfection.
- 08.0 Define sampling techniques.
- 09.0 Define federal, state, and local regulations that apply to water technologies.
- 10.0 Demonstrate employability skills.
- 11.0 Identify sampling techniques and explain the significance of the steps.
- 12.0 Identify chemical, biological, and physical constituents of water entering the water-treatment facility or distribution systems.
- 13.0 Describe the principles, operational and troubleshooting practices of the aeration process.
- 14.0 Describe the principles, operational and troubleshooting practices of the mixing, coagulation, and flocculation processes.
- 15.0 Describe the principles, operational and troubleshooting practices of the sedimentation process.
- 16.0 Describe the principles, operational and troubleshooting practices of the filtration process.
- 17.0 Describe the principles, operational and troubleshooting practices of the water-softening process.
- 18.0 Describe the principles, operational and troubleshooting practices of the stabilization process.
- 19.0 Describe the principles, operational and troubleshooting practices of the corrosion-control process.
- 20.0 Describe the principles, operational and troubleshooting practices of the disinfection process.
- 21.0 Describe the principles, operational and troubleshooting practices for the control and treatment of trihalomethanes.
- 22.0 Describe the principles, operational and troubleshooting practices of the iron-and manganese-removal processes.
- 23.0 Describe the principles, operational and troubleshooting practices for taste and odor control.
- 24.0 Describe the principles, operational and troubleshooting practices of the demineralization processes.
- 25.0 Describe the principles, operational and troubleshooting practices of the fluoridation process.
- 26.0 Identify facility operational problems.
- 27.0 Describe basic hydraulics and pumping operations.
- 28.0 Identify appropriate federal, state, and local regulations for the operation and maintenance of a public potable-water facility.
- 29.0 Perform equipment inspection, and identify basic maintenance for the treatment train, treatment residuals disposal, and solids management.
- 30.0 Analyze the constituents of water and select the appropriate treatment.
- 31.0 Identify advanced sampling techniques and interpret the results.
- 32.0 Solve algebra, ratio, and proportion problems in the water treatment process.
- 33.0 Demonstrate process optimization for water treatment.
- 34.0 Analyze and correct facility operational problems.
- 35.0 Demonstrate equipment inspection and preventive maintenance for water treatment.
- 36.0 Apply appropriate federal, state and local regulations for operation and management of a public potable water facility.
- 37.0 Apply federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.

- 38.0 Describe energy conservation and identify ways to conserve energy in the water treatment facility.
- 39.0 Demonstrate supervisory skills.
- 40.0 Describe theoretical facility management skills.
- 41.0 Demonstrate methods of organization and control.
- 42.0 Develop a plan for cost management.
- 43.0 Prepare budgets and personnel assignments.
- 44.0 Develop standard operating procedures for the training and orientation of new employees.
- 45.0 Demonstrate personnel selection and discipline.
- 46.0 Demonstrate contingency planning.
- 47.0 Develop a plan for energy conservation.
- 48.0 Describe record keeping and use of computer applications in planning.
- 49.0 Explain process optimization for water or wastewater treatment facilities.
- 50.0 Interpret permits and blueprints.
- 51.0 Develop a laboratory plan for process control.
- 52.0 Discuss public-relations skills in community interactions.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Water Treatment Technologies
PSAV Number: P150507

Course Number: EVS0133
Occupational Completion Point: A
Water Treatment Plant Operator C – 155 Hours – SOC Code 51-8031

01.0 Identify professions related to the water technology field--The student will be able to:

01.01 List duties of water technology workers such as wastewater operator, water operator, systems operator, stormwater operator, residual (bio-solids) hauler operator, cross connection operator, pretreatment operator, and meter reading/maintenance operator.

01.02 Identify the basic terms and concepts involved in processes used in these professions.

01.03 List potential employers in the water technology field: federal, municipal, county, state and private.

01.04 Identify resources to assist in finding employment in the field.

01.05 Identify professional organizations related to the water technology field.

01.06 Identify career ladder levels in the water technology field: trainee, C Level, B Level, A Level.

02.0 Identify scientific concepts common in water and wastewater treatment--The student will be able to:

02.01 Identify chemical symbols used in water and wastewater treatment.

02.02 Describe the hydrologic cycle.

02.03 Describe the basic concepts of the pH scale and its importance in the treatment process.

02.04 Identify the differences between mixtures, elements, and compounds, and organic and inorganic chemicals.

02.05 Identify principle states of matter: liquid, solid, and gas.

02.06 Identify the basic nitrogen, phosphorous, and carbon cycles.

03.0 Identify safety hazards associated with water technologies--The student will be able to:

03.01 Identify the types of hazards common to water technology facilities.

03.02	Recognize unsafe conditions and prescribe corrective measures.
03.03	Identify and safely handle hazardous chemicals common to water technology facilities.
03.04	Recognize electrical hazards.
03.05	Recognize fire hazards, identify types of fires, and describe appropriate extinguishing techniques.
04.0	Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials--The student will be able to:
04.01	Identify the kinds of information presented on Material Safety Data Sheets (MSDS).
04.02	Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (chapter 442, F.S.).
05.0	Solve basic math problems common to water technologies--The student will be able to:
05.01	Perform basic arithmetic problems, including addition, subtraction, multiplication, division, fractions, decimals, percentages, rounding (significant figures), graphing, etc.
05.02	Identify metric measurements and perform conversions.
05.03	Perform calculations that involve areas, volumes, capacities, retention times, pounds, mg/L, velocities, flow rates, pressure, and head.
06.0	Define pumping and basic hydraulic principles--The student will be able to:
06.01	Identify types of pumps.
06.02	Discuss application and use of different types of pumps.
06.03	Identify components/characteristics of pumps including pump operation and basic pump curves including centrifugal pumps, positive displacement pumps, and air lift pumps.
06.04	Identify types of pipes, valves, and fittings.
06.05	Define cross connections.
06.06	Identify the appropriate equipment used in the treatment processes.
07.0	Define principles of disinfection--The student will be able to:
07.01	List the need/reasons for disinfection (list of waterborne diseases).
07.02	Define concepts related to disinfection.
07.03	List methods and chemicals used in disinfection.
07.04	Define the physical properties of chlorine.

07.05	List kinds of disinfection equipment used.
08.0	Define sampling techniques--The student will be able to:
08.01	Define the reasons for sampling and types of samples.
08.02	Define methods of sample collection and handling.
08.03	Define the basic procedure for quality control and quality assurance in sampling.
08.04	Define the chain of custody for samples.
08.05	Perform total and free chlorine residual analysis.
08.06	Perform pH analysis.
09.0	Define federal, state, and local regulations that apply to water technologies--The student will be able to:
09.01	List regulatory agencies and their roles in monitoring the water technology field.
09.02	Define regulations associated with the appropriate federal, state or local agencies.
09.03	Define training and certification requirements for water technology workers.
10.0	Demonstrate employability skills--The student will be able to:
10.01	Conduct a job search.
10.02	Secure information about a job.
10.03	Develop a detailed and complete resume.
10.04	Complete a job application.
10.05	Demonstrate competence in job-interview techniques.
10.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
10.07	Identify acceptable work habits.
10.08	Demonstrate knowledge of how to make job changes appropriately.
10.09	Demonstrate acceptable employee-health habits for the treatment facility environment.
10.10	Identify materials and documents needed for a professional library.

10.11	Demonstrate productive and positive customer interactions.
10.12	Demonstrate effective interpersonal communication skills.
11.0	Identify sampling techniques and explain the significance of the steps--The student will be able to:
11.01	Identify the laboratory tests that are commonly performed by operators in Florida water-treatment facilities, including those required by the Safe Drinking Water Regulation.
11.02	Define pathogenic organisms, including bacteria, protozoa, and virus, and describe their disease associations.
11.03	Describe the laboratory test performed for the presence of bacteria.
11.04	Describe the correct procedure for obtaining a bacteriological sample.
11.05	Describe correct sample collection procedures for inorganic and organic analyses.
11.06	Describe the laboratory quality-control checks and required documentation.
11.07	Identify the chain of custody for a sample.
12.0	Identify chemical, biological, and physical constituents of water entering the water-treatment facility or distribution systems--The student will be able to:
12.01	Determine which constituents are inherent to groundwater and/or surface water.
12.02	Describe the relationship between turbidity and the microbiological quality of water.
12.03	Describe the uses of chemical analysis in water-treatment operations.
12.04	Identify symbols and common names for elements and chemical compounds.
12.05	Select the primary constituents to be measured and the most commonly used units of measurement for each.
12.06	Explain the importance of water treatment for the control of coliform bacteria and algae.
13.0	Describe the principles, operational and troubleshooting practices of the aeration process--The student will be able to:
13.01	Describe the aeration and air stripping processes, and explain how they differ.
13.02	Identify the types of aeration systems.
13.03	Identify the benefits of aeration.
13.04	Describe the components of an air-stripping system.
13.05	Troubleshoot aeration and air stripping processes.

14.0	Describe the principles, operational and troubleshooting practices of the mixing, coagulation, and flocculation processes--The student will be able to:
14.01	Define concepts such as turbidity, color, coagulation, and flocculation.
14.02	Define the difference between sweep and enhanced coagulation.
14.03	Identify the kinds of equipment used in the coagulation process.
14.04	Identify coagulant chemicals used in water-treatment facilities.
14.05	Identify coagulant chemicals used in water-treatment facilities.
14.06	Identify the steps of coagulation, in order.
14.07	Identify the specific sampling locations for process control in a coagulation process.
14.08	Identify factors that would contribute to poor floc formation.
14.09	Compute the feed rate in pounds per day (lbs/d) when the chemical coagulant (mg/l) and flow rate (MGD) are known.
14.10	Compute the dosage (mg/l) of coagulant when the rate of flow (MGD) and the feed rate (lbs/day) of the chemical coagulant are known.
14.11	Compute the dosage rate that is needed to treat a different flow (MGD) at the current dosage when the current rate of flow (MGD) and the current coagulant feed rate (lbs/d) are known.
14.12	Describe troubleshooting techniques for basic mixing, coagulation, and flocculation processes.
15.0	Describe the principles, operational and troubleshooting practices of the sedimentation process--The student will be able to:
15.01	Describe an upflow clarifier and basin sedimentation.
15.02	Identify factors that affect efficient sedimentation.
15.03	Identify the measures that would be effective in preventing or controlling algae growth on surfaces of coagulation and sedimentation basins.
15.04	Identify methods of sludge removal from sedimentation basins.
15.05	Describe troubleshooting techniques for sedimentation and upflow clarifier processes.
16.0	Describe the principles, operational and troubleshooting practices of the filtration process--The student will be able to:
16.01	Explain concepts related to filtration, including types of filters, filter-system components, and the steps for normal filtration operations.
16.02	Explain common problems of filtering systems, including head loss, mudballs, and filter media loss.
16.03	Determine when to backwash a filter.

16.04	Identify the steps for backwashing a filter.
16.05	Describe troubleshooting techniques for filtration processes.
17.0	Describe the principles, operational and troubleshooting practices of the water-softening process--The student will be able to:
17.01	Describe the two types of hardness.
17.02	Identify the appropriate chemical(s) to use in chemical-precipitation softening processes for the two kinds of hardness.
17.03	Describe alkalinity and its components.
17.04	Identify treatment processes used for water softening.
17.05	Calculate the distribution of bicarbonate, carbonate, and/or hydroxide ions when given the total alkalinity and phenolphthalein alkalinity.
17.06	Describe selective carbonate removal.
17.07	Identify the important zones of an upflow clarifier unit.
17.08	Describe the lime soda ash softening process, including its control.
17.09	Compute lime demand from raw-water analyses.
17.10	Describe the reasons for recarbonation.
17.11	Compute carbon dioxide demands for recarbonation.
17.12	Compute hardness removal when the ion-exchange capacity is known.
17.13	Describe troubleshooting techniques for water-softening processes.
18.0	Describe the principles, operational and troubleshooting practices of the stabilization process--The student will be able to:
18.01	Identify the chemicals used in stabilization.
18.02	Identify two stabilization indices.
18.03	Determine water stability, using the Langelier index, the marble test, and CCPP method.
18.04	Troubleshoot stabilization processes.
19.0	Describe the principles, operational and troubleshooting practices of the corrosion control process--The student will be able to:
19.01	Identify the factors that influence corrosion.

19.02	Describe the problems that can be created by corrosive waters.
19.03	Describe the basic concepts related to electrolysis.
19.04	Define electrochemical reaction.
19.05	Identify the chemicals used in corrosion control.
19.06	Describe the conditions for calcium carbonate film formation.
19.07	Define cathode film formation.
19.08	Define cathodic protection and describe its application in water-treatment facilities.
19.09	Describe troubleshooting techniques for corrosion-control processes.
20.0	Describe the principles, operational and troubleshooting practices of the disinfection process--The student will be able to:
20.01	Identify the chemicals used in primary disinfection.
20.02	Identify commonly used chlorinators and hypochlorinators.
20.03	Determine the maximum amount of chlorine gas (in pounds) that may be taken from a cylinder in a 24-hour period.
20.04	Identify proper maintenance procedures for equipment chlorination.
20.05	Identify terminology related to chlorination and disinfection.
20.06	Identify common safety problems or emergency situations that might occur during chlorination.
20.07	Identify the properties of chlorine and describe its use in water treatment.
20.08	Explain the points at which chlorine is applied most effectively in water treatment.
20.09	Compute the feed rate (lbs/d) when given the rate of flow (MGD) and dosage of chlorine (mg/1).
20.10	Compute the feed rate (lbs/d) of a hypochlorite compound that contains a given percentage of available chlorine when given a problem where the rate of flow (MGD) and the chlorine dosage (mg/1) are known.
20.11	Compute the new rate of flow and the feed rate that will be needed to maintain the current dosage when given the current rate of flow (MGD), the current chlorine feed rate (lbs/d), and the amount by which the rate of flow is to be increased or decreased.
20.12	Compute the feed rate needed to treat a given amount of water when given a chlorine demand and the desired chlorine residual.
20.13	Describe troubleshooting techniques for disinfection processes.
21.0	Describe the principles, operational and troubleshooting practices for the control and treatment of trihalomethanes--The student will be able to:

21.01	Describe the formation of total trihalomethanes (TTHM).
21.02	Identify the specific procedure for collecting samples to determine trihalomethane levels.
21.03	Compute the quarterly average and the annual TTHM measurements when sample results are given.
21.04	Identify processes that remove trihalomethane precursors.
21.05	Identify processes that remove trihalomethanes after they are formed.
21.06	Identify the benefits of alternate disinfectants.
21.07	Describe chloramination as a control of TTHM.
21.08	Describe troubleshooting techniques for the control and treatment of trihalomethanes.
22.0	Describe the principles, operational and troubleshooting practices of the iron- and manganese-removal processes--The student will be able to:
22.01	Explain the occurrence of iron and manganese in source water and in treated water.
22.02	Describe the importance of controlling iron and manganese.
22.03	Describe sample-collection and analysis procedures for iron and manganese.
22.04	Describe remedial processes for controlling iron and manganese.
22.05	Compute the potassium permanganate dosage for a known concentration of iron and manganese in the water being treated.
22.06	Describe troubleshooting techniques for iron and manganese-removal processes.
23.0	Describe the principles, operational and troubleshooting practices for taste and odor control--The student will be able to:
23.01	Identify common types of complaints about water quality.
23.02	Identify causes of tastes and odors.
23.03	Describe how microbial growths affect tastes and odors.
23.04	Describe how eutrophication contributes to surface-water tastes and odors.
23.05	Describe a cross-connection.
23.06	Identify the chemicals used in the control and treatment of tastes and odors.
23.07	Describe the Threshold Odor Number (TON) test.

23.08	Determine the TON when dilution volumes and positive samples are given.
23.09	Describe troubleshooting techniques for taste and odor control.
24.0	Describe the principles, operational and troubleshooting practices of the demineralization processes--The student will be able to:
24.01	Define concepts related to demineralization, such as reverse osmosis (RO), flux, feedwater, permeate, and salinity.
24.02	Describe the structure, composition, and performance of an RO membrane.
24.03	Describe feedwater impurities, physical parameters, and conditions potentially harmful to the RO process.
24.04	Identify items included in a typical RO-facility-operation checklist.
24.05	Describe the common causes of membrane damage.
24.06	Describe the procedure for membrane cleaning.
24.07	Compute the percent of recovery when product flow and feed flow are known.
24.08	Compute the percent of mineral rejection when total dissolved solids are known for the feedwater and product water.
24.09	Describe the basic concepts of electro dialysis (ED), such as the cathode and anode relationship and the removal of typical inorganic salts.
24.10	Describe the most common problem of ED operation in a facility.
24.11	Explain how the cation membrane and the anion membrane differ.
24.12	Describe the multi-compartment unit used in the ED process.
24.13	Describe ED operating procedures in detail.
24.14	Describe the two most common chemical solutions used to flush ED stack membranes.
25.0	Describe the principles, operational and troubleshooting practices of the fluoridation process--The student will be able to:
25.01	Define the basic concepts related to fluoridation, including its purpose and the kinds of chemicals used.
25.02	Identify the properties of fluoride and describe its use.
25.03	Identify the types of equipment used in fluoridation.
25.04	Describe proper maintenance procedures for fluoridation equipment.
25.05	Describe potential safety problems or emergency situations in the fluoridation process, and ways to avoid them.

25.06	Compute the feed rate of chemicals used in the fluoridation process.
25.07	Describe troubleshooting techniques for the fluoridation processes.
26.0	Identify facility operational problems--The student will be able to:
26.01	Respond to customer questions about taste or odor in the water.
26.02	Respond to customer questions about red water or rust stains.
26.03	Identify the probable cause(s) for a sudden change in chlorine demand; take corrective action.
27.0	Describe basic hydraulics and pumping operations--The student will be able to:
27.01	Describe the relationship between the system head and pressure, and make conversions between them.
27.02	Describe three types of head, i.e., pressure, suction, and atmospheric.
27.03	Describe proper operation of centrifugal and displacement pumps.
27.04	Describe causes and solutions that are effective in preventing "water hammer "
27.05	Describe causes and solutions that are effective in preventing cavitation.
27.06	Troubleshoot pump operations.
28.0	Identify appropriate federal, state, and local regulations for the operation and maintenance of a public potable-water facility--The student will be able to:
28.01	Complete the Drinking Water Bacteriological Analysis Form correctly.
28.02	Complete the DEP daily operation report (DOR) form correctly.
28.03	Complete the DEP monthly operation report (MOR) form correctly.
28.04	Identify the DEP requirements for the operation of standby and emergency equipment.
28.05	Identify the DEP requirements for microbiological monitoring and analyses.
28.06	Identify the DEP requirements for sampling and testing.
29.0	Perform equipment inspection, and identify basic maintenance for the treatment train, treatment residuals disposal, and solids management--The student will be able to:
29.01	Identify the appropriate equipment used in the treatment train, treatment residuals disposal, and solids management.
29.02	Describe a preliminary site inspection of the equipment used in the treatment train, treatment residuals disposal, and solids management.

29.03	Identify the maintenance needs of equipment used in the treatment train, treatment residuals disposal, and solids management, including safe procedures for maintenance.
29.04	Describe proper record keeping for preventive and corrective maintenance.
29.05	Describe preventive and corrective maintenance procedures for equipment used in the treatment process, treatment residuals disposal, and solids management

Course Number: EVS0143
Occupational Completion Point: B
Water Treatment Plant Operator B – 130 Hours – SOC Code 51-8031

30.0	Analyze the constituents of water, and select the appropriate treatment--The student will be able to:
30.01	Describe the water-treatment processes common in Florida.
30.02	Describe those processes that may reduce or control a contaminant for which maximum contaminant levels (MCL) exist.
31.0	Identify advanced sampling techniques, and interpret the results--The student will be able to:
31.01	Demonstrate the need for chemical analyses in water treatment.
31.02	Select the appropriate treatment for a problem identified through laboratory testing.
31.03	Determine whether the finished water is acceptable or unacceptable according to laboratory results.
32.0	Solve algebra, ratio, and proportion problems in the water-treatment process--The student will be able to:
32.01	Perform advanced math problems including ratio and proportion.
32.02	Identify metric measurements and perform conversions.
32.03	Perform algebraic calculations essential to water treatment, when given values for components.
33.0	Demonstrate process optimization for water treatment--The student will be able to:
33.01	Describe the advanced principles and operational practices of sweep and enhanced coagulation and flocculation.
33.02	Describe the advanced principles and operational practices of sedimentation.
33.03	Describe the advanced principles and operational practices of disinfection.
33.04	Describe the advanced principles and operational practices of filtration.

33.05	Describe the advanced principles and operational practices of corrosion control.
33.06	Describe the advanced principles and operational practices of taste and odor control.
33.07	Describe the advanced principles and operational practices of iron and manganese control.
33.08	Describe the advanced principles and operational practices of fluoridation.
33.09	Describe the advanced principles and operational practices of softening.
33.10	Describe the advanced principles and operational practices of demineralization.
33.11	Describe the advanced principles, operational practices, and control of trihalomethanes and HAA5.
33.12	Demonstrate process optimization for coagulation and flocculation.
33.13	Demonstrate process optimization for sedimentation.
33.14	Demonstrate process optimization for disinfection.
33.15	Demonstrate process optimization for filtration.
33.16	Demonstrate process optimization for corrosion control.
33.17	Demonstrate process optimization for taste and odor control.
33.18	Demonstrate process optimization for iron and manganese control.
33.19	Demonstrate process optimization for fluoridation.
33.20	Demonstrate process optimization for softening.
33.21	Demonstrate process optimization for demineralization.
33.22	Demonstrate process optimization for trihalomethanes and HAA5.
34.0	Analyze and correct facility operational problems--The student will be able to:
34.01	Demonstrate troubleshooting techniques and corrective action for sweep and enhanced coagulation and flocculation.
34.02	Demonstrate troubleshooting techniques and corrective action for sedimentation.
34.03	Demonstrate troubleshooting techniques and corrective action for disinfection.
34.04	Demonstrate troubleshooting techniques and corrective action for filtration.

34.05	Demonstrate troubleshooting techniques and corrective action for corrosion control.
34.06	Demonstrate troubleshooting techniques and corrective action for taste and odor control.
34.07	Demonstrate troubleshooting techniques and corrective action for iron and manganese control.
34.08	Demonstrate troubleshooting techniques and corrective action for fluoridation.
34.09	Demonstrate troubleshooting techniques and corrective action for softening.
34.10	Demonstrate troubleshooting techniques and corrective action for demineralization.
34.11	Demonstrate troubleshooting techniques and corrective action for trihalomethanes and HAA5.
35.0	Demonstrate equipment inspection and preventive maintenance procedures--The student will be able to:
35.01	Identify the components of a preventive maintenance plan.
35.02	Use trend analysis in preventive maintenance.
35.03	Perform a site inspection.
35.04	Develop a training plan (for a new employee) for inspection of equipment.
36.0	Apply appropriate federal, state, and local regulations for the operation and maintenance of a public potable-water facility--The student will be able to:
36.01	Explain the regulations in Chapter 62-602, F.A.C., covering duties, responsibilities, certification requirements, testing, renewal, staffing, and facility classification.
36.02	Explain the regulations in Chapter 62-550, F.A.C. concerning samples and analyses at water-treatment facilities.
36.03	Explain the regulation of Chapter 62-555, FAC concerning the construction and maintenance of water plants.
36.04	Explain DEP regulations that apply to procedures such as reclaiming water and managing residuals.
36.05	Apply regulations concerning facility management.
36.06	Apply regulations concerning samples and analyses.
36.07	Apply regulations concerning laboratory management.
37.0	Apply federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials--The student will be able to:
37.01	Identify the reporting requirements as specified in SARA Title III and Chapter 252, F.S.
37.02	Describe the responsibilities toward the community as specified in SARA Title III and Chapter 252, F.S.

38.0	Describe energy conservation, and identify ways to conserve energy in the water-treatment facility--The student will be able to:
38.01	Identify the causes of energy loss.
38.02	Rank various pieces of equipment in order of energy consumption.
38.03	Describe procedures for performing an energy survey.
38.04	Describe methods to conserve energy, such as equipment and process adjustments.
39.0	Demonstrate supervisory skills--The student will be able to:
39.01	Identify supervisory skills and various leadership styles.
39.02	Delegate responsibility and assign tasks to employees.
39.03	Follow the proper procedure for handling employee grievances.
39.04	Follow the proper procedure for disciplining employees.
39.05	Follow staffing guidelines in planning.
39.06	Conduct an orientation of a new employee, and follow the training program.
39.07	Evaluate employees objectively.
39.08	Identify emergency situations and respond appropriately.
39.09	Identify the components of the budgeting process.
39.10	Demonstrate inventory-control procedures.
39.11	Explain the importance of ethics in supervision.
39.12	Identify the role of the supervisor in a facility safety program.
39.13	Identify the role of the supervisor in customer relations.

Course Number: EVS0153
Occupational Completion Point: C
Water Treatment Plant Operator A – 120 Hours – SOC Code 51-8031

40.0	Describe theoretical facility-management skills--The student will be able to:
40.01	Describe the principles of management and supervision.
40.02	Describe concepts related to management and supervision.
41.0	Demonstrate methods of organization and control--The student will be able to:
41.01	Demonstrate organizational methods.
41.02	Develop an organizational chart.
41.03	Develop a staffing pattern.
41.04	Identify formal and informal lines of communication.
42.0	Develop a plan for cost management--The student will be able to:
42.01	Identify the costs of operation, such as personnel, inventory, operations, energy consumption, and equipment maintenance.
42.02	Perform cost surveys.
42.03	Develop a plan for efficient operations.
42.04	Explain system-efficiency balance.
43.0	Prepare budgets and personnel assignments--The student will be able to:
43.01	Identify budget activities and categories of expense accounts related to water- or wastewater-treatment facilities.
43.02	Identify techniques of budget control.
43.03	Prepare a budget, including long-range projections.
43.04	Prepare a staffing schedule, including the appropriate levels of staff for all required shifts.
44.0	Develop standard operating procedures for the training and orientation of new employees--The student will be able to:
44.01	Develop a written plan for an in-house orientation program for new employees.
44.02	Identify information that a supervisor should give new employees, including leave procedures, insurance procedures, safety procedures, chain of command, etc.
44.03	Develop a written plan for an in-house training program that includes safety measures and hazardous or toxic materials in the work

	place.
	44.04 Develop a written plan for a cross-training program in facility operations.
45.0	Demonstrate personnel selection and discipline--The student will be able to:
45.01	Identify appropriate interviewing and hiring practices.
45.02	Develop a job description and identify the essential functions of the job.
45.03	Identify control factors that are important in an organizational plan and that set limits on delegated authority.
45.04	Identify appropriate actions of the supervisor, the employee, etc., in a grievance procedure.
45.05	Identify characteristics important to the role of a supervisor.
45.06	Determine requirements for a new position.
45.07	Advertise for the position, including the job description, job responsibilities, education requirements, and job conditions.
45.08	Analyze job applications to select qualified candidates to interview.
45.09	Conduct interviews.
45.10	Notify interviewees of the results, and conduct follow-up activities.
45.11	Use appropriate human-relations and communication skills.
45.12	Train, evaluate, and discipline employees objectively.
45.13	Identify appropriate actions of a supervisor in evaluating personnel performance.
46.0	Demonstrate contingency planning--The student will be able to:
46.01	Analyze potential emergency situations that can occur in a facility.
46.02	Develop a plan for handling problems caused by emergency situations, including what equipment would be used and what sampling would be needed.
46.03	Develop procedures for responding to customer complaints.
46.04	Develop procedures to ensure employee safety.
46.05	Develop procedures to ensure continuous operations, including preventive maintenance, alternative procedures, etc.
47.0	Develop a plan for energy conservation--The student will be able to:

47.01	Describe concepts related to energy conservation.
47.02	Identify energy-conservation measures.
48.0	Describe record-keeping and use of computer applications in planning--The student will be able to:
48.01	Develop a plan for inventory control.
48.02	Develop a plan for an analysis of operation and maintenance (O&M) logs and for the optimum operation of equipment.
48.03	Identify the various types of facility automation.
48.04	Review available hardware and software, based on record-keeping needs.
49.0	Describe process optimization for water or wastewater treatment facilities--The student will be able to:
49.01	Develop a plan for process control to achieve efficient, energy-saving, cost-effective operation.
49.02	Develop a plan for testing and analyzing the treatment operations for use in long-range facility operations.
49.03	Develop a plan for the systematic troubleshooting of operational problems.
49.04	Develop a plan for documenting operations and problems in order to anticipate and avoid potential problems.
50.0	Interpret permits and blueprints--The student will be able to:
50.01	Read and interpret blueprints for water and wastewater facilities.
50.02	Read the facility construction and operating permits, and relate permit requirements to facility operations.
51.0	Develop a laboratory plan for process control--The student will be able to:
51.01	Identify laboratory equipment for process control.
51.02	Develop a plan for equipment calibration and maintenance.
51.03	Develop a laboratory-staffing plan.
51.04	Determine whether in-house laboratory operations are cost-effective.
51.05	Review procedures for quality assurance/quality control in a facility laboratory.
51.06	Review procedures for obtaining certification for a facility laboratory.
51.07	Develop a sampling/analysis schedule for effective process control.

52.0	Employ public-relations skills in community interactions--The student will be able to:
52.01	Plan facility tours for the public.
52.02	Demonstrate how to handle press and public inquiries appropriately.
52.03	Demonstrate how to inform the public if a potential emergency situation arises.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program has no statewide articulation agreement approved by the Florida State Board of Education. However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Advanced Water Treatment Technologies
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	P150509
CIP Number	0715050606
Grade Level	30, 31
Standard Length	612 hours
Teacher Certification	WSP OPER 7G
CTSO	N/A
SOC Codes (all applicable)	51-8031 - Water and Wastewater Treatment Plant and System Operators
Facility Code	263 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: 9 Language: 9 Reading: 9

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 water treatment sector of 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 water treatment sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to an understanding of various feed waters; various water treatment schemes, power generation, pharmaceutical, biotech, semiconductor and other applications; safety and troubleshooting of water treatment systems; piping and instrumentation diagrams; pumps, valves, gauges and meters; the pretreatment technologies required to produce safe drinking water as well as the pretreated water required for advanced technologies; the theory, process and equipment of common membrane water treatment systems; and the initial monitoring and troubleshooting skills required to effectively operate and maintain a membrane water treatment system.

See the Appendix for additional information relevant to Career and Technical Education (CTE) program implementation.

Program Structure

This program is a planned sequence of instruction consisting of 2 occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	EVS0355	Membrane Water Treatment Specialist	306 hours	51-8031
B	EVS0357	High Purity Water Treatment Specialist	306 hours	51-8031

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:

- 01.0 Identify jobs related to the advanced water treatment field.
- 02.0 Identify safety hazards associated with advanced water technologies.
- 03.0 Explain the importance of each section on a Material Safety Data Sheet (MSDS).
- 04.0 Solve basic math problems common to advanced water treatment technologies.
- 05.0 Describe how various pumps work and basic hydraulic principles.
- 06.0 Identify various valves and the differences in different piping materials.
- 07.0 Compare and contrast the characteristics of drinking water, boiler feed water, semiconductor rinse water and pharmaceutical water.
- 08.0 Demonstrate job interviewing skills and resume/cover letter writing skills.
- 09.0 Describe the different types of contaminants in various feed waters.
- 10.0 Demonstrate how to use piping & instrumentation diagrams (P & ID) and process flow diagrams (PFD) to understand a water treatment process.
- 11.0 Describe the theory, equipment, and practice of scaling-control pretreatment technologies.
- 12.0 Describe the theory, equipment, and practice of fouling-control pretreatment technologies.
- 13.0 Describe the theory, equipment, and practice of chemical attack-control pretreatment technologies.
- 14.0 Describe the theory, equipment, and practice of chlorination and chloramination.
- 15.0 Identify where in a water treatment system various contaminants are removed.
- 16.0 Explain how reverse osmosis (RO) works.
- 17.0 Describe the rejection capabilities of each type of membrane.
- 18.0 Explain how to chemically clean a membrane unit.
- 19.0 Explain how to monitor before, during, and after chemical cleaning.
- 20.0 Explain which type, or types, of membrane to use in different water treatment applications.
- 21.0 Describe the pretreatment requirements for different membrane technologies.
- 22.0 Explain why conventional water treatment has difficulty removing Cryptosporidium and Giardia cysts and which membrane technologies to use.
- 23.0 Describe the three most common problems with nanofiltration and RO membranes.
- 24.0 Describe the instruments and the monitoring required to catch performance problems at an early stage.
- 25.0 Describe the common methods used to control scaling, fouling and chemical attack in membrane units.
- 26.0 Explain the differences between designing for well water and designing for surface water.
- 27.0 Demonstrate how to use advanced troubleshooting techniques.
- 28.0 Explain the information on a membrane manufacturer's specification sheet and how to practically use this information at a plant.
- 29.0 Demonstrate how to operate and maintain an RO unit.
- 30.0 Explain why membrane water treatment is becoming common for the production of municipal drinking water.
- 31.0 Describe and perform appropriate water analyses.
- 32.0 Describe and perform appropriate sampling techniques.
- 33.0 Describe the theory, equipment, and operation of aeration, decarbonation, and degasification.
- 34.0 Describe the theory, equipment, and operation of stabilizing water.
- 35.0 Describe the theory, equipment, and operation of corrosion control.

- 36.0 Describe the characteristics and the measurement of silica contaminants.
- 37.0 Describe the characteristics and the measurement of organic contaminants.
- 38.0 Describe the characteristics and the measurement of ionic contaminants.
- 39.0 Describe the characteristics and the measurement of non-living particle contaminants.
- 40.0 Describe the characteristics and the measurement of living particle contaminants.
- 41.0 Explain the monitoring and troubleshooting required for media filters.
- 42.0 Explain the monitoring and troubleshooting required for activated carbon beds.
- 43.0 Explain the monitoring and troubleshooting required for membrane units.
- 44.0 Explain the theory, equipment, and practice of probing.
- 45.0 Explain the theory, equipment, and practice of profiling.
- 46.0 Explain the theory, equipment, and practice of membrane element replacement.
- 47.0 Demonstrate how to chemically clean an RO unit.
- 48.0 Demonstrate how to use software programs to trend membrane unit performance.
- 49.0 Demonstrate how to use software programs to check the scaling and fouling characteristics of a membrane unit.
- 50.0 Explain the theory, and describe the function, of ion exchange resin beads and resin sheets.
- 51.0 Explain the concept of selectivity.
- 52.0 Demonstrate an understanding of selectivity.
- 53.0 Describe the normal operation of strong acid cation (SAC) single-bed ion exchange units.
- 54.0 Describe and demonstrate how to regenerate an SAC single bed.
- 55.0 Describe the normal operation of strong base anion (SBA) single-bed ion exchange units.
- 56.0 Describe and demonstrate how to regenerate an SBA single bed.
- 57.0 Describe the normal operation of a SAC and SBA dual-bed ion exchange system.
- 58.0 Describe the normal operation of mixed-bed ion exchange units.
- 59.0 Describe how to regenerate a mixed bed.
- 60.0 Describe the normal operation and regeneration of electrodeionization units.
- 61.0 Describe the normal operation of 254 nm and 185 nm ultraviolet (UV) irradiation units.
- 62.0 Explain the functions of final filters.
- 63.0 Explain the usage of ozone in high purity water treatment systems.
- 64.0 Explain the problems caused by dead legs.
- 65.0 Identify the pieces of equipment that remove feed water contaminants.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Advanced Water Treatment Technologies
PSAV Number: P150507

Course Number: EVS0355
Occupational Completion Point: A
Membrane Water Treatment Specialist – 306 Hours – SOC Code 51-8031

01.0	Identify jobs related to the advanced water treatment field--The student will be able to:
01.01	List the duties of various advanced water treatment jobs such as operator, service technician, sales rep, lab technician, instrumentation and control technician, and sales engineer.
01.02	List the personality traits that are beneficial for each job.
01.03	List potential employers in the advanced water treatment field, including semiconductor, power generation drinking water, beverage, pharmaceutical, biotech, and governmental agencies.
01.04	Describe how to contact potential employers through websites.
02.0	Identify safety hazards associated with advanced water technologies--The student will be able to:
02.01	List the tripping hazards in an advanced water treatment plant.
02.02	List the electrocution hazards in an advanced water treatment plant.
02.03	List the chemical hazards in an advanced water treatment plant.
02.04	List the fire hazards in an advanced water treatment plant.
02.05	List the cutting hazards in an advanced water treatment plant.
02.06	List the inhalation hazards in an advanced water treatment plant.
03.0	Explain the importance of each section on a Material Safety Data Sheet (MSDS)--The student will be able to:
03.01	Identify the chemical properties of the chemical.
03.02	Identify the hazards associated with the chemical.
03.03	Identify any fire hazards associated with the chemical.

03.04	Identify any firefighting procedures recommended.
03.05	Identify the personal protection equipment and procedures required when handling the chemical.
03.06	Identify the toxicological effects of the chemical.
04.0	Solve basic math problems common to advanced water treatment technologies--The student will be able to:
04.01	Calculate Normalized Permeate Flow.
04.02	Calculate Percent Salt Rejection.
04.03	Calculate Differential Pressures.
04.04	Calculate +/- percentages on water analysis reports.
04.05	Calculate Net Driving Pressure.
04.06	Calculate average pressures, salt concentrations, and osmotic pressures.
04.07	Calculate water flux in gallons per square foot of membrane per day.
05.0	Describe how various pumps work and basic hydraulic principles--The student will be able to:
05.01	Describe how a given example of a positive displacement pump works.
05.02	Describe how a given example of a centrifugal pump works.
05.03	Describe the differences between two different types of well pumps.
05.04	List a minimum of three things to check out on an operating pump.
05.05	Define suction head.
05.06	Define discharge head.
05.07	Describe a pump curve.
05.08	Define gauge pressure versus absolute pressure.
05.09	Discuss principles of multi-stage centrifugal pumps.
05.10	Discuss hydraulic principles.
06.0	Identify various valves and the differences in piping materials--The student will be able to:

06.01	Identify a globe valve.
06.02	Identify a ball valve.
06.03	Identify a gate valve.
06.04	Identify a needle valve.
06.05	Identify a butterfly valve.
06.06	Identify a plug valve.
06.07	Identify various actuated control valves.
06.08	Identify PVC piping material.
06.09	Identify carbon steel piping material.
06.10	Identify various stainless steel piping materials.
06.11	Identify PVDF piping material.
06.12	Define gauges of pipe.
06.13	Discuss the support requirements for different pipe materials (i.e. pvdf continuous, PVC short intervals, carbon steel longer intervals, etc.)
06.14	Discuss temperature of conveyed material versus psi rating of pipe.
06.15	Discuss head loss associated with fittings and pipe friction.
06.16	Compare and contrast pipe sizing versus flow rate – target feet per second flow design rates
07.0	Compare and contrast the characteristics of drinking water, boiler feed water, semiconductor rinse water and pharmaceutical water--The student will be able to:
07.01	List the order of end-use water quality from drinking water to semiconductor rinse water.
07.02	List the regulatory agencies and their roles in monitoring drinking water.
07.03	Define state and federal regulations concerning drinking water
07.04	Define the training and certification requirements for drinking water operators.
07.05	List the contaminant limitations of 2000 PSI boiler water.
07.06	List the contaminant limitations of purified water.

07.07	List the contaminant limitations of water for Injection.
07.08	List the contaminant limitations for rinse water used to make 0.18 micron semiconductor devices.
08.0	Demonstrate job interviewing skills and resume/cover letter writing skills--The student will be able to:
08.01	Describe the job search process.
08.02	Explain the most important characteristics of a good cover letter.
08.03	Explain the most important characteristics of a good resume.
08.04	Explain some of the most important considerations during a job interview.
08.05	Explain the employer concerns that the cover letter should address.
08.06	Explain the purpose of a cover letter.
08.07	Explain the purpose of a resume.
08.08	Describe how to dress for an interview.
08.09	Describe how to act at an interview.
09.0	Describe the different types of contaminants in various feed waters--The student will be able to:
09.01	List the different categories of source water.
09.02	Identify the TDS classification of fresh water, brackish water, highly brackish water, and seawater.
09.03	List common characteristics of surface water.
09.04	List common characteristics of well water.
09.05	List common characteristics of seawater.
09.06	Define the six different categories of water contaminants.
09.07	Compare and contrast the ionic, gaseous, siliceous, organic, non-living and living particulate differences between ground water and surface water.
10.0	Demonstrate how to use piping and instrumentation diagrams (P & ID) and process flow diagrams (PFD) to understand a water treatment process--The student will be able to:
10.01	Identify the sequence of the main pieces of equipment at a water treatment plant given a PFD.
10.02	Identify the instruments at a water treatment plant given a P & ID.

10.03	Trace lines using a P & ID.
10.04	Define an indicator, transmitter, and indicating controller.
10.05	Identify flaws in given PFD.
11.0	Describe the theory, equipment, and practice of scaling-control pretreatment technologies--The student will be able to:
11.01	Describe the theory and practice of ion exchange softeners.
11.02	Describe the theory and practice of acid injection.
11.03	Describe the theory and practice of scale inhibitor injection.
11.04	Identify the one scalant that ion exchange softeners cannot handle.
11.05	Describe the limitations of scale inhibitors.
11.06	Describe what acid injection does to calcium carbonate scale potential.
11.07	Describe what acid injection does for non-carbonate scale potential.
11.08	Describe the benefits of adding caustic between two-pass RO's to remove CO ₂ in the 1 st pass permeate (reduce loading on downstream DI trains).
12.0	Describe the theory, equipment, and practice of fouling-control pretreatment technologies--The student will be able to:
12.01	Describe the theory and practice of clarifiers.
12.02	Describe the theory and practice of multimedia filters.
12.03	Describe the theory and practice of sand filters.
12.04	Describe the theory and practice of green sand filters.
12.05	Describe the theory and practice of bag filters.
12.06	Describe the theory and practice of cartridge filters.
12.07	Describe the theory and practice of coagulant injection.
12.08	Describe the theory and practice of flocculant injection.
12.09	Describe the theory and practice of organic scavengers.
12.10	Describe the theory and practice of silt dispersant injection.

12.11	Compare membrane pretreatment technologies – nanofilters, ultrafilters and microfilters (double or triple membrane systems becoming more popular).
13.0	Describe the theory, equipment, and practice of chemical attack control pretreatment technologies--The student will be able to:
13.01	Describe the theory and practice of activated carbon beds.
13.02	Describe the theory and practice of pH control for cellulosic membranes.
13.03	Describe the theory and practice of sulfite ion injection.
13.04	Describe the theory and practice of ultraviolet irradiation for removal of chlorine and ozone.
14.0	Describe the theory, equipment, and practice of chlorination and chloramination--The student will be able to:
14.01	Describe the chemical reaction of chlorine with water.
14.02	List free chlorine compounds.
14.03	List the chemical reaction of chlorine and ammonia.
14.04	Describe the relationship among free chlorine, combined chlorine, and total chlorine.
14.05	Explain what happens to the proportion of free chlorine compounds with changes in pH.
14.06	Describe at what pH free chlorine is most biocidal.
14.07	Explain the reason for chloramination as opposed to breakpoint free chlorination.
14.08	Explain the difference in the effect of free chlorine and combined chlorine with polyamide thin film membranes.
14.09	Explain the effects of iron, copper, and cobalt in relationship with chlorine attack of polyamide thin film membranes.
14.10	Discuss how chemicals affect CA membranes versus TFC membranes.
15.0	Identify where in a water treatment system various contaminants are removed--The student will be able to:
15.01	Identify, given various water treatment schemes, where ionic contaminants are removed.
15.02	Identify, given various water treatment schemes, where organic contaminants are removed.
15.03	Identify, given various water treatment schemes, where siliceous contaminants are removed.
15.04	Identify, given various water treatment schemes, where gaseous contaminants are removed.
15.05	Identify, given various water treatment schemes, where non-living particulate contaminants are removed.

15.06	Identify, given various water treatment schemes, where living particulate contaminants are removed.
16.0	Explain how reverse osmosis works--The student will be able to:
16.01	Explain the process of osmosis.
16.02	Define a semipermeable membrane.
16.03	Explain the concept of applied pressure.
16.04	Explain the concept of osmotic pressure.
16.05	Explain the concept of net osmotic pressure.
16.06	Explain the process of reverse osmosis.
16.07	Explain the relationship of net driving pressure to water flux through a membrane.
16.08	Describe how a membrane element works.
17.0	Describe the rejection capabilities of each type of membrane--The student will be able to:
17.01	Describe how nanofiltration and reverse osmosis membrane reject ionic contaminants.
17.02	Describe how nanofiltration and reverse osmosis membrane reject non-ionic contaminants.
17.03	Describe the rejection capabilities of microfiltration membranes.
17.04	Describe the rejection capabilities of ultrafiltration membranes.
17.05	Describe the rejection capabilities of nanofiltration membranes.
17.06	Describe the rejection capabilities of hyperfiltration membranes.
18.0	Explain how to chemically clean a membrane unit--The student will be able to:
18.01	Describe the symptoms of a fouled membrane unit.
18.02	Describe the symptoms of a scaled membrane unit.
18.03	Describe the game plan required to remove scalants.
18.04	Describe the game plan required to remove foulants.
18.05	List generic chemicals used to remove scalants.

18.06	List generic chemicals used to remove foulants.
18.07	Describe air scouring during membrane CIP.
18.08	Discuss CIP versus removal for offsite cleaning and why offsite may be more beneficial under certain fouling circumstances.
19.0	Explain how to monitor before, during, and after chemical cleaning--The student will be able to:
19.01	Identify membrane unit performance trends that indicate the need for cleaning.
19.02	List a minimum of six parameters that should be monitored during a chemical cleaning.
19.03	Explain the problems that cleaning at too high or low a pH may cause.
19.04	Explain the problems that cleaning at too high or low a temperature may cause.
19.05	Explain the problems that cleaning at too high or low a flow rate may cause.
19.06	Describe the data used to indicate when to end a cleaning.
19.07	Describe the monitoring parameters that document how well a cleaning was performed.
20.0	Explain which type, or types, of membrane to use in different water treatment applications--The student will be able to:
20.01	Identify, given a feed water analysis and end-use requirements, whether microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), and/or reverse osmosis (RO) would produce the desired end-use water.
20.02	Describe the most important parameters for determining which membrane technology to use.
20.03	Define the pore size of MF membranes and provide examples for both municipal and industrial applications.
20.04	Define the pore size of UF membranes and provide examples for both municipal and industrial applications.
20.05	Define the pore size of NF membranes and provide examples for both municipal and industrial applications.
20.06	Define the pore size of RO membranes and provide examples for both municipal and industrial applications.
21.0	Describe the pretreatment requirements for different membrane technologies--The student will be able to:
21.01	Describe the pretreatment requirements for MF.
21.02	Describe the pretreatment requirements for UF.
21.03	Describe the pretreatment requirements for NF and RO to control scaling.
21.04	Describe the pretreatment requirements for NF and RO to control colloidal fouling.

21.05	Describe the pretreatment requirements for NF and RO to control biofouling.
21.06	Describe the pretreatment requirements for NF and RO to control chemical attack.
22.0	Explain why conventional water treatment has difficulty removing Cryptosporidium and Giardia cysts and which membrane technologies are effective--The student will be able to:
22.01	Define the size of Cryptosporidium and Giardia cysts.
22.02	Define the removal capabilities of coagulation, flocculation, sedimentation, and media filtration.
22.03	Explain why chlorination is not effective enough for inactivation of Cryptosporidium and Giardia cysts.
22.04	Identify which membrane technologies will effectively remove both Cryptosporidium and Giardia cysts.
23.0	Describe the three most common problems with nanofiltration and reverse osmosis membranes--The student will be able to:
23.01	Describe the mechanisms of scaling in NF and RO units.
23.02	Describe the mechanisms of fouling in NF and RO units.
23.03	Describe the mechanisms of chemical attack of NF and RO membranes.
23.04	Explain why NF membrane units may foul more than RO units.
23.05	Describe design features that reduce the fouling of NF and RO units.
23.06	Explain where fouling is the worst in NF and RO units.
24.0	Describe the instruments and the monitoring required to catch NF and RO problems at an early stage--The student will be able to:
24.01	List the minimum instrumentation required for effective monitoring.
24.02	Explain why interstage pressure gauges are required.
24.03	Explain the need for a feed water temperature indicator.
24.04	Explain the need for a permeate pressure gauge.
24.05	Demonstrate the ability to collect performance data and input it into the appropriate membrane manufacturer's monitoring software programs.
24.06	Demonstrate the ability to produce normalized permeate flow, percent salt rejection, and pressure drop performance trends.
24.07	List the instruments required to calculate net driving pressure.
24.08	List the instruments required to calculate normalized permeate flow.

24.09	List the instruments required to calculate percent salt passage.
24.10	List the instruments required to calculate percent recovery.
24.11	List the instruments required to calculate pressure drops.
24.12	Calculate net driving pressure given performance data from a membrane unit.
24.13	Calculate normalized permeate flow given performance data from a membrane unit.
24.14	Calculate percent salt rejection given performance data from a membrane unit.
24.15	Calculate percent recovery given performance data from a membrane unit.
24.16	Calculate pressure drops given performance data from a membrane unit.
25.0	Describe the common methods used to control scaling, fouling, and chemical attack in RO & NF units--The student will be able to:
25.01	List a minimum of six treatment steps or design features used to control scaling.
25.02	List a minimum of eight treatment steps or design features used to control colloidal fouling.
25.03	List a minimum of six treatment steps or design features used to control biofouling.
25.04	List a minimum of three treatment steps used to control chemical attack.
26.0	Explain the differences between designing membrane units for well water and designing for surface water--The student will be able to:
26.01	Explain the concept of GFD (gallons per square foot per day) based on different source waters.
26.02	Explain why well water will typically require less membrane than surface water.
26.03	Describe the common characteristics of shallow well water.
26.04	Describe the common characteristics of deep well water.
26.05	Describe the common characteristics of surface water.
26.06	Describe the common characteristics of seawater.
26.07	Draw three typical treatment schemes for RO and NF units operating on well water.
26.08	Draw three typical treatment schemes for RO and NF units operating on surface water.
27.0	Demonstrate how to use advanced troubleshooting techniques--The student will be able to:

27.01	Identify scaling given normalized permeate flow, percent salt rejection, and pressure drop performance graphs.
27.02	Identify fouling given normalized permeate flow, percent salt rejection, and pressure drop performance graphs.
27.03	Identify chemical attack given normalized permeate flow, percent salt rejection, and pressure drop performance graphs.
27.04	Determine a calcium carbonate scaling problem using membrane manufacturer's design software.
27.05	Determine a calcium sulfate scaling problem using membrane manufacturer's design software.
27.06	Determine a barium sulfate scaling problem using membrane manufacturer's design software.
27.07	Determine a strontium sulfate scaling problem using membrane manufacturer's design software.
27.08	Determine a silica scaling problem using membrane manufacturer's design software.
27.09	Determine that a unit is fouling due to high GFD.
27.10	Determine that a unit is fouling due to low cross flow velocities.
28.0	Explain the information on a membrane manufacturer's specification sheet and how to practically use this information at a plant--The student will be able to:
28.01	Identify the square footage of membrane per element and explain the significance.
28.02	Identify the test conditions of the membrane elements and explain the significance.
28.03	Identify the allowable normal operating and chemical cleaning temperature ranges of the membrane elements and explain the significance.
28.04	Identify the allowable normal operating and chemical cleaning pH ranges of the membrane elements and explain the significance.
28.05	Identify whether membrane elements are fiberglass wrapped or cage wrapped and explain the significance.
28.06	Identify heat sanitizable membrane elements and explain why and when these elements would be used.
28.07	Identify the pressure drop limitations of membrane elements and explain the significance.
28.08	Describe a minimum of three potentials problems that could occur when switching membrane elements.
29.0	Demonstrate how to operate and maintain an RO unit--The student will be able to:
29.01	Load and unload membrane elements.
29.02	Replace o-rings.
29.03	Replace brine seals.

29.04	Shim a unit.
29.05	Install end-cap adaptors.
29.06	Install interconnectors.
29.07	Replace cartridge filters.
29.08	Dechlorinate the feed water.
29.09	Adjust the pH of the feed water if required.
29.10	Start and stop a unit.
29.11	Adjust the percent recovery by changing the valving.
29.12	Identify an o-ring leak.
29.13	Take conductivity readings.
29.14	Perform the Silt Density Index.
29.15	Profile the unit.
29.16	Perform a probing of a pressure vessel.
29.17	Identify all components of a unit.
29.18	Identify all instruments on a unit.
30.0	Explain why membrane water treatment is becoming common for the production of municipal drinking water--The student will be able to:
30.01	Describe the hydrological cycle.
30.02	Describe the effect the human population increase has on water quality.
30.03	Describe the problem of Cryptosporidium and Giardia cysts.
30.04	Describe the problem with arsenic.
30.05	Describe the problem with disinfection by-products.
30.06	Describe the basic reasons why conventional water treatment cannot remove certain substances down to current and future regulated levels.
30.07	Describe which problems MF can control.

30.08	Describe which problems UF can control.
30.09	Describe which problems NF can control.
30.10	Describe which problems RO can control.
31.0	Describe and perform appropriate water analyses--The student will be able to:
31.01	Identify the laboratory tests required for drinking water, boiler feed water, purified water, water for injection and semiconductor rinse water.
31.02	Identify the bacteriological monitoring that must be done for drinking water, boiler feed water, purified water, water for injection and semiconductor rinse water.
31.03	Describe how the heterotrophic plate count (HPC) enumerates bacteria.
31.04	Describe how sulfate-reducing bacteria (SRB), iron-related bacteria (IRB), and slime-forming bacteria (SFB) are enumerated.
31.05	Perform HPC, SRB, IRB, and SFB bacterial analysis.
32.0	Describe and perform appropriate sampling techniques--The student will be able to:
32.01	Define good sampling techniques for microbiological analysis.
32.02	Perform good sampling techniques for microbiological analysis.
32.03	Define good sampling techniques for chemical analysis.
32.04	Perform good sampling techniques for chemical analysis.
33.0	Describe the theory, equipment, and operation of aeration, decarbonation, and degasification--The student will be able to:
33.01	Describe the theory, equipment, and operation of induced draft aeration/decarbonation.
33.02	Describe the theory, equipment, and operation of forced draft aeration/decarbonation.
34.0	Describe the theory, equipment, and operation of stabilizing water--The student will be able to:
34.01	List the chemicals used to stabilize drinking water.
34.02	Describe how to measure the stability of drinking water.
34.03	Calculate Langelier Saturation Index (LSI) using software programs.
35.0	Describe the theory, equipment, and operation of corrosion control--The student will be able to:
35.01	Describe the process of corrosion.

35.02	Describe the problems caused by corrosion for drinking water, boiler feed water, purified water, water for injection and semiconductor rinse water.
35.03	Identify chemicals used for corrosion control.
35.04	Describe cathodic protection.

Course Number: EVS0357
Occupational Completion Point: B
High Purity Water Treatment Specialist – 306Hours – SOC Code 51-8031

36.0	Describe the characteristics and the measurement of silica contaminants--The student will be able to:
36.01	Describe a problem that silica compounds pose for the power generation, semiconductor, and pharmaceutical industries.
36.02	Describe a problem that silica compounds pose in ion exchange resin.
36.03	Describe a problem that silica compounds pose in nanofiltration and RO units.
36.04	Identify ionic and non-ionic forms of silica compounds.
36.05	Discuss the difference between <i>reactive</i> and <i>non-reactive</i> silica compounds.
36.06	Discuss the characteristics of colloidal silica compounds.
36.07	Describe how silica compounds are typically measured in a water sample.
37.0	Describe the characteristics and the measurement of organic contaminants--The student will be able to:
37.01	Describe a problem that organic compounds pose for the drinking water, power generation, semiconductor, and pharmaceutical industries.
37.02	Describe a problem that organic compounds pose in ion exchange resin.
37.03	Describe a problem that organic compounds pose in nanofiltration and RO units.
37.04	Describe a problem that organic compounds pose in activated carbon beds.
37.05	Identify ionic and non-ionic forms of organic compounds.
37.06	Discuss the difference between <i>polar</i> and <i>non-polar</i> organic compounds.
37.07	Discuss the characteristics of colloidal organic compounds.

37.08	Describe how organic compounds are typically measured in a water sample.
38.0	Describe the characteristics and the measurement of ionic contaminants--The student will be able to:
38.01	List six common cations.
38.02	List six common anions.
38.03	List four scaling cations.
38.04	List two scaling anions.
38.05	Discuss the acid ion.
38.06	Discuss the caustic ion.
38.07	List two non-scaling cations.
38.08	List two non-scaling anions.
38.09	Discuss the relationship of pH to ionic carbon dioxide compounds.
38.10	Describe two instruments used to measure ionic contaminants.
39.0	Describe the characteristics and the measurement of non-living particle contaminants--The student will be able to:
39.01	Discuss the importance of the surface charge of colloidal particles.
39.02	Define silt, clay, and sand based upon size and chemical composition.
39.03	Discuss ultraviolet irradiation effectiveness versus suspended solids loading.
39.04	Discuss chemical disinfection effectiveness versus suspended solids loading.
39.05	Discuss the fouling implications to membrane units of suspended solids loading.
39.06	Discuss Silt Density Index measurement of suspended solids.
39.07	Describe how a turbidimeter works.
39.08	Describe how a laser particle counter works.
39.09	Explain how a TSS (Total Suspended Solids) measurement is made.
40.0	Describe the characteristics and the measurement of living particle contaminants--The student will be able to:

40.01	List five types of microbiological particles.
40.02	Describe five ideal conditions for bacterial growth.
40.03	Calculate the number of bacteria present after 24 hours if a bacterium begins reproducing at time zero every 20 minutes.
40.04	List five waterborne diseases.
40.05	Discuss the significance of gram staining.
40.06	Describe the problem that certain gram-negative bacteria produce in the pharmaceutical/biotech industries.
40.07	Describe how a heterotrophic bacterial count is performed.
40.08	Discuss the significance of serial dilution.
41.0	Explain the monitoring and troubleshooting required for media filters--The student will be able to:
41.01	Discuss the significance of pressure drop across a media bed.
41.02	Describe the concept of channeling.
41.03	Explain how a media filter is backwashed.
41.04	Describe how a media bed should look when examined after backwash.
41.05	Discuss the problems that can cause an uneven bed.
41.06	Describe how to sample the media in a bed.
41.07	Explain the implications of water temperature and backwashing.
41.08	Discuss the addition of filter aid polymer to MMF to reduce SDI.
41.09	Discuss the addition of filter aid precoat and/or body feed (using DE) to reduce SDI.
42.0	Explain the monitoring and troubleshooting required for activated carbon beds--The student will be able to:
42.01	Discuss the significance of pressure drop across an activated carbon (AC) bed.
42.02	Discuss the problems associated with channeling and/or exhaustion.
42.03	Identify how to determine if an AC bed is exhausted.
42.04	Explain the bacterial problems associated with AC beds.

42.05	Explain how to sanitize an AC bed.
42.06	Describe the limitations of sanitization of AC beds.
42.07	Discuss the annual monitoring that must be done on AC beds.
43.0	Explain the monitoring and troubleshooting required for membrane units--The student will be able to:
43.01	List the instruments that must be present in order to monitor normalized permeate flow, percent salt rejection, percent recovery, trans-membrane pressure, and differential pressures.
43.02	Identify, given performance graphs, the status of various membrane units.
43.03	Identify, given instrument readings, the status of various membrane units.
43.04	Describe how to test the accuracy of pressure gauges.
43.05	Describe how to test the accuracy of conductivity meters.
43.06	Describe how to test the accuracy of flow meters.
43.07	Demonstrate how to use software programs as troubleshooting tools.
44.0	Explain the theory, equipment, and practice of probing--The student will be able to:
44.01	Describe the purpose of probing.
44.02	Explain when to perform a probing.
44.03	Explain the probing procedure.
44.04	Perform a probing.
44.05	Identify problems, given probing data.
44.06	Demonstrate how to use software programs to supplement probing data.
45.0	Explain the theory, equipment, and practice of profiling--The student will be able to:
45.01	Describe the purpose of profiling.
45.02	Explain when to perform a profiling.
45.03	Explain the profiling procedure.
45.04	Perform a profile.

45.05	Identify problems, given profiling data.
45.06	Demonstrate how to use software programs to supplement profiling data.
46.0	Explain the theory, equipment, and practice of membrane element replacement--The student will be able to:
46.01	Identify elements that need to be replaced given probing and profiling data.
46.02	Identify elements that need to be replaced based on autopsy data.
46.03	Explain how to remove variously located membrane elements from pressure vessels.
46.04	Explain how to install new elements to replace variously located membrane elements in pressure vessels.
46.05	Describe the problems that may occur when installing new elements in pressure vessels that contain used elements.
46.06	Discuss the issues concerning replacing the lead elements.
46.07	Discuss the issues concerning replacing the last elements.
46.08	Identify various lubrication methods that may be employed during membrane element loading and the pros and cons of each method.
46.09	Perform membrane element replacements.
47.0	Demonstrate how to chemically clean an RO unit--The student will be able to:
47.01	List two performance trends that indicate a cleaning is required.
47.02	Explain how fouling and scaling can be distinguished prior to cleaning.
47.03	Explain the chemical cleaning procedure.
47.04	Perform chemical cleanings.
47.05	Identify and correct problems during a cleaning.
47.06	Explain what chemicals to use for different scalants and foulants.
48.0	Demonstrate how to use software programs to trend membrane unit performance--The student will be able to:
48.01	Describe how to download free software from the Internet.
48.02	Demonstrate how to input the data from a complete water analysis.
48.03	Explain how frequently performance data should be recorded and how often the data should be graphed and evaluated.

48.04	Input operating data into the software program.
48.05	Generate graphs using the software program.
48.06	Evaluate performance graphs.
49.0	Demonstrate how to use software programs to check the scaling and fouling characteristics of a membrane unit--The student will be able to:
49.01	Explain how design software can provide scaling and fouling characteristics of a membrane unit.
49.02	Input appropriate data into membrane manufacturer's design software.
49.03	Explain the important information generated by the design software with respect to scaling and fouling.
49.04	Identify, given examples, poor membrane unit designs with respect to scaling and fouling control.
49.05	Explain changes to a poor design that would result in better fouling and scaling control.
50.0	Explain the theory and describe the function of ion exchange resin beads and resin sheets--The student will be able to:
50.01	Describe how ions diffuse into resin beads and resin sheets.
50.02	Describe how charged functional groups within ion exchange resin attract and bond with feed water ions.
50.03	Identify the functional group that makes a strong acid cation resin.
50.04	Identify the functional groups that make a strong base anion resin.
50.05	Explain the importance of resin cross linkage.
51.0	Explain the concept of selectivity--The student will be able to:
51.01	Explain the charge-for-charge ion exchange process.
51.02	List the selectivity order for the hydrogen, calcium, and magnesium ions concerning strong acid cation resin.
51.03	List the selectivity order for hydroxide, silica, bicarbonate, chloride, and sulfate ions concerning strong base anion resin.
52.0	Demonstrate an understanding of selectivity--The student will be able to:
52.01	Identify, given a list of ions, which ions can "kick off" which other ions from strong acid cation resin.
52.02	Identify, given a list of ions, which ions can "kick off" which other ions from strong base anion resin.
53.0	Describe the normal operation of strong acid cation (SAC) single-bed ion exchange units--The student will be able to:

53.01	Identify, given an illustration of a cutaway ion exchange single bed, the valves that must be open and closed, and the flow path through the vessel during normal operation.
53.02	Describe, step-by-step, what happens in an SAC resin bed concerning the migration of ions.
53.03	Identify which ion is the first to break through an SAC bed.
53.04	Identify, given a typical feed water, what the conductivity and pH of an SAC effluent will be compared to the influent.
53.05	Identify, given a non-typical feed water, what the conductivity and pH of an SAC effluent will be compared to the influent.
53.06	Explain the process of "sodium leakage".
54.0	Describe and demonstrate how to regenerate a SAC single bed--The student will be able to:
54.01	List the most common chemical used to regenerate SAC beds and why it is most common.
54.02	List the second most common chemical used to regenerate SAC beds and which industries typically use this chemical.
54.03	Describe, given an illustration of a cutaway resin bed, what happens during each step of an SAC regeneration.
54.04	Explain the purpose of each of the four steps in a SAC bed regeneration.
54.05	Explain what to monitor during each of the steps in a SAC bed regeneration.
54.06	Identify the performance outcome if the backwash step is too short.
54.07	Identify the performance outcome if the backwash flow rate is too low.
54.08	Identify the performance outcome if the backwash flow rate is too high.
54.09	Identify the performance outcome if the acid injection step is too short.
54.10	Identify the performance outcome if the acid injection step is too long.
54.11	Identify the performance outcome if the rinse step is too short.
54.12	Identify the performance outcome if the rinse step is too long.
54.13	Explain the differences and different outcomes of co-current regeneration versus counter current regeneration.
54.14	Perform a co-current regeneration of a laboratory size SAC bed.
55.0	Describe the normal operation of strong base anion (SBA) single-bed ion exchange units--The student will be able to:
55.01	Identify, given an illustration of a cutaway ion exchange single bed, the valves that must be open and closed, and the flow path through the vessel during normal operation.

55.02	Describe, step-by-step, what happens in an SBA resin bed concerning the migration of ions.
55.03	Identify which ion is the first to break through an SBA bed.
55.04	Identify, given a typical feed water, what the conductivity and pH of an SBA effluent will be compared to the influent.
55.05	Identify, given a non-typical feed water, what the conductivity and pH of an SBA effluent will be compared to the influent.
55.06	Identify, given an illustration of a cutaway SBA unit, where silica, hydroxide, chloride, sulfate, and bicarbonate ions will be located just prior to a regeneration.
55.07	Identify, given an illustration of a cutaway SBA unit, where silica, hydroxide, chloride, sulfate, and bicarbonate ions will be located just after a regeneration.
56.0	Describe and demonstrate how to regenerate an sba single bed--The student will be able to:
56.01	List the most common chemical used to regenerate SBA beds.
56.02	Describe, given an illustration of a cutaway resin bed, what happens during each step of an SBA regeneration.
56.03	Explain the purpose of each of the four steps in an SBA bed regeneration.
56.04	Explain what to monitor during each of the steps in an SBA bed regeneration.
56.05	Identify the performance outcome if the backwash step is too short.
56.06	Identify the performance outcome if the backwash flow rate is too low.
56.07	Identify the performance outcome if the backwash flow rate is too high.
56.08	Identify the performance outcome if the caustic injection step is too short.
56.09	Identify the performance outcome if the caustic injection step is too long.
56.10	Identify the performance outcome if the rinse step is too short.
56.11	Identify the performance outcome if the rinse step is too long.
56.12	Explain the differences and different outcomes of co-current regeneration versus counter current regeneration.
56.13	Perform a co-current regeneration of a laboratory size SBA bed.
57.0	Describe the normal operation of a SAC and SBA dual-bed ion exchange system--The student will be able to:
57.01	Explain, step-by-step, what happens to hydrogen, sodium, calcium, magnesium, silica, hydroxide, bicarbonate, chloride, and sulfate ions in a dual-bed system.
57.02	Explain the impact of increased sodium leakage.

57.03	Describe how to determine if the SAC bed exhausts first.
57.04	Describe how to determine if the SBA bed exhausts first.
57.05	Identify the relative pH and conductivity of the influents and effluents of each bed given a particular feed water.
57.06	Describe what happens to the concentration of SBA effluent silica with SAC bed break through.
58.0	Describe the normal operation of mixed-bed ion exchange units--The student will be able to:
58.01	Explain the concept of a polishing mixed bed.
58.02	List the types of resin in a mixed bed and how they are configured.
58.03	Explain, step-by-step, given a cutaway illustration of a mixed bed vessel, how the unit works.
58.04	Identify which ion is the first to break through a mixed bed.
58.05	Identify how to determine which resin is exhausted.
58.06	Describe the correlation between conductivity and resistivity.
58.07	Explain the instrumentation required on a mixed bed effluent if ultra-pure water is required.
59.0	Describe how to regenerate a mixed bed--The student will be able to:
59.01	Identify the ten steps of a mixed-bed regeneration.
59.02	Identify, given an illustration of a cutaway mixed-bed vessel, the flow path during each step of a mixed-bed regeneration.
59.03	Describe what happens to the different resins during the backwash step.
59.04	Explain the function of "inert resin".
59.05	Identify how to tell if a good backwash has occurred.
59.06	Identify the problems associated with a poor backwash.
59.07	Explain the consequences of the resin separation line being too high or too low.
59.08	Describe the flow path of acid and caustic during the regenerant injection step.
59.09	Identify the problems associated with too high or too low regenerant flow rates.
59.10	Explain the reason why hot caustic is frequently used for a mixed-bed regeneration.

59.11	Explain the purpose of the regenerant displacement step.
59.12	Explain the purpose of the air mix step.
59.13	Identify the problems that may occur if the air mix step is not effective.
59.14	Describe “bed lock” and how it is accomplished.
59.15	Describe the difference between the slow rinse step and the fast rinse step.
60.0	Describe the normal operation and regeneration of an electrode ionization unit--The student will be able to:
60.01	Identify, given an illustration of an electrodeionization (EDI) unit, the anion transfer resin sheets, cation transfer resin sheets, mixed resin beads, dilute channels, concentrate channels, recirculation pump, waste line, and electrodes.
60.02	Explain how an EDI unit works during normal operation.
60.03	Explain how an EDI unit is regenerated continuously.
60.04	Describe the pretreatment requirements for most EDI units.
61.0	Describe the normal operation of 254 nm and 185 nm ultraviolet (UV) irradiation units--The student will be able to:
61.01	Describe at least three differences between low pressure and medium pressure UV systems.
61.02	Describe at least three uses for 254 nm UV units.
61.03	Describe the main reason for using 185 nm UV units for high purity water applications.
61.04	Describe the difference between 254 nm and 185 nm UV lamps.
61.05	Explain the purpose of a quartz sleeve in a low pressure UV system.
61.06	Explain “solarization”.
61.07	Describe how a 185 nm UV irradiation destroys organic compounds.
61.08	Explain what happens to the conductivity or resistivity of the effluent of 254 nm and 185 nm UV units compared to the influent.
61.09	Identify the useful life of low pressure and medium pressure UV lamps.
61.10	Explain why UV units have stainless steel inlets and outlets even if connected to plastic pipe.
61.11	Explain why there is always a polishing mixed bed downstream of a 185 nm UV unit in a high purity water treatment system.
61.12	Explain why there is usually a filter downstream of a germicidal UV unit.

62.0	Explain the functions of final filters--The student will be able to:
62.01	Explain the purpose of final filters in a high purity water treatment system.
62.02	List at least three different types of final filter used.
62.03	Describe at least two different ways to test the integrity of final filters.
63.0	Explain the usage of ozone in high purity water treatment systems--The student will be able to:
63.01	Identify two potential points in a high purity water loop where ozone may be continuously injected.
63.02	Describe at least two reasons for injecting ozone.
64.0	Explain the problems caused by dead legs--The student will be able to:
64.01	Define a "dead leg".
64.02	Describe the two main problems caused by dead legs.
65.0	Identify the pieces of equipment that remove feed water contaminants--The student will be able to:
65.01	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of particles greater than 20 microns.
65.02	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of particles greater than 1 micron.
65.03	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of particles greater than 0.1 micron.
65.04	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of particles greater than 0.01 micron.
65.05	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of calcium ions.
65.06	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of colloidal silica.
65.07	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of colloidal organic particles.
65.08	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of dissolved organic compounds.
65.09	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of dissolved ionic silica compounds.
65.10	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of chlorine compounds ahead of an RO unit.
65.11	Identify, given a high purity water treatment scheme, which pieces of equipment will reduce the concentration of scaling compounds ahead of an RO unit.

65.12 Identify, given a high purity water treatment scheme, which pieces of equipment will be most prone to biofouling.

65.13 Identify, given a high purity water treatment scheme, which pieces of equipment will be most prone to scaling.

65.14 Identify, given a high purity water treatment scheme, which pieces of equipment will be most prone to chemical attack.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Basic Skills (if applicable)

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement (Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed at <http://www.fldoe.org/workforce/dwdframe/rtf/basicskills-License-exempt.rtf>.

Articulation

This program has no statewide articulation agreement approved by the Florida State Board of Education. However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

2014 – 2015

**Florida Department of Education
Curriculum Framework**

Program Title: Wastewater Treatment Technologies
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV	
Program Number	P150527
CIP Number	0715050604
Grade Level	30, 31
Standard Length	405 hours
Teacher Certification	WSP OPER 7G
CTSO	N/A
SOC Codes (all applicable)	51-8031 - Water and Wastewater Treatment Plant and System Operators
Facility Code	263 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp
Basic Skills Level	Mathematics: N/A Language: N/A Reading: N/A

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 career Agriculture, Food and Natural Resources 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 Wastewater Treatment sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to source water or influent characteristics; treatment facility unit processes and operational techniques; water quality and identification; identifying treatment goals and measuring their achievement; disinfection; process control techniques; sampling, testing, and laboratory analysis; supervision; operation maintenance and inspection of facility equipment; application of current DEP regulations and standards; facility administration and management techniques; and troubleshooting operational control problems. The emphasis is on skills that are needed for effective treatment process control and troubleshooting.

See the Appendix for additional information relevant to Career and Technical Education (CTE) program implementation.

Program Structure

This program is a planned sequence of instruction consisting of 3 occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

The following table illustrates the post-secondary program structure:

OCP	Course Number	Course Title	Length	SOC Code
A	EVS0333	Wastewater Treatment Plant Operator C	155 hours	51-8031
B	EVS0343	Wastewater Treatment Plant Operator B	130 hours	51-8031
C	EVS0350	Wastewater Treatment Plant Operator A	120 hours	51-8031

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:

- 01.0 Identify professions related to the water technology field.
- 02.0 Identify scientific concepts common in water and wastewater treatment.
- 03.0 Identify safety hazards associated with water technologies.
- 04.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 05.0 Solve basic math problems common to water technologies.
- 06.0 Define pumping and basic hydraulic principles.
- 07.0 Define principles of disinfection.
- 08.0 Define sampling techniques.
- 09.0 Define federal, state, and local regulations that apply to water technologies.
- 10.0 Demonstrate employability skills.
- 11.0 Identify the basic characteristics and principles of wastewater treatment.
- 12.0 Identify sampling techniques and interpret the results.
- 13.0 Describe the sources of wastewater and the types of collection systems.
- 14.0 Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management.
- 15.0 Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management.
- 16.0 Perform equipment inspection, and identify basic maintenance for the treatment train, effluent disposal, and solids management.
- 17.0 Identify and correct facility operational problems.
- 18.0 Identify federal, state, and local regulations governing wastewater technologies.
- 19.0 Describe federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 20.0 Identify the constituents of influent and its effects on the treatment process.
- 21.0 Identify the constituents of wastewater and select the appropriate treatment.
- 22.0 Demonstrate advanced sampling techniques and interpret results.
- 23.0 Describe process optimization for preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal, and solids management.
- 24.0 Describe advanced treatment process control for the treatment train, effluent disposal, and solids management.
- 25.0 Describe advanced equipment inspection and preventive maintenance for the treatment train, effluent disposal, and solids management.
- 26.0 Describe and correct facility operational problems.
- 27.0 Apply federal, state, and local regulations governing wastewater technologies.
- 28.0 Apply federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 29.0 Describe energy conservation and identify ways to conserve energy in the wastewater treatment facility.
- 30.0 Demonstrate supervisory skills.
- 31.0 Discuss facility management skills.
- 32.0 Demonstrate methods of organization and control.
- 33.0 Develop a plan for cost management.
- 34.0 Prepare budgets and personnel assignments.
- 35.0 Develop standard operating procedures for the training and orientation of new employees.

- 36.0 Demonstrate personnel selection and discipline.
- 37.0 Demonstrate contingency planning.
- 38.0 Develop a plan for energy conservation.
- 39.0 Demonstrate record keeping and use of computer applications in planning.
- 40.0 Demonstrate process optimization for water or wastewater treatment facilities.
- 41.0 Interpret permits and blueprints.
- 42.0 Develop a laboratory plan for process control.
- 43.0 Employ public-relations skills in community interactions.

2014 – 2015

**Florida Department of Education
Student Performance Standards**

Program Title: Wastewater Treatment Technologies
PSAV Number: P150527

Course Number: EVS0333
Occupational Completion Point: A
Wastewater Treatment Plant Operator C – 155 Hours – SOC Code – 51-8031

01.0	Identify professions related to the water technology field--The student will be able to:
01.01	List duties of water technology workers such as wastewater operator, water operator, systems operator, stormwater operator, residual (bio-solids) hauler operator, cross connection operator, pretreatment operator, and meter reading/maintenance operator.
01.02	Identify the basic terms and concepts involved in processes used in these professions.
01.03	List potential employers in the water technology field: federal, municipal, county, state and private.
01.04	Identify resources to assist in finding employment in the field.
01.05	Identify professional organizations related to the water technology field.
01.06	Identify career ladder levels in the water technology field: trainee, C Level, B Level, A Level.
02.0	Identify scientific concepts common in water and wastewater treatment--The student will be able to:
02.01	Identify chemical symbols used in water and wastewater treatment.
02.02	Describe the hydrologic cycle.
02.03	Describe the basic concepts of the pH scale and its importance in the treatment process.
02.04	Identify the differences between mixtures, elements, and compounds, and organic and inorganic chemicals.
02.05	Identify principle states of matter: liquid, solid, and gas.
02.06	Identify the basic nitrogen, phosphorous, and carbon cycles.
03.0	Identify safety hazards associated with water technologies--The student will be able to:
03.01	Identify the types of hazards common to water technology facilities.

03.02	Recognize unsafe conditions and prescribe corrective measures.
03.03	Identify and safely handle hazardous chemicals common to water technology facilities.
03.04	Recognize electrical hazards.
03.05	Recognize fire hazards, identify types of fires, and describe appropriate extinguishing techniques.
04.0	Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials--The student will be able to:
04.01	Identify the kinds of information presented on Material Safety Data Sheets (MSDS).
04.02	Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (chapter 442, F.S.).
05.0	Solve basic math problems common to water technologies--The student will be able to:
05.01	Perform basic arithmetic problems, including addition, subtraction, multiplication, division, fractions, decimals, percentages, rounding (significant figures), graphing, etc.
05.02	Identify metric measurements and perform conversions.
05.03	Perform calculations that involve areas, volumes, capacities, retention times, pounds, mg/L, velocities, flow rates, pressure, and head.
06.0	Define pumping and basic hydraulic principles--The student will be able to:
06.01	Identify types of pumps.
06.02	Discuss application and use of different types of pumps.
06.03	Identify components/characteristics of pumps including pump operation and basic pump curves including centrifugal pumps, positive displacement pumps, and air lift pumps.
06.04	Identify types of pipes, valves, and fittings.
06.05	Define cross connections.
06.06	Identify the appropriate equipment used in the treatment processes.
07.0	Define principles of disinfection--The student will be able to:
07.01	List the need/reasons for disinfection (list of waterborne diseases).
07.02	Define concepts related to disinfection.
07.03	List methods and chemicals used in disinfection.
07.04	Define the physical properties of chlorine.

07.05	List kinds of disinfection equipment used.
08.0	Define sampling techniques--The student will be able to:
08.01	Define the reasons for sampling and types of samples.
08.02	Define methods of sample collection and handling.
08.03	Define the basic procedure for quality control and quality assurance in sampling.
08.04	Define the chain of custody for samples.
08.05	Perform chlorine residual analysis.
08.06	Perform pH analysis.
09.0	Define federal, state, and local regulations that apply to water technologies--The student will be able to:
09.01	List regulatory agencies and their roles in monitoring the water technology field.
09.02	Define regulations associated with the appropriate federal, state or local agencies.
09.03	Define training and certification requirements for water technology workers.
10.0	Demonstrate employability skills--The student will be able to:
10.01	Conduct a job search.
10.02	Secure information about a job.
10.03	Identify documents that may be required for a job application.
10.04	Complete a job application.
10.05	Demonstrate competence in job-interview techniques.
10.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
10.07	Identify acceptable work habits.
10.08	Demonstrate knowledge of how to make job changes appropriately.
10.09	Demonstrate acceptable employee-health habits for the treatment facility environment.
10.10	Identify materials and documents needed for a professional library.

10.11	Demonstrate productive and positive customer interactions.
10.12	Demonstrate effective interpersonal communication skills.
11.0	Identify the basic characteristics and principles of wastewater treatment--The student will be able to:
11.01	Identify the sources of wastewater and the objectives of wastewater treatment.
11.02	Identify terms used in wastewater treatment.
11.03	Identify the impact of wastewater on receiving bodies of water.
11.04	Identify biological organisms present in treatment processes.
11.05	Identify waterborne diseases.
11.06	Identify commonly measured wastewater parameters.
11.07	Identify factors affecting raw wastewater.
11.08	Correlate treatment processes to types of facility influent and solids.
12.0	Identify sampling techniques and interpret the results--The student will be able to:
12.01	Identify the reasons for sampling and the types of samples (e.g., simple, representative, grab, composite).
12.02	Describe methods of sample collection and handling.
12.03	Identify specific samples (biological or chemical) and determine the significance of sample results required for process quality control, for compliance with standards, and for reporting.
12.04	Identify representative sampling points.
12.05	Identify the significance of the flow measurement on process control.
13.0	Describe the sources of wastewater and the types of collection systems--The student will be able to:
13.01	Describe the types of wastewater collection systems.
13.02	Identify flow variations and conditions that affect plant treatment, including infiltration, inflow, and lift stations.
13.03	Identify methods to detect and correct infiltration.
13.04	Identify dissolved gases in wastewater and the effect of their presence/absence on treatment.
14.0	Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management--The student will be able to:

14.01	Describe concepts related to preliminary and primary treatment.
14.02	Describe the types of preliminary treatment equipment, the way they function, and the relationship of each to the treatment train.
14.03	Describe the types of primary treatment equipment, the way they function, and the relationship of each to the treatment train.
14.04	Describe concepts related to secondary treatment, including attached growth processes, suspended growth processes, aeration, and clarification.
14.05	Describe the types of secondary treatment equipment, the way they function, and the relationship of each to the treatment train.
14.06	Describe concepts related to tertiary treatment processes, including sand filtration, nitrification/denitrification, oxic/anoxic, activated carbon, and artificial wetlands.
14.07	Describe the types of tertiary treatment equipment, the way they function, and the relationship of each to the treatment train.
14.08	Describe concepts related to disinfection and effluent disposal, including surface water, reuse reclamation, deep well, and ocean outfall.
14.09	Describe the types of disinfection and the types of effluent-disposal equipment, the way they function, and the relationship of each to the system.
14.10	Describe concepts related to solids management, including thickening, aerobic and anaerobic digestion, stabilization, de-watering, and reuse.
14.11	Describe the types of solids-management equipment, the way they function, and the relationship of each to the system.
15.0	Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management--The student will be able to:
15.01	Describe the grit-removal process and the operational efficiency of each step.
15.02	Describe the laboratory tests performed on influent.
15.03	Describe the primary-clarifier removal efficiencies, including settleable solids, suspended solids, total solids, BOD, and bacteria.
15.04	Describe sampling points, frequency of sampling, and the laboratory tests and results that are used for the proper operation of the primary clarifier.
15.05	Select and plot on a trend chart the parameters for primary clarification.
15.06	Use the operational data required to evaluate the performance of secondary-treatment processes, including attached growth, suspended growth, aeration, and clarification.
15.07	Describe sampling points, the frequency of sampling, and the laboratory tests and results used for proper operation of the secondary-treatment processes.
15.08	Select and plot on a trend chart the parameters for secondary clarification.
15.09	Describe how nitrification affects secondary processes and clarification.
15.10	Describe how denitrification affects secondary processes and clarification.

15.11	Use operational data to evaluate the performance of sand filtration.
15.12	Describe sampling points, the frequency of sampling, and the laboratory tests and results used for checking the proper operation of sand filtration. Select and plot on a trend chart the parameters for sand filtration.
15.13	Use operational data to evaluate the nitrification/denitrification process.
15.14	Use operational data to evaluate the performance of effluent-disposal processes, including disinfection and dechlorination.
15.15	Describe sampling points, the frequency of sampling, and the laboratory tests used for checking the proper operation of effluent disposal.
15.16	Select and plot on a trend chart the parameters for effluent disposal.
15.17	Describe various methods of effluent disinfection including UV, chlorination, and ozonation.
15.18	Describe the chemical and physical properties of chlorine, and describe the reactions of chlorine with water, ammonia compounds, and sulfides.
15.19	Describe the safe storage and handling of chlorine, including the use of testing compounds.
15.20	Explain the points of application of chlorine in wastewater treatment.
15.21	Describe the methods of dechlorination.
15.22	Describe the methods commonly used to dispose of wastewater effluents, including reuse applications.
15.23	Describe the laboratory tests commonly used on the reuse of effluent.
15.24	Describe the types of sludge and their characteristics.
15.25	Use operational data to evaluate the performance of solids management, including sludge thickening, digestion, de-watering, and disposal processes.
15.26	Describe sampling points, the frequency of sampling, and the laboratory tests and results used for checking the proper operation of solids management and for compliance with Chapter 62-640 F.A.C.
16.0	Perform equipment inspection, and identify basic maintenance for the treatment train, effluent disposal, and solids management—The student will be able to:
16.01	Identify the appropriate equipment used in the treatment train, effluent disposal, and solids management.
16.02	Describe a preliminary site inspection of the equipment used in the treatment train, effluent disposal, and solids management.
16.03	Identify the maintenance needs of equipment used in the treatment train, effluent disposal, and solids management, including safe procedures for maintenance.
16.04	Describe proper record keeping for preventive and corrective maintenance.
16.05	Describe preventive and corrective maintenance procedures for equipment used in the treatment process, effluent disposal, and solids management.

17.0	Identify and correct facility operational problems--The student will be able to:
17.01	Describe common facility operational problems in the treatment train, effluent disposal, and solids management.
17.02	Describe methods to evaluate operational problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.
17.03	Select appropriate corrective actions for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.
17.04	Describe the methods for monitoring results of corrective action taken for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management.
18.0	Identify appropriate federal, state, and local regulations--The student will be able to:
18.01	Identify federal, state and local regulations that apply to the operation of a wastewater-treatment facility.
18.02	Describe the operator's duties and responsibilities, certification requirements, testing, renewal, staffing, and facility classification (sections of Chapter 62-602 F.A.C.).
18.03	Explain and describe the contents of an operating permit.
18.04	Identify state regulations that apply to procedures such as reclaimed water, reuse, and residuals management.
19.0	Describe federal, state, and local laws for the handling, storage, and use of toxic and hazardous materials--The student will be able to:
19.01	Identify the kinds of information presented on the MSDS.
19.02	Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (Chapter 442, F.S.).
19.03	Identify the reporting requirements as specified in SARA Title III and Chapter 252, F.S.
19.04	Describe the responsibilities toward the community as specified in SARA Title III and Chapter 252, F.S.

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Occupational Completion Point: B

Wastewater Treatment Plant Operator B – 130 Hours – SOC Code – 51-8031

20.0	Identify the constituents of influent and its effects on the treatment process--The student will be able to:
20.01	Explain the significance of dissolved gases in the influent and the effects of dissolved gases on treatments.
20.02	Explain the sources of infiltration and inflow, and discuss the effects of infiltration and inflow on treatment processes.
20.03	Explain the effect of lift-station performance on the overall treatment process.

20.04	Describe solutions for lift-station problems, such as surging flows, septic conditions, and power outages.
21.0	Identify the constituents of wastewater, and select the appropriate treatment--The student will be able to:
21.01	Identify the specific physical, chemical, and biological characteristics of wastewater.
21.02	Describe respiration, gas production, aerobic and anaerobic conditions, different methods of effluent disposal, and solids management.
21.03	Identify levels of wastewater treatment and limits on facility discharges.
22.0	Demonstrate advanced sampling techniques and interpret the results--The student will be able to:
22.01	Develop standard operating procedures for taking samples for process quality control, for compliance with standards, and for reporting requirements.
22.02	Identify microorganisms present in wastewater, and discuss the significance of changes in their populations.
22.03	Demonstrate laboratory quality-control/quality-assurance procedures and required documentation.
22.04	Demonstrate the reasons for measuring the flows of treated and untreated wastewater, and the effects of those flows on process control.
23.0	Describe process optimization for preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management--The student will be able to:
23.01	Interpret laboratory data commonly obtained on incoming wastewater to monitor the efficiency of the selected treatment.
23.02	Describe possible adjustments to achieve process optimization for handling influent.
23.03	Interpret laboratory data commonly obtained on wastewater during primary treatment to monitor the efficiency of the selected treatment.
23.04	Describe possible adjustments to achieve process optimization for handling primary treatment.
23.05	Interpret laboratory data commonly obtained on wastewater during secondary treatment to monitor the efficiency of the selected treatment.
23.06	Describe possible adjustments to achieve process optimization for secondary treatment.
23.07	Interpret laboratory data commonly obtained on wastewater during tertiary treatment to monitor the efficiency of the selected treatment.
23.08	Describe possible adjustments to achieve process optimization for tertiary treatment.
23.09	Interpret laboratory data commonly obtained on reclaimed water during disinfection and disposal to monitor the efficiency of the selected treatment.
23.10	Describe possible adjustments to achieve process optimization for disinfection and disposal processes.
23.11	Interpret laboratory data commonly obtained during solids management, including solids-content tests, to monitor the efficiency of the selected treatment.

23.12	Describe possible adjustments to achieve process optimization in solids management.
23.13	Describe options for solids disposal, based on the analysis of constituents, including all accountability records, and the costs.
24.0	Describe advanced treatment process control for the treatment train, effluent disposal, and solids management--The student will be able to:
24.01	Describe concepts related to advanced laboratory tests taken in the secondary-treatment processes.
24.02	Describe concepts related to advanced laboratory tests taken in advanced or tertiary treatment.
24.03	Describe concepts related to advanced laboratory tests for disinfection, effluent disposal, and solids management.
25.0	Describe advanced equipment inspection and preventive maintenance for the treatment train, effluent disposal, and solids management--The student will be able to:
25.01	Describe a preventive maintenance plan for a specific piece of equipment and/or unit process.
25.02	Describe trends analysis used in preventive maintenance planning.
25.03	Describe the monitoring of facility equipment operation and usage with remote sensing equipment.
26.0	Describe and correct facility operational problems--The student will be able to:
26.01	Describe troubleshooting techniques to locate operational problems.
26.02	Select appropriate corrective actions for advanced operational problems.
26.03	Describe advanced methods of monitoring results of corrective actions taken.
26.04	Describe actions that should be taken to prevent recurrence of identified advanced operational problems.
27.0	Apply federal, state, and local regulations governing wastewater technologies--The student will be able to:
27.01	Describe supervisory tasks related to duties, responsibilities, certification requirements, testing, renewal, staffing, and facility classification (Chapter 62-602 F.A.C.).
27.02	Apply rules concerning samples and analyses at wastewater-treatment facilities (Chapter 62-601, F.A.C.).
27.03	Complete the DEP monthly operating report (MOR) Form correctly.
27.04	Complete a National Pollution Discharge Elimination System (NPDES) MOR form.
27.05	Follow DEP rules that apply to procedures such as reclaiming and reusing water and managing residuals.
27.06	Follow federal rules that apply to the operation of a wastewater-treatment facility.
28.0	Apply federal, state, and local laws for the handling, storage, and use of toxic and hazardous materials--The student will be able to:

28.01	Identify the kinds of information presented on the MSDS.
28.02	Demonstrate requirements for in-plant training and the accessibility of information on hazardous and toxic substances (Chapter 442, F.S.).
28.03	Identify the reporting requirements as specified in SARA Title III and Chapter 252, F.S.
28.04	Describe the responsibilities toward the community as specified in SARA Title III and Chapter 252, F.S.
29.0	Describe energy conservation, and demonstrate ways to conserve energy in the wastewater-treatment facility--The student will be able to:
29.01	Identify the causes of energy loss.
29.02	Rank various pieces of equipment in order of energy consumption.
29.03	Demonstrate procedures for performing an energy survey.
29.04	Demonstrate methods to conserve energy, such as equipment and process adjustments.
30.0	Demonstrate supervisory skills--The student will be able to:
30.01	Identify supervisory skills and various leadership styles.
30.02	Delegate responsibility and assign tasks to employees.
30.03	Follow the proper procedure for handling employee grievances.
30.04	Follow the proper procedure for disciplining employees.
30.05	Follow staffing guidelines in planning.
30.06	Conduct an orientation of a new employee, and follow the training program.
30.07	Evaluate employees objectively.
30.08	Identify emergency situations and respond appropriately.
30.09	Identify the components of the budgeting process.
30.10	Demonstrate inventory control procedures.
30.11	Explain the importance of ethics in supervision.
30.12	Identify the role of the supervisor in a facility safety program.
30.13	Identify the role of the supervisor in customer relations

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Occupational Completion Point: C
Wastewater Treatment Plant Operator A– 120 Hours – SOC Code – 51-8031

31.0 Discuss facility-management skills--The student will be able to:

31.01 Describe the principles of management and supervision.

31.02 Describe concepts related to management and supervision.

32.0 Demonstrate methods of organization and control--The student will be able to:

32.01 Demonstrate organizational methods.

32.02 Develop an organizational chart.

32.03 Develop a staffing pattern.

32.04 Identify formal and informal lines of communication.

33.0 Develop a plan for cost management--The student will be able to:

33.01 Identify the costs of operation such as personnel, inventory, operations, energy consumption, and equipment maintenance.

33.02 Perform cost surveys.

33.03 Develop a plan for efficient operations.

33.04 Explain system-efficiency balance.

34.0 Prepare budgets and personnel assignments--The student will be able to:

34.01 Identify budget activities and categories of expense accounts related to water- or wastewater-treatment facilities.

34.02 Identify techniques of budget control.

34.03 Prepare a budget, including long-range projections.

34.04 Prepare a staffing schedule, including the appropriate levels of staff for all required shifts.

35.0 Develop standard operating procedures for the training and orientation of new employees--The student will be able to:

35.01	Develop a written plan for an in-house orientation program for new employees.
35.02	Identify information that a supervisor should give new employees, including leave procedures, insurance procedures, safety procedures, chain of command, etc.
35.03	Develop a written plan for an in-house training program that includes safety measures and hazardous or toxic materials in the work place.
35.04	Develop a written plan for a cross-training program in facility operations.
36.0	Demonstrate personnel selection and discipline--The student will be able to:
36.01	Identify appropriate interviewing and hiring practices.
36.02	Develop a job description.
36.03	Identify control factors that are important in an organizational plan and that set limits on delegated authority.
36.04	Identify appropriate actions of the supervisor, the employee, etc., in a grievance procedure.
36.05	Identify characteristics important to the role of a supervisor.
36.06	Determine requirements for a new position.
36.07	Advertise for the position, including the job description, job responsibilities, education requirements, and job conditions.
36.08	Analyze job applications to select qualified candidates to interview.
36.09	Conduct interviews.
36.10	Notify interviewees of the results, and conduct follow-up activities.
36.11	Use appropriate human-relations and communication skills.
36.12	Train, evaluate, and discipline employees objectively.
36.13	Identify appropriate actions of a supervisor in evaluating personnel performance.
37.0	Demonstrate contingency planning--The student will be able to:
37.01	Analyze potential emergency situations that can occur in a facility.
37.02	Develop a plan for handling problems caused by emergency situations, including what equipment would be used and what sampling would be needed.
37.03	Develop procedures for responding to customer complaints.
37.04	Develop procedures to ensure employee safety.

37.05	Develop procedures to ensure continuous operations, including preventive maintenance, alternative procedures, etc.
38.0	Develop a plan for energy conservation--The student will be able to:
38.01	Describe concepts related to energy conservation.
38.02	Identify energy-conservation measures.
39.0	Demonstrate record-keeping and use of computer applications in planning--The student will be able to:
39.01	Develop a plan for inventory control.
39.02	Develop a plan for an analysis of operation and maintenance (O & M) logs and for the optimum operation of equipment.
39.03	Identify the various types of facility automation.
39.04	Review available hardware and software, based on record-keeping needs.
40.0	Demonstrate process optimization for water or wastewater treatment facilities--The student will be able to:
40.01	Develop a plan for process control to achieve efficient, energy-saving, cost-effective operation.
40.02	Develop a plan for testing and analyzing the treatment operations for use in long-range facility operations.
40.03	Develop a plan for the systematic troubleshooting of operational problems.
40.04	Develop a plan for documenting operations and problems in order to anticipate and avoid potential problems.
41.0	Interpret permits and blueprints--The student will be able to:
41.01	Read and interpret blueprints for water and wastewater facilities.
41.02	Read the facility construction and operating permits, and relate permit requirements to facility operations.
42.0	Develop a laboratory plan for process control--The student will be able to:
42.01	Identify laboratory equipment for process control.
42.02	Develop a plan for equipment calibration and maintenance.
42.03	Develop a laboratory-staffing plan.
42.04	Determine whether in-house laboratory operations are cost-effective.
42.05	Review procedures for quality assurance/quality control in a facility laboratory.

42.06	Review procedures for obtaining certification for a facility laboratory.
42.07	Develop a sampling/analysis schedule for effective process control.
43.0	Employ public-relations skills in community interactions--The student will be able to:
43.01	Plan facility tours for the public.
43.02	Demonstrate how to handle press and public inquiries appropriately.
43.03	Demonstrate how to inform the public if a potential emergency situation arises.

Additional Information

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

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. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. 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 Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). 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 an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. 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.

Articulation

This program has no statewide articulation agreement approved by the Florida State Board of Education. However, this does not preclude the awarding of credits by any college through local agreements.

For details on statewide articulation agreements which correlate to programs and industry certifications, refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.