

Florida Department of Education
Curriculum Framework

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

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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	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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

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

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

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

Program Structure

This program is a planned sequence of instruction 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	Graduation Requirement
A	8106810	Agriscience Foundations 1	1 credit	19-4091	3	EQ
	8106850	Agriculture Biotechnology 2	1 credit		3	VO
	8113010	Environmental Resources 3	1 credit		3	VO
	8113020	Environmental Resources 4	1 credit		3	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

This program is daggered and will not be aligned to academic courses.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Agriscience Foundations 1	14/67 21%	4/75 5%	8/54 15%	11/46 24%	11/45 24%	11/45 24%	11/45 24%

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.

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/finalafnrstandsv324609withisbn_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.

Daggered for Deletion

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.

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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,	

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.	
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	
02.02	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 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.	

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
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.	LAFS.910.W.3.7 LAFS.1112.W.3.7		CS.10.02.01
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures – the student will be able to:		SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
05.02 Demonstrate proper safety precautions and use of personal protective equipment.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		CS.06.03.01.a CS.07.04.01.c.
05.03 Evaluate the food safety responsibilities that occur along the food supply chain.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		CS.07.04.01
05.05 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02.b ESS.04.05.01
05.06 Describe emergency procedures.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		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.	MAFS.912.N-Q.1.3		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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.01.02.01.c AS.02.02.02.b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		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.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		CS.11.01.01 CS.11.02.01

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 MAFS.912.S-IC.2.6		
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		BS.02.05.03.a.
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		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.	LAFS.910.W.3.8 LAFS.1112.W.3.8		NRS.02.06.09 CS.05.03.02
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.04.01.b AS.08.01.01.c
07.06 Identify conservation practices related to natural resources.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.a
08.0 Investigate and utilize basic scientific skills and principles in plant science – the student will be able to:		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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.03 Examine the processes of plant growth including photosynthesis and respiration.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.02.03.01
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1 MAFS.912.N-Q.1.1 MAFS.912.N-Q.1.2 MAFS.912.N-Q.1.3		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.	LAFS.910.W.2.4 LAFS.1112.W.2.4		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.	LAFS.910.W.2.4 LAFS.1112.W.2.4		FPP01.01.01.a
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		AS.02.01.02.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Categorize animals according to use, type, breed, and scientific classification.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.01.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.02.a AS.05.02.01.a
09.04 Compare basic internal and external anatomy of animals.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8		AS.06.02.01.a FPP01.01.01.a
09.08 Explore career opportunities in animal science.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8		AS.01.01.02.b.
10.0 Demonstrate the use of agriscience tools, equipment, and instruments – the student will be able to:		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	
10.01 Select and demonstrate proper use of agriscience tools, equipment, and instruments.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		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, pulleys, hydraulics, and internal combustion).	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PST.03.04.01.b PST.03.03.02.a.
10.03 Solve time, distance, area, volume, ratio, proportion, and percentage problems in agriscience.			PST.04.04.03.a PST.04.04.06.a
10.04 Service and maintain agriscience equipment, instruments, facilities, and supplies.			CS.08.03.01.c PST.03.02.03.c. PST.01.03.01.a.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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).	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3 MAFS.912.F-LE.2.5		CS.09.02.01.b CS.10.01.01.a.
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.03.01.03.b.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		CS.03.01.01 CS.03.01.02
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
11.06 Demonstrate good listening skills.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.0 Apply leadership and citizenship skills – the student will be able to:			
12.01 Identify and describe leadership characteristics.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.01.06.01.a.
12.02 Identify opportunities to apply acquired leadership skills.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.02.02.02.b.
12.03 Identify and demonstrate ways to be an active citizen.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		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.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		

Daggered for Deletion

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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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).	

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 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	
02.02	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 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	
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	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	NGSSS-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.			
16.02 Demonstrate how traits are inherited.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
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.
17.10 Perform protein separation techniques and interpret the results.			

CTE Standards and Benchmarks		FS-M/LA	NGSS-Sci	National Standards
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.			
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.

Daggered for Deletion

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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	

Florida Standards		Correlation to CTE Program Standard #
19.02.3	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	
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	
20.02 Production and Distribution of Writing		
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,	

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.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	
21.04	Model with mathematics. MAFS.K12.MP.4.1	
21.05	Use appropriate tools strategically.	

Florida Standards	Correlation to CTE Program Standard #
	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-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:	MA	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.		SC.912.N.1.1	
22.02 Determine soil pH using pH test kit.		SC.912.N.1.1	PS.02.03.03.c
22.03 Conduct soil, mineral and elemental analysis using soil test kit.		SC.912.N.1.1	PS.02.03.03.c
22.04 Determine and record texture, structure, temperature and color of each soil layer.		SC.912.N.1.1	
22.05 Construct a soil profile or soil pit.		SC.912.N.1.1	
22.06 Analyze soil data and write lab report.	MAFS.912.S-IC.2.6	SC.912.N.1.1	
22.07 Determine the effect of texture, density, and porosity on permeability/infiltration rates and seasonal high groundwater table.		SC.912.L.17.2	ESS.03.02.01.c
22.08 Examine the relationship between soil texture, water movement and water holding capacity.		SC.912.L.17.2	ESS.03.02.01.c
22.09 Determine land class capability utilizing resources, such as: NRCS County Soil Survey, using Geographic Information Systems or other resources.	MAFS.912.G-GMD.2.4	SC.912.L.17.2	ESS.03.02.01.c NRS.02.02.01.c
23.0 Determine the quality and quantity of water resources – the student will be able to:		SC.912.L.17.16	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
23.01 Determine water quality of groundwater, rivers, lakes, and spring water.		SC.912.L.17.2	ESS.03.03.04.c
23.02 Determine stream flow.	MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5	SC.912.N.1.1	ESS.03.03.05.c
23.03 Collect, store and label water samples from a representative test site.		SC.912.N.1.1	ESS.03.03.04.c
23.04 Determine the quality of water samples by measuring for pH, turbidity, dissolved solids and dissolved oxygen.		SC.912.N.1.1	ESS.03.03.04.c
23.05 Investigate water shed boundaries and drainage patterns.	MAFS.912.G-GMD.2.4	SC.912.L.17.2	
23.06 Monitor water levels of rivers, streams, ponds and lakes.		SC.912.N.1.1	ESS.03.03.05.c
24.0 Identify, classify and preserve samples and specimens of native flora and fauna – the student will be able to:		SC.912.L.17.7, 11, 12 SC.912.N.1.1	
24.01 Identify invasive species and their impact on the environment.		SC.912.L.17.8	NRS.02.06.07.c
24.02 Perform a comprehensive ecological study of a forest.		SC.912.N.1.1	NRS.01.02.01.c
24.03 Identify native species and their range, habitat, and functions.		SC.912.L.17.7	
24.04 Identify threatened and endangered upland species, range, and habitat.		SC.912.L.17.7	
24.05 Demonstrate sample collection and preservation methods.	MAFS.912.S-IC.1.1	SC.912.N.1.1	NRS.01.01.02.c
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.		SC.912.L.17.7	NRS.01.02.01.b NRS.01.02.02.b NRS.01.02.03.b NRS.01.02.04.b
25.02 Identify the boundary between uplands and wetlands using resources such as: aerial photographs, soils, plants, and/or hydrology.	MAFS.912.G-GMD.2.4	SC.912.L.17.7	
25.03 Identify environmental factors affecting Florida’s major ecosystems.		SC.912.L.17.10	
25.04 Identify threatened and endangered plant and animal species of specific habitats.		SC.912.L.17.7	
25.05 Analyze political, biological, economical, and sociological impacts	MAFS.912.G-MG.1.2, 3	SC.912.L.17.12 SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
on managing ecosystems.			
25.06 Trace the effects of pollution through an ecosystem.		SC.912.L.17.8	
25.07 Demonstrate knowledge of biodegradable and non-biodegradable products.		SC.912.L.17.8	
25.08 Explain how lack of predation contributes to uncontrollable exotic populations.		SC.912.L.17.6, 8	NRS.02.06.07.c
25.09 Explain how exotic populations stress native.		SC.912.L.17.8	NRS.02.06.07.b
26.0 Collect, record and analyze data – the student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2.6	SC.912.N.1.1, 2, 3, 6	
26.01 Maintain lab journal.		SC.912.N.1.1	ABS.03.01.01.a
26.02 Construct data tables.	MAFS.912.N-Q.1.2	SC.912.N.1.1	
26.03 Compile data.		SC.912.N.1.1	ABS.03.01.01.a
26.04 Make inferences from data.	MAFS.912.S-IC.2.6 MAFS.912.S-MD.1.4 MAFS.912.S-MD.2.6, 7	SC.912.N.1.1	ABS.03.01.01.b
26.05 Use word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and Geographic Information Systems (GIS).	MAFS.912.G-GMD.2.4	SC.912.N.1.1	NRS. 02.02.01.c
27.0 Demonstrate orienteering and map reading skills – the student will be able to:	MAFS.912.N-Q.1.3 MAFS.912.S-IC.2.6		
27.01 Interpret legal land descriptions.	MAFS.912.G-GMD.2.4	SC.912.L.17.15	
27.02 Interpret current and historical aerial photography for land cover and land use applications.	MAFS.912.G-GMD.2.4	SC.912.L.17.13, 15	
27.03 Explain topographic map symbols and legends.		SC.912.L.17.15	
27.04 Measure acreage on maps.	MAFS.912.N-Q.1.3	SC.912.N.1.1	
27.05 Determine location and other information from maps, using technology such as Global Positioning System (GPS) and compass.	MAFS.912.G-GMD.2.4	SC.912.L.17.15	NRS.02.02.01.c
27.06 Measure elevation in the field using survey equipment.	MAFS.912.N-Q.1.3	SC.912.N.1.1	
28.0 Research environmental issues – the student will be able to:		SC.912.L.17.13, 14, 16	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.N.1.1, 2, 3, 4, 5, 6, 7	
28.01 Conduct an environmental issue investigation.		SC.912.N.1.1	ESS.03.03.01.c
28.02 Develop an action plan based on investigation.		SC.912.N.1.1	
28.03 Prepare and present oral and written presentation.		SC.912.N.1.1	
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.		SC.912.L.17.12, 19	
29.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.		SC.912.L.17.2	ABS.02.01.02.b
29.03 Identify and describe the primary government agencies involved with agriculture.		SC.912.L.17.2	
29.04 Research new and emerging technologies and their impact on the economy.		SC.912.L.17.15	
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.		SC.912.N.1.1	

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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.	
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	
20.02	Production and Distribution of Writing	
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,	

Florida Standards		Correlation to CTE Program Standard #
	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	
21.04	Model with mathematics. MAFS.K12.MP.4.1	
21.05	Use appropriate tools strategically.	

Florida Standards	Correlation to CTE Program Standard #
	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-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.		SC.912.L.17.12, 13	
31.02 Describe the management of state lands.		SC.912.L.17.12, 13	
31.03 Describe the management of local lands.		SC.912.L.17.12, 13	
31.04 Describe the management of private lands.		SC.912.L.17.12, 13	
31.05 Demonstrate how burning of vegetation releases nutrients into the soil.		SC.912.L.17.19 SC.912.E.7.3, 8	
31.06 Investigate the merits of growing season burns versus non-growing season burns.		SC.912.L.17.19 SC.912.E.7.8	
31.07 Demonstrate safety precautions for controlled burns and legal ramifications.		SC.912.L.17.13	
31.08 Identify different types of buffers and riparian zones and their applications.		SC.912.L.17.16	NRS.02.06.04.b
31.09 Determine the applications and benefits of buffers.		SC.912.L.17.16	
31.10 Develop and discuss theoretical strategies for managing/eradicating exotic species.		SC.912.L.17.18	
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	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
32.01 Interpret a weather map.		SC.912.L.17.5, 6	ESS.03.01.01.c
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.	MAFS.912.N-Q.1.2, 3	SC.912.N.1.1	ESS.03.01.01.c
32.03 Demonstrate the use of a hurricane-tracking chart.	MAFS.912.G-GMD.2.4	SC.912.L.17.6	ESS.03.01.01.c
32.04 Analyze the impact of weather in regards to risk management.		SC.912.L.17.6	
33.0 Practice sustainable agriculture – the student will be able to:	MAFS.912.N-Q.1.3	SC.912.L.17.12, 13, 14, 20	
33.01 Describe why it is important to sustain domestic agriculture.		SC.912.L.17.12	
33.02 Explain international issues affecting domestic agriculture.		SC.912.L.17.12	
33.03 Apply principles of nutrient, water, and waste management to environmental problems.	MAFS.912.N-Q.1.2, 3	SC.912.L.17.13	
33.04 Compare practices that either enhance or hinder the sustainability of agriculture.		SC.912.L.17.1, 18, 20	
33.05 Analyze the benefit of recent technological advances on the agricultural industry.			
33.06 Identify and monitor erosion hazards and environmental quality.		SC.912.L.17.16	
33.07 Differentiate between point and non-point sources of pollution.		SC.912.L.17.16	
33.08 Describe Best Management Practices (BMP) and their significance.		SC.912.L.17.12, 15, 17	
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.		SC.912.L.17.13	
34.02 Identify regulatory agencies that govern agriculture activities.		SC.912.L.17.13	
34.03 Compare alternative programs to regulations (Examples: local partnerships, agricultural BMPs and others).		SC.912.L.17.12, 15, 17	
35.0 Identify environmental detriments to agriculture – the student will be able to:			
35.01 Identify diseases and pests that impact agriculture production.		SC.912.L.17.8	PS.03.03.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
35.02 Explain methods to control and eradicate diseases and pests.		SC.912.L.17.8, 17	PS.03.02.01.c
35.03 Describe isolation or quarantine methods to minimize spread of diseases and pests.		SC.912.L.17.8, 17	
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.			

Additional Information

Laboratory Activities

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

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. 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.

Additional Resources

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

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

Daggered for Deletion

**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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

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

The content includes but is not limited to 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	Graduation Requirement
A	8111510	Veterinary Assisting 1	1 credit	31-9096	3	VO
	8111540	Veterinary Assisting 2	1 credit		3	VO
	8111550	Veterinary Assisting 3	1 credit		3	VO
B	8111520	Veterinary Assisting 4	1 credit	31-9096	3	VO
C	8111530	Veterinary Assisting 5	1 credit	29-2056	3	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Veterinary Assisting 1	4/87 5%	5/80 6%	30/83 36%	3/69 4%	21/67 31%	17/70 24%	8/69 12%	26/82 32%	12/66 18%	24/74 32%	3/72 4%
Veterinary Assisting 2	37/87 43%	3/80 4%	32/83 39%	1/69 1%	21/67 31%	4/70 6%	5/69 7%	25/82 30%	2/66 3%	22/74 32%	3/72 4%
Veterinary Assisting 3	30/87 34%	26/80 33%	17/83 20%	25/69 36%	5/67 7%	29/70 41%	30/69 43%	9/82 11%	24/66 36%	7/74 9%	24/72 33%
Veterinary Assisting 4	25/87 29%	23/80 29%	8/83 10%	22/69 32%	3/67 4%	25/70 36%	22/69 32%	3/82 4%	20/66 30%	4/74 5%	21/72 29%
Veterinary Assisting 5	3/87 3%	2/80 3%	7/83 8%	2/69 3%	2/67 3%	9/70 13%	3/69 4%	3/82 4%	6/66 9%	2/74 3%	2/72 3%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Veterinary Assisting 1	10/67 15%	9/75 12%	8/54 15%	**	**	**	**
Veterinary Assisting 2	9/67 13%	9/75 12%	8/54 15%	**	**	**	**
Veterinary Assisting 3	12/67 18%	9/75 12%	8/54 15%	**	**	**	**
Veterinary Assisting 4	3/67 4%	2/75 3%	#	**	**	**	**
Veterinary Assisting 5	12/67 18%	11/75 17%	8/54 15%	**	**	**	**

** 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.

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	
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 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	
02.02	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	

Florida Standards		Correlation to CTE Program Standard #
	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	
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.	

Florida Standards	Correlation to CTE Program Standard #
	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

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.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Describe veterinary science and the role of animals in society – the students will be able to:			AS.01.01.01B
04.01 Define veterinary science.		SC.912.N.1.2 SC.912.N.2.1 SC.912.N.4.1	
04.02 Identify key components in the domestication of animals.		SC.912.L.15.3,13 SC.912.N.4.1	
04.03 Choose current issues facing the animal industry today and describe the effect of each on society.		SC.916.L.14.6 SC.912.L.15.13, 15 SC.912.L.16.7,10 SC.912.L.17.11,12, 13, 14, 15, 16, 17, 18, 19, 20 SC.912.N.4.1 SC.912.L.15.12,13	
05.0 Describe the socioeconomic role of veterinary sciences on the companion animal and livestock industries – the students will be able to:			AS.01.01.02C
05.01 Summarize the history of the veterinary sciences, companion animal and livestock industry.		SC.912.N.4.1, 2	
05.02 Assess the impact of companion animals on the veterinary science industry.		SC.912.L.16.10 SC.912.N.4.1, 2,	
05.03 Discuss the role of the animal industry in the interaction of population, food, energy, and the environment.		SC.912.L.14.6 SC912.L.16.10 SC.912.L.17.11,12 13, 14, 15, 16, 17, 18, 19, 20, SC.912.N.4.1, 2	AS.08.01.01A
06.0 Discuss the human-animal bond and its effects on human health – the students will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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>		SC.912.N.4.2	
06.04 Discuss the positive health effects on people resulting from their interaction with animals.		SC.912.N.4.1, 2	
06.05 Discuss programs that use human-animal interaction as a therapy tool.		SC.912.N.4.1, 2	
06.06 Describe the characteristics of animals used in the animal-facilitated therapy programs.		SC.912.N.4.1, 2	
06.07 Describe national and local programs that use animal-facilitated therapy.		SC.912.N.4.1, 2	
06.08 Discuss grief-response and emotional impact of animal loss.		SC.912.N.4.1, 2	
07.0 Demonstrate the proper use of veterinary science terminology – the students will be able to:			AS.02.01.01C
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.		SC.912.L.15.5,6,7	
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.			
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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:			CS.07.04.01C, 02C CS.07.02.01.B CS.06.02.01A CS.06.03.01.A AS.03.01.05A
09.01 <i>Recognize and avoid potential safety hazards (physical, chemical, biological and zoonotic).</i>		SC.912.N.1.1	
09.02 <i>Utilize proper safety precautions and procedures when working in the hospital (laboratory, kennel, surgery/prep area, treatment, and exam room).</i>		SC.912.N.1.1	
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>		SC.912.N.1.1	
09.04 <i>Locate and demonstrates use of an eye wash solution or station</i>		SC.912.N.1.1	
09.05 <i>Locate first aid kit and fire extinguisher</i>		SC.912.N.1.1	
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>		SC.912.N.1.1	
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>		SC.912.N.1.1	
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 information</i>		SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
09.11 Recognize allergic reactions and toxicity.			
09.12 Control minor hemorrhage and/or trauma.		SC.912.L.14.35	
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.		SC.912.N.1.1	
10.0 Recognize normal and abnormal animal behaviors – the students will be able to:			AS.06.01.01C (ALL)
10.01 Distinguish between instinctive and learned behaviors.			
10.02 Recognize normal and abnormal behavioral characteristics of animals through observations.		SC.912.N.1.1	
10.03 Recognize signs of aggressive animal behaviors.		SC.912.N.1.1	
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:			AS.06.01.01C (ALL)
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>			
11.07 <i>Demonstrate positioning an animal in sternal, dorsal, and lateral</i>			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
<i>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:			
12.01 Identify canine breeds and list breed characteristics.		SC.912.L.15.3, 4, 5,	
12.02 Identify feline breeds and list breed characteristics.		SC.912.L.15.3, 4, 5,	
12.03 Identify breeds of rabbits and list their primary use.		SC.912.L.15.3, 4, 5,	
13.0 Investigate the common husbandry practices and daily care of several species of animals – the students will be able to:			
13.01 Describe husbandry and care of canine breeds.		SC.912.L.14.6	
13.02 Describe husbandry and care of feline breeds.		SC.912.L.14.6	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.03 Describe husbandry and care of rabbits.		SC.912.L.14.6	
13.04 Describe husbandry and care of rodents.		SC.912.L.14.6	
13.05 Describe husbandry and care of bovine.		SC.912.L.14.6	
13.06 Describe husbandry and care of ovine.		SC.912.L.14.6	
13.07 Describe husbandry and care of caprine.		SC.912.L.14.6	
13.08 Describe husbandry and care of porcine.		SC.912.L.14.6	
13.09 Describe husbandry and care of equine.		SC.912.L.14.6	
13.10 Describe husbandry and care of poultry.		SC.912.L.14.6	
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>		SC.912.L.14.6	
13.12 <i>Explain common diseases of the canine and feline and current recommendations for disease prevention</i>		SC.912.L.14.6	
13.13 <i>List benefits of spaying and neutering pets including health benefits as well as population control</i>		SC.912.L.14.6	
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.			CS.01.01.03C, 04C, 05C
14.04 Collect, interpret, and analyze data using an organized record-keeping system	MAFS.912.S-IC.2.5 MAFS.912.S-ID.3.9 MAFS.912.S-ID.1.3	SC.912.N.1.1	
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 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 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	
02.02	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	

Florida Standards		Correlation to CTE Program Standard #
	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	
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.	

Florida Standards	Correlation to CTE Program Standard #
	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

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.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
15.0 Demonstrate basic first aid for companion and livestock animals – the students will be able to:			CS.07.02.01C
15.01 Recognize emergency health (physical and behavioral) status.		SC.912.N.1.1	
15.02 Describe procedures to restrain and move injured animals.		SC.912.N.1.1	
15.03 Demonstrate hemorrhage control.		SC.912.L.14.35	
15.04 Dress wounds and punctures.		SC.912.N.1.1	
15.05 Demonstrate the correct emergency procedures for shock, burns, heatstroke, and fractures.		SC.912.N.1.1	
15.06 Describe and access up-to-date information on animal health.		SC.912.N.1.1	
15.07 Demonstrate animal CPR.		SC.912.N.1.1	
16.0 Demonstrate the use of tools, equipment, and instruments in the veterinary science and companion animal industry – the students will be able to:			
16.01 Identify and select the proper tools, equipment, and instruments for a specific job.		SC.912.L.14.4, SC.912.N.1.1	
16.02 Describe the principles of selected mechanical applications as it relates to large animal restraint equipment (e.g., levers, pulleys, hydraulics).		SC.912.P.12.3, 4	
16.03 Demonstrate the ability to use an equipment or instrument manual.		SC.912.L.14.4, SC.912.N.1.1	
16.04 Demonstrate the use of selected tools, equipment, and instruments.		SC.912.L.14.4, SC.912.N.1.1	BS.02.02.01B ESS.06.02.01A
16.05 Service, maintain, and store tools, equipment, instruments, and supplies.		SC.912.L.14.4, SC.912.N.1.1	BS.02.02.01B

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.06 <i>Demonstrate the proper placement of a slide in the microscope and focus on 100X and 400X magnification</i>		SC.912.L.14.4, SC.912.N.1.1	BS.02.02.01B
16.07 <i>Explain appropriate materials for cleaning the microscope</i>		SC.912.L.14.4, SC.912.N.1.1	BS.02.02.01B
16.08 <i>Demonstrate the centrifugation of a sample</i>		SC.912.N.1.1	BS.02.02.01B
16.09 <i>Explain the purpose of the blood analyzer machine.</i>		SC.912.N.1.1	BS.02.02.01B
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>	MAFS.912.A-CED.1.4	SC.912.N.1.1	
17.02 <i>Demonstrate how to use, clean, and store thermometers.</i>		SC.912.N.1.1	
17.03 <i>Appropriately identify and record the MM (mucus membrane color).</i>		SC.912.N.1.1	
17.04 <i>Appropriately obtain and record the CRT (capillary refill time).</i>		SC.912.N.1.1	
17.05 <i>Identify normal and abnormal range for each parameter (TPR, MM, and CRT).</i>		SC.912.N.1.1	
18.0 Identify common breeds of livestock animals – the students will be able to:			
18.01 Identify bovine breed and their characteristics.		SC.912.L.15.4, 5, 6	
18.02 Identify ovine breed and their characteristics.		SC.912.L.15.4, 5, 6	
18.03 Identify caprine breed and their characteristics.		SC.912.L.15.4, 5, 6	
18.04 Identify porcine breed and their characteristics.		SC.912.L.15.4, 5, 6	
18.05 Identify equine breed and their characteristics.		SC.912.L.15.4, 5, 6	
18.06 Identify poultry breed and their characteristics.		SC.912.L.15.4, 5, 6	
19.0 Identify parts and functions of various systems of selected animals – the students will be able to:			AS.02.02.01C AS.02.02.03A AS.02.02.04C AS.02.02.05C AS.02.02.06C AS.02.03.01B
19.01 Identify internal and external anatomy of selected animals.		SC.912.L.14.11, 16	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.02 Identify parts of the skeletal system of selected animals.		SC.912.L.14.13,14,15	
19.03 Compare the human skeletal system to that of other animals.		SC.912.L.14.13,14,15	
19.04 Identify parts and functions of the following systems of animals using correct terminology:		SC.912.L.14.43,44	
19.04.1 <i>Identify the general function of the respiratory system and the major organs</i>		SC.912.L.14.13,14	
19.04.2 <i>Identify the general function of the skeletal system and the major bones of the axial and appendicular skeleton</i>		SC.912.L.14.16,17,18,19,20	
19.04.3 <i>Identify the general function of the muscular system and major groups of muscles</i>		SC.912.L.14.45,46 SC.912.L.18.11	
19.04.4 <i>Identify the general function of the digestive system and the major organs</i>		SC.912.L.14.34,35,36,37,38,39	
19.04.5 <i>Identify the general function of the cardiovascular system and the major organs</i>		SC.912.L.14.43,44	
19.04.6 <i>Identify the general function of the respiratory system and the major organs</i>		SC.912.L.14.43,44	
19.04.7 <i>Identify the general function of the endocrine and the major organs</i>		SC.912.L.14.29,31,32	
19.04.8 <i>Identify the general function of the urinary system and the major organs</i>		SC.912.L.14.47,48	BS.03.02.01A
19.04.9 <i>Identify the general function of the reproductive system and both male and female organs</i>		SC.912.L.14.33 SC.912.L.15.12,13,15 SC.912.L.16.13	
19.04.10 <i>Identify the general function of the nervous system and the major organs</i>		SC.912.L.14.21,22,24,25,26,27,28,49,50	
19.04.11 <i>Identify the general function of the integumentary system and the major organs</i>		SC.912.L.14.11,51	
19.04.12 <i>Explain the species differences in species of the digestive tracks of ruminates monogastric non-ruminants, and hindgut fermenters</i>		SC.912.L.14.45,46 SC.912.L.18.2,3,4,11 SC.912.N.1.1	
19.04.13 <i>Explain the differences in the teeth and eating habits for omnivores, carnivores and herbivores</i>		SC.912.L.14.45,46 SC.912.N.1.1	
20.0 Investigate the common husbandry practices and daily care of companion animals and exotic animals and fish – the students will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
20.01 Describe husbandry and care of guinea pigs.		SC.912.L.14.6	
20.02 Describe husbandry and care of chinchillas and degus.		SC.912.L.14.6	
20.03 Describe husbandry and care of ferrets.		SC.912.L.14.6	
20.04 Describe husbandry and care of amphibians.		SC.912.L.14.6	
20.05 Describe husbandry and care of reptiles.		SC.912.L.14.6	
20.06 Describe husbandry and care of birds.		SC.912.L.14.6	
20.07 Describe husbandry and care of fish.		SC.912.L.14.6	
21.0 Explain the various methods of animal identification – the student will be able to:			
21.01 <i>Explain types of identification tags and their use.</i>		SC.912.L.17.13	AS.06.02.02B
21.02 <i>Explain the use of microchips for animal identification.</i>			AS.06.02.02B
21.03 <i>Explain types of tattoos for animals and the use in both companion and production animals.</i>		SC.912.L.17.13	AS.06.02.02B
21.04 <i>Explain the types of ear tags and their use in production animals.</i>		SC.912.L.17.13	AS.06.02.02B
21.05 <i>Explain types of ear notching and use for identification.</i>			AS.06.02.02B

**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	
22.01.1	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	
22.01.2	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	
22.01.3	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	
22.02	Craft and Structure	
22.02.1	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	
22.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
22.02.3	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 #
22.03	Integration of Knowledge and Ideas	
22.03.1	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	
22.03.2	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	
22.03.3	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	
22.04	Range of Reading and Level of Text Complexity	
22.04.1	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.	
22.04.2	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	
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	
23.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
23.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
23.02	Production and Distribution of Writing	
23.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
23.02.2	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	
23.02.3	Use technology, including the Internet, to produce, publish, and update	

Florida Standards		Correlation to CTE Program Standard #
	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		
23.03.1	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	
23.03.2	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	
23.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
23.04 Range of Writing		
23.04.1	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	
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. 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.	

Florida Standards	Correlation to CTE Program Standard #
	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

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.

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:			
25.01 Differentiate between animal control agencies and animal welfare organizations.		SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2	
25.02 Describe the responsibilities and goals of animal control agencies and animal welfare organizations		SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2	
25.03 Identify and locate local animal control agencies and animal welfare organizations.		SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2	AS.06.01.02A
26.0 Describe the problems, causes, and solutions of animal overpopulation – the students will be able to:			
26.01 Explain the cause and effect of overpopulation in animals.	MAFS.912.S-ID.3.9	SC.912.L.17.1,5,6, 8,11,13 SC.912.N.4.1,2	
26.02 Define euthanasia and describe its role in animal overpopulation.		SC.912.L.17.13	
26.03 Identify organizations involved in the public education of animal overpopulation.		SC.912.N.4.1,2 SC.912.L.17.13	
26.04 Explain the pet owners' and societies' responsibilities concerning animal overpopulation.		SC.912.N.4.1,2 SC.912.L.17.13	
26.05 Discuss the medical benefits of spaying and neutering.		SC.912.L.17.13	
27.0 Locate and interpret animal-related laws – the students will be able to:			
27.01 Describe local animal control laws.		SC.912.L.17.13 SC.912.N.4.1,2	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	
27.02 Describe permitting requirements for exotic and wildlife animals.		SC.912.L.17.13 SC.912.N.4.1,2	
27.03 Demonstrate knowledge of local and state animal regulations.		SC.912.L.17.13 SC.912.N.4.1,2	
27.04 Determine the legal limitations of duties of an employee in the animal services industry.		SC.912.L.17.13 SC.912.N.4.1,2	
27.05 Identify when an Animal Health Certificate is required.		SC.912.L.17.13 SC.912.N.4.1,2	
27.06 Explain the laws governing the sale of animals and the disposal of animals.		SC.912.L.17.13 SC.912.N.4.1,2	ESS.02.01.01C
<i>27.07 List the options for euthanasia.</i>		SC.912.N.4.1,2	
<i>27.08 List the options for disposal of the pet's body.</i>		SC.912.L.17.13 SC.912.N.4.1,2	ESS.02.01.01C
28.0 Identify the different digestive systems of animals and the nutritional requirements of selected species – the students will be able to:			
28.01 Differentiate between ruminants and non-ruminants (monogastric and hind gut fermentors).		SC.912.L.14.45,46 SC.912.L.18.2,3,4, 11 SC.912.N.1.1	
28.02 Differentiate the teeth and eating habits of omnivorous, carnivores, and herbivores.		SC.912.L.14.45,46 SC.912.N.1.1	
28.03 Describe the basic nutritional requirements of selected species.		SC.912.L.18.2,3,4	FPP.03.01.03B FPP.03.01.05B
28.04 Analyze different feed labels and identify feed ingredients.	MAFS.912.A-CED.1.4 MAFS.912.N-Q.1.1, 3 MAFS.912.N-VM.3.6,7,8		AS.04.01.01B AS.04.01.02C FPP.03.01.05B
28.05 Differentiate animal food products for healthy and ill animals.			AS.04.01.02B
<i>28.06 Explain the appropriate storage for dry and canned dog or cat food.</i>			
<i>28.07 Identify the date code for dry and canned dog or cat food and appropriate disposal if out of date.</i>			
<i>28.08 Identify the feeding guide for dry and canned dog or cat food and appropriate measuring cup or device.</i>			
<i>28.09 Demonstrate knowledge of nutritional based on life stage and size of animal and chooses appropriate food and amount for specific animals for general care.</i>			
28.10 <i>Demonstrate ability to follow oral or written instructions for therapeutic pet food including type, amount, and frequency.</i>		SC.912.N.1.1	
28.11 <i>Explain potential problems with feeding therapeutic foods incorrectly or to the wrong patient.</i>		SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	
28.12 <i>Monitor and record in the medical record food and water intake for each patient.</i>		SC.912.N.1.1	
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:			
29.01 Describe the male and female reproductive systems.		SC.912.L.14.33 SC.912.L.16.13	AS.05.01.01B
29.02 Determine sex of animals.		SC.912.L.14.33 SC.912.L.16.13	
29.03 Determine appropriate age for breeding.		SC.912.L.14.33 SC.912.L.16.13	AS.05.02.01C
29.04 Identify gestation length.		SC.912.L.14.33 SC.912.L.16.13	
29.05 Describe estrous cycle.		SC.912.L.14.33 SC.912.L.16.13	AS.05.03.04B
29.06 Describe breeding techniques.		SC.912.L.14.33 SC.912.L.15.9	AS.05.03.02C AS.05.03.05C
29.07 Select male and female for breeding.		SC.912.L.15.9,15 SC.912.L.16.1,2	AS.05.01.01C
29.08 Care of breeding stock.			
29.09 Care of newborn.		SC.912.L.14.41	
29.10 Explain the differences and similarities between reproduction in different animal species.		SC.912.L.14.33	
30.0 Identify common species and/or breeds of exotic animals – the students will be able to:			CS.01.02.01C,02 C CS.01.04.04C CS.01.06.03C CS.02.03.03C CS.03.01.02C CS.02.05 (ALL) CS.01.03.01C,.02 C, 03C
30.01 Identify common avian species/breed and their characteristics.		SC.912.L.15.4, 5, 6	
30.02 Identify common reptile species/breed and their characteristics.		SC.912.L.15.4, 5, 6	
30.03 Identify common exotic mammal species/breed and their characteristics.		SC.912.L.15.4, 5, 6	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	
30.04 Identify common pet fish species/breed and their characteristics.		SC.912.L.15.4, 5, 6	
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.			
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>			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	
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>			
31.22 <i>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 #
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	
22.01.1	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	
22.01.2	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	
22.01.3	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	
22.02	Craft and Structure	
22.02.1	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	
22.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
22.02.3	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	
22.03	Integration of Knowledge and Ideas	

Florida Standards		Correlation to CTE Program Standard #
22.03.1	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	
22.03.2	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	
22.03.3	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	
22.04 Range of Reading and Level of Text Complexity		
22.04.1	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.	
22.04.2	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	
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		
23.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
23.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
23.02 Production and Distribution of Writing		
23.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
23.02.2	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	
23.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback,	

Florida Standards		Correlation to CTE Program Standard #
	including new arguments or information. LAFS.1112.WHST.2.6	
23.03	Research to Build and Present Knowledge	
23.03.1	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	
23.03.2	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	
23.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
23.04	Range of Writing	
23.04.1	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	
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. 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	

Florida Standards	Correlation to CTE Program Standard #
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

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.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
32.0 Differentiate between animal welfare and animal rights – the students will be able to:			AS.06.01.02A (ALL)
32.01 Define animal welfare and animal rights.		SC.912.L.17.13 SC.912.N.4.1	
32.02 Compare and contrast between animal welfare and animal rights.		SC.912.L.17.13 SC.912.N.4.1 SC.912.N.1.1	
32.03 Identify animal welfare and animal rights advocate groups.		SC.912.L.17.13 SC.912.N.4.1 SC.912.N.1.4	
32.04 Debate current events concerning animal welfare and animal rights.		SC.912.L.17.13 SC.912.N.4.1 SC.912.N.1.1,4	
32.05 Describe animal cruelty and the consequences of cruel treatment of animals.		SC.912.L.17.13 SC.912.N.4.1	
33.0 Explain the role of animals in research – the students will be able to:			
33.01 Describe the history of the role of animals in research.		SC.912.L.16.10; SC.912.N.4.1	
33.02 Discuss medical advances made possible through the use of animals in research.		SC.912.L.16.10; SC.912.N.4.1,2	
33.03 Define USDA and explain its roles in using animals for research.		SC.912.L.16.10; SC.912.N.4.1,2	
33.04 Describe the role of the Institutional Animal Care and Use Committee (IACUC) with regard to animal research facilities.		SC.912.L.16.10; SC.912.N.4.1	
33.05 Explain the controversy over using animals in research.		SC.912.L.16.10; SC.912.N.4.1,2	
33.06 Identify organizations that are in favor of and those that are against the use of animals in research.		SC.912.L.16.10; SC.912.N.4.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.07 Develop a personal position on the use of animals in research and support that position.		SC.912.L.16.10; SC.912.N.4.1,2	
33.08 Explain how biotechnology has affected animal research.		SC.912.L.16.10; SC.912.N.4.1,2	BS.01.01.02C
33.09 Debate the use of cloning for research purposes.		SC.912.L.16.10; SC.912.N.4.1,2	BS.01.03.01C
34.0 Maintain and analyze records – the students will be able to:			
34.01 Maintain and analyze animal records.	MAFS.912.S-IC.2.6	SC.912.N.1.1	
34.02 Discuss the legal requirements of maintaining animal health records, and maintain and analyze animal health records.		SC.912.N.1.1	
34.03 Maintain and analyze basic business records (inventory, depreciation, receipts, expenses), using computer applications.	MAFS.912.S-ID.3.9 MAFS.912.S-IC.2.6 MAFS.912.F-IF.3.8(B) MAFS.912.F-LE.1.1(B,C)		
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	National Standards
34.12 Describe the duties of an office or hospital staff member as outlined by NAVTA which includes: <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.		SC.912.N.1.1	
35.0 Demonstrate knowledge of preventive medicine and disease control – the students will be able to:			AS.03.01.02A AS.03.01.03C AS.03.01.05C
35.01 Describe the importance of preventive medicine for animal health.		SC.912.L.14.6, 38, 52	
35.02 Differentiate between healthy and sick animals.		SC.912.L.14.6	
35.03 Describe common infectious and noninfectious diseases of animals to include bacterial, viral, fungal, prion and zoonotic.		SC.912.L.14.38	
35.04 Describe vaccinations available for disease prevention and vaccination procedures.		SC.912.L.14.52 SC.912.L.16.8	
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. 		SC.912.L.14.52	
35.06 Discuss the terms immunology and active and passive immunity as it applies to disease and vaccination.		SC.912.L.14.52	
35.07 Describe concepts for periodic health check-up.			
35.08 <i>List and discuss common zoonotic diseases.</i>		SC.912.L.14.52	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
35.09	Demonstrate proper sanitation techniques for an examination room, hospital facilities, surgical suites, kennel, cattery, paddock, rabbit hutch, and zoo.			
35.09.1	<i>Keep assigned work areas clean and organized</i>			
35.09.2	<i>Explain sanitary procedures including physical cleaning, disinfecting, and sterilizing</i>			
35.09.3	<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>			
35.09.4	<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>			
35.09.5	<i>Change bedding materials in a timely and efficient manner.</i>			
35.09.6	<i>Demonstrate of the proper disposal of bedding and waste materials.</i>			
35.09.7	<i>Notify supervisor of needed repair or maintenance on cages, kennels, or stalls</i>			
35.10	Determine containment procedure and treatment for an epidemic.		SC.912.N.1.1	
36.0	Explain diagnostic testing – the students will be able to:			AS.03.01.01C (ALL) BS.02.03.02B (ALL) ESS.03.06.01C (ALL)
36.01	Explain diagnostic blood tests including: obtaining a blood sample and blood chemistry profiles (to monitor organ function).		SC.912.N.1.1	
36.02	Explain a urinalysis including:			
36.02.1	<i>List methods for urine collection commonly used in the veterinary practice</i>			
36.02.2	<i>Collect a free-caught urine sample using proper techniques for dogs</i>			
36.02.3	<i>Identify time and storage parameters for urine samples</i>			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
36.02.4	List precautions and safety factors in handling urine samples including personal protection equipment			
36.03	Explain fecal test including:			
36.03.1	Explain methods of collecting fecal samples.			
36.03.2	Identify time and storage parameters for fecal samples.			
36.03.3	Identify appropriate volume of feces for each method of testing.			
36.03.4	Demonstrate the correct technique for handling and preparing the fecal samples for analysis by flotation, sedimentation, and direct smear.			
36.03.5	Explain appropriate method of placing sample on microscope slide or cover slip.		SC.912.L.14.4	
36.03.6	List precautions and safety factors in handling fecal samples including personal protection equipment.			
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.		SC.912.L.14.37	
36.05.1	Discuss restrictions from radiation exposure for pregnant women and minors.			
36.05.2	Explain what a dosimeter badge does and who wears it and when.			
36.05.3	Demonstrate the area of exposure in the radiology room including direct beam and scatter radiation.			
36.05.4	Explain the correct use of personal protection equipment including lead-shielded gowns, lead gloves, lead thyroid shield, lead glasses, and other lead protective wear.			
36.05.5	Explain methods of restraint for positioning for radiographs including no-hold positioning.			
36.05.6	Explain the proper handling of radiographic film including safe light use.			
36.05.7	Demonstrate the appropriate labeling of a radiograph including date, patient. name, view or side of patient, machine calibrations, and film developing			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
36.05.8	<i>Maintain radiograph log and filing of films.</i>			
36.05.9	<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.			
36.06.1	<i>List the common species which may transmit rabies to humans.</i>		SC.912.L.14.6	
36.06.2	<i>Explain the methods of transmission of rabies to animals and humans.</i>		SC.912.L.14.6	
36.06.3	<i>List the symptoms associated with rabies.</i>			
36.06.4	<i>Explain the proper safety measures to follow when handling an animal suspected of having rabies.</i>		SC.912.L.17.13	
36.06.5	<i>Explain the procedure for euthanasia suitable as an explanation for a pet owner.</i>			
36.06.6	<i>Discuss the grief process that an owner may experience on the loss of the pet.</i>			
36.06.7	<i>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:			BS.02.03.02B (ALL)
37.01	<i>Set up fecal flotations or centrifuged fecal samples</i>			ESS.03.06.02C
37.02	<i>Identify ectoparasites fleas, ticks, lice, and mites and explain the life cycle and treatment and prevention methods</i>			ESS.03.06.02C
37.03	<i>Identify ova of endoparasites roundworms, hookworms, whipworms, strongyles and explain the life cycle and treatment and prevention methods</i>			ESS.03.06.02C
37.04	<i>Identify adult endoparasites roundworms, hookworms, whipworms, strongyles and heartworms</i>			ESS.03.06.02C
37.05	<i>Identify giardia and coccidia in fecal samples</i>			ESS.03.06.02C
37.06	<i>Identify tapeworm segments in fecal sample or on pet</i>			ESS.03.06.02C
37.07	Understand an accurately describe route of transmission, parasite vectors, and zoonotic potential.		SC.912.L.14.6	

**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

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.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
38.0 Groom selected companion and livestock animals – the students will be able to:			
38.01 <i>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.</i>			
38.02 <i>Demonstrate a basic knowledge of using clippers to cut animal hair/fur as needed for both cosmetic and therapeutic reasons.</i>			
38.03 <i>Explain the necessity of following written and oral instructions and all label directions regarding shampoos for bathing and therapeutic or flea rinses (dips).</i>			
38.04 <i>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.</i>			
38.05 <i>Identify the area of blood and nerve supply of the nail in the dog and cat and common pets such as rabbits and ferrets.</i>			
38.06 <i>Identify appropriate instrument or nail trimmer for small and large dogs and cats.</i>			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
38.07 <i>Demonstrate comfortable handling of paw or limb during nail trim for dog and cat.</i>			
38.08 <i>Explain methods for hemostasis if nail is accidentally trimmed too short.</i>		SC.912.L.14.35	
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:			
39.01 Define exotic animal, zoo animal, invasive and native animals.		SC.912.L.17.8	
39.02 Identify exotic animals native and invasive to Florida.		SC.912.L.17.8	
39.03 Explain the effects of urbanization on the wildlife population.		SC.912.L.14.6 SC.912.L.17.11,12,13,18,19,20	
39.04 Describe the roles of the Florida Fish and Wildlife Conservation Commission in wildlife management.		SC.912.L.17.11,12,13	
39.05 Explain the effects of state, national, and international laws on the domestication of the exotic animals.		SC.912.L.17.13	
40.0 Assess techniques used in surgical assisting and surgical preparation – the students will be able to:			AS.03.01.04B (ALL)
<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> 		SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
<p>40.02 Describe components of surgical assisting.</p> <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 			
<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>MAFS.912.S-IC.1.2 MAFS.912.N-Q.1.2</p>	<p>SC.912.N.1.1</p>	
<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</p>			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
<i>and humans.</i>			
41.03 <i>Demonstrate the reconstitution of vaccine using appropriate diluents and amounts of diluents.</i>	MAFS.912.N-Q.1.2,3		
41.04 <i>Demonstrate administration of a tablet or capsule to a cat and to a dog.</i>			
41.05 <i>Demonstrate the administration of a liquid to a cat and to a dog.</i>			
41.06 <i>Explain per os, oral, topical, parenteral, and injectable in terms of administering pharmaceuticals.</i>			
41.07 <i>Demonstrate the ability to follow oral and written instructions on medication, form of medication, amount of medication, and route of administration of medication.</i>	MAFS.912.N-Q.1.2,1.3 MAFS.912.A-CED.1.4		
41.08 <i>List the components that must be present on a prescription label.</i>			
41.09 <i>Observe and understand controlled substances logs and security</i>		SC.912.N.1.1	
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 <i>Describe the process for administering medications by injection, oral, nasal and topical.</i>			
41.14 <i>Describe the procedure for safe disposal of medications.</i>			
41.15 <i>Determine methods to observe animals for medicine side effects or allergies.</i>		SC.912.N.1.1	
42.0 <i>Explain proper methods of syringe and hypodermic needle use – the student will be able to:</i>			
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>			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
<i>42.04 Identify specified syringe size when requested.</i>			
<i>42.05 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.</i>	MAFS.912.N-Q.1.3		
<i>42.06 Describe appropriate SQ, IM, and IV injection sites.</i>			

Additional Information

Laboratory Activities

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

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. (www.fvma.org)

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 intercurricular 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. 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.

Additional Resources

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

<http://www.fl DOE.org/academics/career-adult-edu/career-tech-edu/program-resources.shtml>

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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

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

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

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

Program Structure

This program is a planned sequence of instruction 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	Graduation Requirement
A	8106810	Agriscience Foundations 1	1 credit	41-4011	3	EQ
	8116010	Agricultural Sales and Services 2	1 credit		2	VO
	8116020	Agricultural Sales and Services 3	1 credit		2	PA

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%
Agricultural Sales and Services 2	#	#	21/83 25%	#	21/67 31%	#	#	21/82 26%	#	21/74 28%	#
Agricultural Sales and Services 3	22/87 25%	22/80 28%	#	22/69 32%	#	22/70 31%	22/69 32%	#	22/66 33%	#	22/72 31%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Ag. Foundations	14/67 21%	4/75 5%	8/54 15%	11/46 24%	11/45 24%	11/45 24%	11/45 24%
Agricultural Sales and Services 2	**	**	**	8/46 17%	8/45 18%	6/45 13%	6/45 13%
Agricultural Sales and Services 3	**	**	**	11/46 24%	11/45 24%	11/45 24%	11/45 24%

** 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.

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 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Sales and Services.
- 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.
- 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.
- 26.0 Explain the components of the American business system.
- 27.0 Investigate agricultural cooperatives structure and function.
- 28.0 Demonstrate knowledge of the general principles of agribusiness.
- 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.

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

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 Sales & 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	

Florida Standards		Correlation to CTE Program Standard #
	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 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 Agriculture Sales & 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	

Florida Standards		Correlation to CTE Program Standard #
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 Agriculture Sales & 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	

Florida Standards		Correlation to CTE Program Standard #
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

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;	CS.10.02.01
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures--The student will be able to:		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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.06.03.01.a CS.07.04.01.c.
05.02 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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.03 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.07.04.01
05.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02. b ESS.04.05.01
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;	CS.07.03.01.c
06.01 Employ scientific measurement skills.			
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 CS.10.01.01.a
06.03 Identify the parts and functions of plant and animal cells.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		BS.02.02.01 ESS.01.01.02. b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.01.02.01.c AS.02.02.02.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		PS.01.02.01.b. AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4		CS.11.01.01 CS.11.02.01
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		BS.02.05.03.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	BS.01.01.03.a.
07.01 Research how different climactic and geological activity influences agriculture.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.02.06.09 CS.05.03.02
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
07.06 Identify conservation practices related to natural resources.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.b AS.08.01.01.c
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:		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;	PS.03.04.01.a
08.01 Identify and describe the specializations within the plant science industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to	LAFS.910.W.2.4 LAFS.1112.W.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
industry and scientific standards.			
08.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc....	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.03.01 PS.01.03.02
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.02.03.01
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.02.03.04
08.07 Investigate the impacts of various pests and propose solutions for their control.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.01.03 PS.03.01.02
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.03.02 PS.03.03.03 PS.03.03.04
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		FPP01.01.01.a
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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Analyze commercially important livestock breeds in Florida.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.02.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.01.c
09.04 Compare and contrast animal welfare issues.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4		AS.02.01.02.a AS.05.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.SL.2.4		
09.05 Investigate the nature and properties of food, fiber, and by-products from 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.
09.06 Explore career opportunities in animal science.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
10.01 Select and demonstrate proper use of hand tools in agriculture.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		AS.06.02.01.a FPP01.01.01.a
10.02 Operate service and maintain agriscience equipment, and instruments.			AS.01.01.02.b.
10.03 Manage facilities and supplies.			
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			CS.08.01.01.b PST.02.02.02. b.
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		PST.03.04.01. b PST.03.03.02. a.
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		PST.04.04.03. a PST.04.04.06. a
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.08.03.01.c PST.03.02.03.c .

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			PST.01.03.01.a.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
11.06 Demonstrate good listening skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.09.02.01.b CS.10.01.01.a.
12.0 Apply leadership and citizenship skills--The student will be able to:			CS.03.01.03.b.
12.01 Identify and describe leadership characteristics.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.02 Identify opportunities to apply acquired leadership skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.03 Identify and demonstrate ways to be an active citizen.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.04 Participate in community based learning activities.			
12.05 Demonstrate the ability to work cooperatively.			CS.01.06.01.a.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		CS.02.02.02.b.
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.05.02.c.
12.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.			
13.0 Discuss components of food safety and handling practices in agriculture - The student will be able to:			
13.01 Demonstrate proper safety precautions and use of personal protective equipment.			
13.02 Evaluate the food safety responsibilities that occur along the food supply chain.			
13.03 Explain techniques and procedures for the safe handling of food products.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
13.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			

**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 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 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	
02.02	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	

Florida Standards		Correlation to CTE Program Standard #
	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	
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.	

Florida Standards	Correlation to CTE Program Standard #	
	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 Describe the basic concepts of agribusiness – the student will be able to:			
14.01 Explain the following concepts: <ul style="list-style-type: none"> • business cycle • profit/loss • competition 	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
14.02 Identify and discuss ethical issues in agribusiness.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
14.03 Identify the different roles in agriculture sales careers.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
15.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to:			
15.01 Assess the agricultural impact upon the US gross national product and the total global economy.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
15.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
15.03 Identify and describe the primary government agencies involved with agriculture.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
15.04 Research new and emerging technologies and their impact on the economy.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
15.05 Recognize the value of the food and agribusiness industry.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
16.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy – the student will be able to:			
16.01 Define and explore agriculture and agribusinesses and their role in the economy.	LAFS.910.W.3.7 LAFS.1112.W.3.7		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
16.02	Evaluate and explore the agribusiness career opportunities in agriculture.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
16.03	Compare how key organizational structures and processes affect organizational performance and the quality of products and services.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
16.04	Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
17.0	Explain business logistics – the student will be able to:			
17.01	Operate and maintain the equipment appropriate for a selected agribusiness.			
17.02	Maintain facilities for a selected agribusiness.			
17.03	Store received agricultural products according to the manufacturer's specifications.			
17.04	Prepare agricultural products for shipment.			
17.05	Conduct an inventory and utilize a computerized inventory-control system.			
17.06	Describe inventory rotation.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
18.0	Demonstrate acceptable customer-relations skills – the student will be able to:			
18.01	Explain the purpose of a customer file system.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
18.02	Evaluate the importance of self-control in customer-relations.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
18.03	Identify and demonstrate appropriate responses to criticism and praise.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
18.04	Explain the effects of positive human relations on success in business.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
18.05	Demonstrate respect for the customer's desires and property.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
18.06	Practice effective telephone skills to enhance customer relations.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		
19.0	Demonstrate employability skills – the student will be able to:			
19.01	Conduct a job search and identify advanced-training opportunities and requirements.	LAFS.910.W.3.7 LAFS.1112.W.3.7		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
19.02 Compile the components of an employer's investment. (Ex. products, employees, equipment)			
19.03 Secure information about a job, including employee benefits.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
19.04 Prepare a resume.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		
19.05 Evaluate a job offer, considering various factors such as career advancement, job satisfaction, employee benefits, etc.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
19.06 Demonstrate ethical and responsible practices.			
19.07 Evaluate the importance of pride in the quality of workmanship.			
19.08 Describe the advantages of a good driving record and the ramifications of a poor driving record on employability opportunities.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8		
19.09 Reinforce the importance of confidentiality in various workplace situations. (Ex. product launch, customer information, personal social media use)			
19.10 Demonstrate appropriate responses to performance evaluations from the employer, the supervisor, and other persons in the workplace.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
20.0 Conduct appropriate market and marketing research – the student will be able to:			
20.01 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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7		ABS.06.01.01.a
20.02 Apply benefit/cost analysis to marketing in AFNR businesses.			ABS.06.01.01.b
20.03 Implement and evaluate marketing strategies with agricultural commodities, products and services.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7		ABS.06.01.01.c
20.04 Describe functions in agricultural marketing.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ABS.06.01.02.a
20.05 Assess the presence of marketing infrastructure for agricultural commodities.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ABS.06.01.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.910.W.3.7 LAFS.1112.W.3.7		
20.06 Evaluate alternative marketing strategies, such as valueadding, branding and niche marketing, and propose and implement appropriate modifications to achieve AFNR business goals.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7		ABS.06.01.02.c
21.0 Develop a marketing plan – the student will be able to:			
21.01 Identify the purpose, components and developmental processes of marketing plans.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		ABS.06.02.01.a
21.02 Perform a marketing analysis, including evaluation of the competitors, customers, international and domestic policy environment, regulations and rules, standards and AFNR business resources.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		ABS.06.02.01.b
21.03 Establish marketing plan goals/objectives, including monitoring, measuring and analyzing goal achievement.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		ABS.06.02.01.c
22.0 Develop strategies for marketing plan implementation – the student will be able to:			
22.01 Identify and use strategies frequently employed in marketing programs, including those used in niche markets.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ABS.06.03.01.a
22.02 Determine marketing strategies that are most likely to be effective in an AFNR business.	LAFS.910.W.2.4 LAFS.1112.W.2.4		ABS.06.03.01.b
22.03 Revise marketing strategies based on monitoring and measurement information for target customer base.	LAFS.910.W.2.5 LAFS.1112.W.2.5		ABS.06.03.01.c
23.0 Model effective sales principles and techniques – the student will be able to:			
23.01 Describe the process of creating an opening.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7		
23.02 Prepare strategies for handling objections.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.W.3.7		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.W.3.7		
23.03 Compare different methods for highlighting selling points.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7		
23.04 Create versions of closing strategies.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7		

**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 #
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	
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 Agricultural Sales 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	
25.02	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,	

Florida Standards		Correlation to CTE Program Standard #
	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 Agricultural Sales 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	
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.	

Florida Standards	Correlation to CTE Program Standard #
	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 Explain the components of the American business system – the student will be able to:			
27.01 Describe the five basic ways American business is organized.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
27.02 Distinguish and identify between the characteristics of each method of doing business.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
27.03 Evaluate the advantages and disadvantages provided by each business method.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
27.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
28.0 Investigate agricultural cooperatives structure and function – the student will be able to:			
28.01 Explain the definition of a cooperative.	LAFS.910.L.3.6 LAFS.1112.L.3.6		
28.02 Understand the history of cooperative principles and practices.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
28.03 Describe the five areas that classify cooperative structure.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
28.04 Distinguish and identify between the five types of cooperative structure and their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
29.0 Demonstrate knowledge of the general principles of agribusiness – the student will be able to:			
29.01 Explain the different types of record-keeping systems used in agribusiness.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
29.02 Explain and differentiate variable and fixed costs.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
29.03 Identify the various types and sources of credit.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
29.04 Compose a formula to determine the value of your product or service.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
29.05 Describe the decision-making process involved in purchasing capital and sales products.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7		
30.0 Perform agricultural business activities – the student will be able to:			
30.01 Prepare for a customer call or visit.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
30.02 Create a customer record that includes past order history.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
30.03 Order supplies and equipment through various methods, including catalogs and telecommunication and electronic-communication devices.			
30.04 Determine margins and discounts for pricing agricultural supplies and products (e.g., cash, bulk, quantity, early season, etc.).			
30.05 Convey updates on prices of products.	LAFS.910.W.2.6 LAFS.1112.W.2.6		
30.06 Use a computer, demonstrating word-processing skills and the ability to maintain a database, produce a spreadsheet, and access an electronic network.	LAFS.910.W.2.6 LAFS.1112.W.2.6		
31.0 Summarize methods of selling agricultural products and services – the student will be able to:			
31.01 Analyze marketing and pricing alternatives.	LAFS.910.RI.2.6 LAFS.1112.RI.2.6 LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
31.02 Differentiate marketing, pricing, value, and grading standards for different agricultural products.	LAFS.910.RI.2.6 LAFS.1112.RI.2.6 LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
31.03 Promote agricultural products.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
31.04 Explain the purpose, benefit, and quality of the products sold.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
31.05 Determine customer needs and wants.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
31.06 Recommend products and services that meet the customer's needs or wants.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.2.4 LAFS.1112.W.2.4		
31.07 Demonstrate effective sales principles and techniques.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
31.08 Take and fill customer orders by various means, including electronic communications.			
31.09 Perform sales counter activities (e.g., processing sales transactions, completing a purchase order and an invoice, calculating state sales tax, etc.).	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
31.10 Follow up to ensure the quality of services provided to customers.			
31.11 Provide technical assistance to customers.			
31.12 Respond to customer complaints.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.6 LAFS.1112.SL.2.6		
32.0 Develop specific tactics to market AFNR products and services – the student will be able to:			
32.01 Explain the meaning and use of the four Ps (product, price, place, and promotion) in marketing.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ABS.06.04.01.a
32.02 Develop advertising campaigns that promote products and services.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.2.5 LAFS.1112.SL.2.5		ABS.06.04.01.b
32.03 Implement sales goals and incentive programs, and identify pricing strategies used by competitors.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.2.4 LAFS.1112.W.2.4		ABS.06.04.01.c
33.0 Merchandise products and services to achieve specific marketing goals – the student will be able to:			
33.01 Identify, explain and organize components of the sales process.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		ABS.06.05.01.a
33.02 Develop effective customer relationships using approaches that are consistent and comprehensive.			ABS.06.05.01.b
33.03 Monitor marketing approaches to determine effectiveness in goal achievement, and make needed changes in such approaches.	LAFS.910.W.2.5 LAFS.1112.W.2.5		ABS.06.05.01.c
33.04 Develop strategies to gain new customers.	LAFS.910.W.3.7 LAFS.1112.W.3.7		ABS.06.05.02.a
33.05 Devise sales practices to achieve goals effectively and efficiently.	LAFS.910.W.3.7 LAFS.1112.W.3.7		ABS.06.05.05.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.06 Prepare and make sales presentations.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		ABS.06.05.02.c
33.07 Identify and maintain needed sales records.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ABS.06.05.03.a
33.08 Use strategies to follow up sales to provide post-sales service.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ABS.06.05.03.b
33.09 Intercept, interpret and process customer complaints, needs and problems with products and services.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		ABS.06.05.03.c
34.0 Perform promotional activities – the student will be able to:			
34.01 Identify potential customers.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
34.02 Collect and analyze market information.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
34.03 Develop a plan for advertising an agricultural product or service.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
34.04 Identify appropriate trade shows and demonstrations.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
34.05 Make an oral presentation in a promotional meeting, utilizing visual aids.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5 LAFS.910.W.2.6 LAFS.1112.W.2.6		
35.0 Observe local, state, and federal rules and regulations – the student will be able to:			
35.01 Identify current basic government agricultural programs.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
35.02 Identify licensing, inspection, and government-record requirements.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
35.03 Identify the governmental and regulatory agencies related to agribusiness and explain their impact on agribusiness.	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
35.04 Identify the sources of technical assistance available from private and government. (Ex. Extension, FDACS, FDA, IFAS)	LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1		

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
	LAFS.1112.SL.1.1		

Additional Information

Laboratory Activities

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

Career and Technical Student Organization (CTSO)

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

Additional Resources

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

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

**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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

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

The content includes but is not limited to 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	Graduation Requirement
A	8106810	Agriscience Foundations1	1 credit	27-3099	3	EQ
	8117010	Agricultural Communications 2	1 credit		2	PA
	8117020	Agricultural Communications 3	1 credit		2	PA

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Agriscience Foundations1	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%
Agricultural Communications 2	#	2/80 3%	25/83 30%	2/69 3%	26/67 39%	2/70 3%	#	25/82 30%	2/66 3%	26/74 35%	1/72 1%
Agricultural Communications 3	25/87 0%	25/80 31%	2/83 2%	27/69 39%	2/67 3%	26/70 37%	25/69 36%	2/82 2%	20/66 30%	2/74 3%	25/72 35%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Agriscience Foundations 1	14/67 21%	4/75 5%	8/54 15%	11/46 24%	11/45 24%	11/45 24%	11/45 24%
Agricultural Communications 2	**	**	**	10/46 22%	10/45 22%	11/45 24%	11/45 24%
Agricultural Communications 3	**	**	**	12/46 26%	12/45 26%	13/45 28%	13/45 28%

** 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.

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.

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

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 Ag 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	

Florida Standards		Correlation to CTE Program Standard #
	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 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 Agritechology.		
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.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.1.2	
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 Ag Communications.	
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

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;	CS.10.02.01
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures--The student will be able to:		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,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		3; SC.912.N.4.2; SC.912.P.8.7;	
05.01 Identify the common causes and prevention of accidents in agriscience operations.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.06.03.01.a CS.07.04.01.c.
05.02 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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.03 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.07.04.01
05.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02. b ESS.04.05.01
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;	CS.07.03.01.c
06.01 Employ scientific measurement skills.			
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 CS.10.01.01.a
06.03 Identify the parts and functions of plant and animal cells.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		BS.02.02.01 ESS.01.01.02. b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.01.02.01.c AS.02.02.02.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		PS.01.02.01.b. AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4		CS.11.01.01 CS.11.02.01
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		BS.02.05.03.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	BS.01.01.03.a.
07.01 Research how different climactic and geological activity influences agriculture.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.02.06.09 CS.05.03.02
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
07.06 Identify conservation practices related to natural resources.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.b AS.08.01.01.c
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:		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;	PS.03.04.01.a
08.01 Identify and describe the specializations within the plant science industry.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to	LAFS.910.W.2.4 LAFS.1112.W.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
industry and scientific standards.			
08.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc....	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.03.01 PS.01.03.02
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.02.03.01
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.02.03.04
08.07 Investigate the impacts of various pests and propose solutions for their control.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.01.03 PS.03.01.02
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.03.02 PS.03.03.03 PS.03.03.04
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		FPP01.01.01.a
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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Analyze commercially important livestock breeds in Florida.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.02.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.01.c
09.04 Compare and contrast animal welfare issues.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4		AS.02.01.02.a AS.05.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.SL.2.4		
09.05 Investigate the nature and properties of food, fiber, and by-products from 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.
09.06 Explore career opportunities in animal science.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
10.01 Select and demonstrate proper use of hand tools in agriculture.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		AS.06.02.01.a FPP01.01.01.a
10.02 Operate service and maintain agriscience equipment, and instruments.			AS.01.01.02.b.
10.03 Manage facilities and supplies.			
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			CS.08.01.01.b PST.02.02.02. b.
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		PST.03.04.01. b PST.03.03.02. a.
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		PST.04.04.03. a PST.04.04.06. a
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.08.03.01.c PST.03.02.03.c .

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			PST.01.03.01.a.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
11.06 Demonstrate good listening skills.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.09.02.01.b CS.10.01.01.a.
12.0 Apply leadership and citizenship skills--The student will be able to:			CS.03.01.03.b.
12.01 Identify and describe leadership characteristics.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.02 Identify opportunities to apply acquired leadership skills.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.03 Identify and demonstrate ways to be an active citizen.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.04 Participate in community based learning activities.			
12.05 Demonstrate the ability to work cooperatively.			CS.01.06.01.a.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		CS.02.02.02.b.
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.01.05.02.c.
12.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.			
13.0 Discuss components of food safety and handling practices in agriculture - The student will be able to:			
13.01 Demonstrate proper safety precautions and use of personal protective equipment.			
13.02 Evaluate the food safety responsibilities that occur along the food supply chain.			
13.03 Explain techniques and procedures for the safe handling of food products.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
13.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			

**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	
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 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	
02.02 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 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	
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

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.0 Investigate the communications sector of the agricultural industry – the student will be able to:			
14.01 Describe the importance of communications in American agriculture.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		
14.02 Discuss career opportunities in agricultural communications including the educational requirements.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
14.03 Identify professional organizations related to agricultural communications.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		
14.04 Identify the impact of communications to the agriculture industry and to society.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
15.0 Identify the forms of communication – the student will be able to:			
15.01 Explain the purpose of communication.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
15.02 Explain the different types of communication: verbal, non-verbal, written and visual.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1	SC.912.N.1.4	
15.03 Compare the various forms of communication technologies: print, video, online media, visual arts and social media.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2	SC.912.N.1.5	
15.04 Identify communication barriers and determine methods of overcoming these barriers.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
16.0 Develop communication messages – the student will be able to:			
16.01 Conduct an audience analysis.	LAFS.910.W.2.5 LAFS.1112.W.2.5		
16.02 Research information for message development.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
16.03 Analyze research for credibility.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2	SC.912.N.1.4	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.04 Utilize elements of informative and persuasive messages.	LAFS.910.W.1.1 LAFS.910.W.1.2 LAFS.1112.W.1.1 LAFS.1112.W.1.2		
16.05 Compare and contrast media channels.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2		
16.06 Identify agricultural messages in the media.	LAFS.910.SL.1.2 LAFS.1112.SL.1.2		
16.07 Create informative and persuasive messages using various communication methods.	LAFS.910.W.1.1 LAFS.910.W.1.2 LAFS.1112.W.1.1 LAFS.1112.W.1.2		
17.0 Demonstrate oral communications skills – the student will be able to:			
17.01 Determine types of speeches: informative, persuasive.	LAFS.910.W.1.1 LAFS.910.W.1.2 LAFS.1112.W.1.1 LAFS.1112.W.1.2		
17.02 Identify the importance of public speaking skills in career development.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
17.03 Explain the characteristics of an effective public speaker.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
17.04 Explain the steps necessary to prepare a speech.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
17.05 Present a prepared speech.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
17.06 Present an extemporaneous speech.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
17.07 Create visual aids for presentations.	LAFS.910.SL.2.5 LAFS.1112.SL.2.5		
18.0 Conduct interviews – the student will be able to:			
18.01 Research information for an interview (including company or organization information and information about the interviewee to build report).	LAFS.910.W.3.7 LAFS.1112.W.3.7		
18.02 Identify the types of interview questions.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
18.03 Write interview questions.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
18.04 Conduct an interview, using various methods of media.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
18.05 Conduct follow-up procedures.			
19.0 Utilize printed agricultural media – the student will be able to:			
19.01 Explain the evolution and relevance of printed media in the agricultural industry. Describe the components of various styles in written articles.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
19.02 Identify and list the criteria for newsworthiness of a news story.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
19.03 Explain the structure of the inverted pyramid.	LAFS.910.RI.1.3 LAFS.1112.RI.1.3		
19.04 List the five Ws and the H: who, what, when, where, why and how.	LAFS.910.W.1.2 LAFS.1112.W.1.2		
19.05 Write a lead for a story.	LAFS.910.W.1.2 LAFS.1112.W.1.2		
19.06 Compose a news story and news release on an agricultural topic.	LAFS.910.W.1.2 LAFS.1112.W.1.2		
19.07 Use the <i>Associated Press Stylebook and Libel Manual</i> to edit articles.	LAFS.910.W.2.5 LAFS.1112.W.2.5		
19.08 Define the components of an editorial.	LAFS.910.W.1.2 LAFS.1112.W.1.2		
20.0 Utilize photography and graphics – the student will be able to:			
20.01 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.			
20.02 Compose a quality photograph.			
20.03 Demonstrate the use of technology, software, and hardware used in photography and graphic design.			
20.04 Explain the difference among digital file formats. .			
21.0 Develop, design and edit publications and documents – the student will be able to:			
21.01 Identify key terms in publication and document design.	LAFS.910.L.3.6 LAFS.1112.L.36		
21.02 Explain and apply the components of the publication and document development process.	LAFS.910.W.2.5 LAFS.1112.W.2.5		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
21.03 Identify common mistakes in publication and document design.	LAFS.910.W.2.5 LAFS.1112.W.2.5		
21.04 Use the appropriate software to design a publication and document.	LAFS.910.W.2.6 LAFS.1112.W.2.6		
22.0 Develop audio and video media – the student will be able to:			
22.01 Explain and implement the electronic media production process.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
22.02 Write video and audio scripts.	LA.FS.910.L.1.1 LA.FS1112.L.1.1		
22.03 Describe the importance of grammar and punctuation in writing scripts.	LAFS.910.W.2.5 LAFS.910.W.2.6 LAFS.1112.W.2.5 LAFS.1112.W.2.6		
22.04 Draw a video storyboard.	LAFS.910.W.2.5 LAFS.910.W.2.6 LAFS.1112.W.2.5 LAFS.1112.W.2.6		
22.05 Write a video shot outline.	LAFS.910.SL.2.5 LAFS1112.SL.2.5		
22.06 Identify a proper video shot sequence (long shot, medium shot, close-up).	LAFS.910.SL.2.5 LAFS1112.SL.2.5		
22.07 Create a promotional video.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		
22.08 Demonstrate proper tone and voice inflection for radio and video.	LAFS.910.SL.2.5 LAFS1112.SL.2.5		
22.09 Produce a video message with no narration.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
23.0 Investigate ethical and professional issues in agricultural communications – the student will be able to:			
23.01 Demonstrate characteristics of responsible/ethical media professionals: public relations professional, reporter and editor.	LAFS.910.SL.1.3 LAFS.1112.SL.1.3		
23.02 Adhere to all media deadlines.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
23.03 Describe plagiarism, libel, slander, copyright and intellectual property.	LAFS.910.SL.1.3 LAFS.1112.SL.1.3 LAFS.910.L.3.6 LAFS.1112.L.3.6		
24.0 Demonstrate leadership, employability, and human relations skills – the student will be able to:			
24.01 Conduct a job search for a career in agricultural communications.	LAFS.910.W.3.7 LAFS.1112.W.3.7		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
24.02 Develop a resume and an application letter. Identify documents that may be required when applying for a job in the agricultural communication field.	LAFS.910.W.1.2 LAFS.1112.W.1.2		
24.03 Identify and demonstrate proper human relation skills.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
24.04 Complete a job application form.	LAFS.910.W.1.2 LAFS.1112.W.1.2		
24.05 Write a proper thank you letter.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		
24.06 Identify proper workplace and interview attire.			
24.07 Create business letters.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		
24.08 Create electronic correspondence.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		
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.	LAFS.910.L.3.6 LAFS.1112.L.3.6		
25.04 Research new and emerging technologies and their impact on the economy.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
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.	LAFS.910.L.3.6 LAFS.1112.L.3.6		
26.02 Evaluate and explore the agribusiness career opportunities in agriculture.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
26.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and	LAFS.910.W.3.7 LAFS.1112.W.3.7		

CTE Standards and Benchmarks	FS-M/LA	NGSS-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	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		

**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 #
27.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Agricultural Communications	
	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 issues that remain unresolved.	

Florida Standards		Correlation to CTE Program Standard #
	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 Agricultural Communications		
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	
28.02 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	

Florida Standards		Correlation to CTE Program Standard #
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 Agricultural Communications	
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. 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	

Florida Standards	Correlation to CTE Program Standard #
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

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
30.0 Explore the communications sector of the agricultural industry – the student will be able to:			
30.01 Identify influential, historical and current issues in the agricultural industry that necessitates agricultural communication.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
30.02 Objectively debate agricultural issues.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
31.0 Create communication messages – the student will be able to:			
31.01 Define what persuasion is and explain how it can be used to influence others.	LAFS.910.W.1.1 LAFS.1112.W.1.1	SC.912.N.1.1, 4	
31.02 Describe and provide an example of how persuasion is used in the media.	LAFS.910.W.1.1 LAFS.1112.W.1.1	SC.912.N.1.1, 4	
31.03 Create persuasive media.	LAFS.910.W.1.1 LAFS.1112.W.1.1		
31.04 Identify different types of communication research methods.			
32.0 Demonstrate oral communications skills – the student will be able to:			
32.01 Identify various forms of visual aids for an oral presentation.	LAFS.910.SL.2.5 LAFS1112.SL.2.5		
32.02 Construct visual aids for an oral presentation.	LAFS.910.SL.2.5 LAFS1112.SL.2.5		
32.03 Present a speech using visual aids and non-verbal cues.	LAFS.910.SL.2.5 LAFS1112.SL.2.5		
32.04 Evaluate a speech.	LAFS.910.SL.1.3 LAFS.1112.SL.1.3		
33.0 Generate printed agricultural media – the student will be able to:			
33.01 Develop a media kit consisting of a backgrounder, fact sheet, news release and other media.	LAFS910.W.2.4 LAFS910.W.2.6 LAFS1112.W.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.W.2.6		
33.02 Compose an advance story, feature story, follow-up story, cover story and news release on an agricultural topic.	LAFS.910.W.1.2 LAFS.910.W.1.2	SC.912.N.1.1	
34.0 Modify photography and graphics – the student will be able to:			
34.01 Crop and edit photographs and graphics to enhance an article or press release.	LAFS.910.SL.2.5 LAFS.1112.SL.2.5		
34.02 Write effective captions/cutlines for photographs and graphics.	LAFS.910.SL.2.5 LAFS.1112.SL.2.5		
35.0 Create, design and edit publications and documents – the student will be able to:			
35.01 Create a magazine layout, brochure, poster, newsletter, and/or display for an agriculture product or event.	LAFS.910.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.4 LAFS.1112.W.2.6		
36.0 Create or analyze audio and video media – the student will be able to:			
36.01 Create or analyze an informational video.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5		
36.02 Create or analyze a persuasive video.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5		
36.03 Create or analyze an audio program or podcast.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5		
37.0 Investigate ethical and professional issues in agricultural communications – the student will be able to:			
37.01 Define key terms related to ethics and professionalism and discuss their relationship to agriculture.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.L.3.6 LAFS.1112.L.3.6		
37.02 Describe the importance of confidentiality in agricultural communications.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
37.03 Respond appropriately to opposing views in a professional manner.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
37.04 Identify concepts of risk communication and crisis communication.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.910.L.3.6 LAFS.1112.L.3.6		
38.0 Demonstrate leadership, employability, and human relations skills – the student will be able to:			
38.01 Demonstrate competence in job interview techniques	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
38.02 Identify or demonstrate appropriate responses to criticism.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
38.03 Answer interview questions competently.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
38.04 Participate in mock interviews.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
38.05 Analyze one's own online presence.	LAFS.910.SL.1.3 LAFS.1112.SI.1.3		
39.0 Use online and social media – the student will be able to:			
39.01 Compare and contrast the methods of delivering a message through different types of online and social media.	LAFS.910.RI.3.7 LAFS.1112.RI.3.7		
39.02 Analyze online and social media for credibility and relevance.	LAFS.910.RI.3.8 LAFS.1112.RI.3.8		
39.03 Research the agricultural industry's use of online and social media.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
39.04 Compose a professional e-mail.	LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4		
39.05 Demonstrate an understanding of web design software and language.	LAFS.910.W.2.6 LAFS.1112.W.2.6		
39.06 Create or analyze an agricultural website.	LAFS.910.W.2.6 LAFS.1112.W.2.6		
40.0 Create an agricultural communications campaign – the student will be able to:			
40.01 Define key terms in communications campaign development.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
40.02 Identify and perform the various professional roles in a communications campaign.	LAFS.910.W.2.5 LAFS.1112.W.2.5		
40.03 Identify the strengths and weaknesses of various media for use in communication campaigns.	LAFS.910.W.2.5 LAFS.1112.W.2.5		
40.04 Develop a communications campaign.	LAFS.910.W.1.2 LAFS.1112.W.1.2		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.910.W.2.4 LAFS.1112.W.2.4		
40.05 Develop a research report for the agricultural industry using an industry standard format.	LAFS.910.SL.2.4 LAFS.1112.SL.2.4		
41.0 Explain the components of the American business system – the student will be able to:			
41.01 Describe the five basic ways American business is organized.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
41.02 Distinguish and identify between the characteristics of each method of doing business.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
41.03 Evaluate the advantages and disadvantages provided by each business method.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
41.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
42.0 Investigate agricultural cooperatives structure and function – the student will be able to:			
42.01 Explain the definition of a cooperative.	LAFS.910.L.3.6 LAFS.1112.L.3.6		
42.02 Understand the history of cooperative principles and practices.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
42.03 Describe the five areas that classify cooperative structure.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
42.04 Distinguish and identify between the five types of cooperative structure and their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		
42.05 Demonstrate the need for internal and external communications in a cooperative.	LAFS.910.L.3.6 LAFS.1112.L.3.6		

Additional Information

Laboratory Activities

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

Career and Technical Student Organization (CTSO)

FFA is the intercurricular 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. 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.

Additional Resources

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

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

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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the 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	Graduation Requirement
A	8106810	Agriscience Foundations	1 credit	45-4011	3	EQ
	8118310	Forestry and Natural Resources 2	1 credit		2	VO
	8118320	Forestry and Natural Resources 3	1 credit		2	VO
B	8118330	Forestry 4	1 credit	19-4093	2	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%
Forestry and Natural Resources 2	1/87 1%	5/80 6%	29/83 35%	8/69 12%	23/67 34%	13/70 19%	3/69 4%	28/82 34%	9/66 14%	29/74 39%	3/72 4%
Forestry and Natural Resources 3	20/87 23%	25/80 31%	12/83 14%	25/69 36%	9/67 13%	34/70 49%	22/69 32%	8/82 10%	27/66 41%	9/74 12%	23/72 32%
Forestry 4	19/87 22%	21/80 26%	2/83 2%	20/69 29%	2/67 3%	24/70 34%	19/69 28%	1/82 1%	19/66 29%	2/74 3%	20/72 28%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Agriscience Foundations 1	14/67 21%	4/75 5%	8/54 15%	**	**	**	**
Forestry and Natural Resources 2	5/67 7%	5/75 7%	3/54 5%	**	**	**	**

Forestry and Natural Resources 3	5/67 7%	4/75 6%	3/54 5%	**	**	**	**
Forestry 4	#	#	#	**	**	**	**

** 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.

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.

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

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	

Florida Standards		Correlation to CTE Program Standard #
	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 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.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.910.WHST.1.2	
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 Forestry.	
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

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;	CS.10.02.01
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures--The student will be able to:		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,	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		3; SC.912.N.4.2; SC.912.P.8.7;	
05.01 Identify the common causes and prevention of accidents in agriscience operations.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.06.03.01.a CS.07.04.01.c.
05.02 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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.03 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.07.04.01
05.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02. b ESS.04.05.01
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;	CS.07.03.01.c
06.01 Employ scientific measurement skills.			
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 CS.10.01.01.a
06.03 Identify the parts and functions of plant and animal cells.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		BS.02.02.01 ESS.01.01.02. b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.01.02.01.c AS.02.02.02.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		PS.01.02.01.b. AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4		CS.11.01.01 CS.11.02.01
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		BS.02.05.03.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	BS.01.01.03.a.
07.01 Research how different climactic and geological activity influences agriculture.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.02.06.09 CS.05.03.02
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
07.06 Identify conservation practices related to natural resources.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.b AS.08.01.01.c
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:		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;	PS.03.04.01.a
08.01 Identify and describe the specializations within the plant science industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to	LAFS.910.W.2.4 LAFS.1112.W.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
industry and scientific standards.			
08.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc....	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.03.01 PS.01.03.02
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.02.03.01
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.02.03.04
08.07 Investigate the impacts of various pests and propose solutions for their control.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.01.03 PS.03.01.02
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.03.02 PS.03.03.03 PS.03.03.04
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		FPP01.01.01.a
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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Analyze commercially important livestock breeds in Florida.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.02.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.01.c
09.04 Compare and contrast animal welfare issues.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4		AS.02.01.02.a AS.05.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.SL.2.4		
09.05 Investigate the nature and properties of food, fiber, and by-products from 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.
09.06 Explore career opportunities in animal science.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
10.01 Select and demonstrate proper use of hand tools in agriculture.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		AS.06.02.01.a FPP01.01.01.a
10.02 Operate service and maintain agriscience equipment, and instruments.			AS.01.01.02.b.
10.03 Manage facilities and supplies.			
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			CS.08.01.01.b PST.02.02.02. b.
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		PST.03.04.01. b PST.03.03.02. a.
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		PST.04.04.03. a PST.04.04.06. a
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.08.03.01.c PST.03.02.03.c .

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			PST.01.03.01.a.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
11.06 Demonstrate good listening skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.09.02.01.b CS.10.01.01.a.
12.0 Apply leadership and citizenship skills--The student will be able to:			CS.03.01.03.b.
12.01 Identify and describe leadership characteristics.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.02 Identify opportunities to apply acquired leadership skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.03 Identify and demonstrate ways to be an active citizen.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.04 Participate in community based learning activities.			
12.05 Demonstrate the ability to work cooperatively.			CS.01.06.01.a.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		CS.02.02.02.b.
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.05.02.c.
12.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.			
13.0 Discuss components of food safety and handling practices in agriculture - The student will be able to:			
13.01 Demonstrate proper safety precautions and use of personal protective equipment.			
13.02 Evaluate the food safety responsibilities that occur along the food supply chain.			
13.03 Explain techniques and procedures for the safe handling of food products.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
13.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			

**Florida Department of Education
Student Performance Standards**

Course Title: Forestry and Natural Resources 2
Course Number: 8118310
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 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 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	
02.02	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	

Florida Standards		Correlation to CTE Program Standard #
	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. 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.	

Florida Standards	Correlation to CTE Program Standard #
	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-LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.0 Describe the forestry and natural resources industry--The student will be able to:			
14.01 Identify career and educational opportunities in the forestry and natural resources industries.		SC.912.L.17.17, 20	
14.02 Describe the importance of forestry and natural resources.		SC.912.L.17.17,19, 20, SC.912.N.1.5	
14.03 Identify professional and interest organizations and trade journals in the forestry and natural resources industries.		SC.912.N.1.1,1.4,	
15.0 Practice forestry and natural resources safety--The student will be able to:			
15.01 Identify and eliminate hazards of the workplace.		SC.912.N.1.1, SC.912.E.6.6	
15.02 Observe color-coded warnings in work areas and on equipment and machinery.		SC.912.N.1.1, SC.912.E.6.6	
15.03 Demonstrate safety procedures and workplace "housekeeping" practices.		SC.912.N.1.1, SC.912.E.6.6	
15.04 Identify safe and effective fire extinguishing techniques.		SC.912.N.1.1, SC.912.E.6.6	
15.05 Apply minor first aid treatment and identify emergency procedures.		SC.912.N.1.1, SC.912.E.6.6	
15.06 Safely handle and store flammable and nonrestricted chemicals.		SC.912.N.1.1, SC.912.E.6.6	
15.07 Select personal safety equipment and appropriate clothing.		SC.912.N.1.1, SC.912.E.6.6	
15.08 Operate machinery and equipment according to the safety recommendations of the manufacturers.		SC.912.N.1.1, SC.912.E.6.6	
16.0 Operate, maintain, and repair machinery, equipment, and facilities--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.01 Use the equipment operator parts, and repair manuals.		SC.912.N.1.1, SC.912.E.6.6	
16.02 Service and maintain small gasoline engines.	MAFS.912.A.REI.4.11 MAFS.912.A-APR.4.6		
16.03 Operate, service, and maintain tractors and equipment.	MAFS.912.A.REI.4.11 MAFS.912.A-APR.4.6		
16.04 Dispose of waste products according to required procedures.		SC.912.L.17.14,17,	
16.05 Use shop and lab instruments and equipment.		SC.912.N.1.1	
16.06 Perform minor welding repairs using arc and oxy-acetylene equipment.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.N.1.1,4.2	
17.0 Monitor water resources--The student will be able to:			
17.01 Identify important physical and chemical properties of water.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.L.17.16, SC.912.L.18.12	
17.02 Identify present and potential sources of water pollution.		SC.912.L.17.16, SC.912.L.18.12	
18.0 Collect and test soil samples--The student will be able to:			
18.01 Identify important physical and chemical properties of soil.	MAFS.912.F-IF.2.4	SC.912.P.8.2,11	
18.02 Collect soil samples representative of an area, complete soil data forms, and submit them for laboratory analysis.	MAFS.912.F-IF.3.9	SC.912.P.8.2, SC.912.N.1.1	
18.03 Test soil for acidity or alkalinity and recommend proper soil additives to correct the pH level.	MAFS.912.F-IF.2.4	SC.912.P.8.2,11	
18.04 Determine the appropriate conservation management practices for planting a particular area.	MAFS.912.G-MG.1.1	SC.912.L.17.11,19, SC.912.P.8.11	
18.05 Determine land classes according to soil classification standards.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.L.17.19, SC.912.P.8.2	
19.0 Apply multi-use principles to forests and other lands--The student will be able to:			
19.01 Identify the types of land ownership.		SC.912.L17.13,16,17, SC.912.N.4.2	
20.0 Perform basic surveying operations--The student will be able to:			
20.01 Make linear measurements and calculate an area of land.	MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7		
20.02 Perform basic surveying operations.	MAFS.912.S-ID.3.7		
20.03 Locate a land area, using a legal land description.	MAFS.912.G-GPE.2.7 MAFS.912.S-ID.3.7		

CTE Standards and Benchmarks		FS-M/LA	NGSS-Sci	National Standards
21.0	Read and interpret aerial photographs and maps--The student will be able to:			
21.01	Interpret the terms, symbols, and scales used on soil and topographic maps.	MAFS.912.S-ID.3.7		
22.0	Analyze and interpret soil survey data--The student will be able to:			
22.01	Locate a designated site in the soil survey.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9		
22.02	Analyze and interpret soil survey data.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.N.1.1,6	
23.0	Perform basic nursery operation activities--The student will be able to:			
23.01	Identify methods of propagation.		SC.912.L.14.7, SC.912.L.16.17, SC.912.L.18.7 SC.912.P.12.12	
23.02	Perform basic nursery operation activities, such as pruning, trimming, and fertilizing.	MAFS.912.G-GPE.2.7	S SC.912.L.16.17, SC.912.L.14.7 SC.912.L.18.7	
23.03	Maintain plants.		SC.912.L.14.7 SC.912.L.18.7	
24.0	Apply basic financial management skills--The student will be able to:			
24.01	Complete basic financial records.	MAFS.912.A-SSE.1.1		
24.02	Demonstrate the use of banking procedures.	MAFS.912.A-SSE.1.1		
25.0	Demonstrate leadership and employability skills--The student will be able to:			
25.01	Identify documents that may be required for a job application.			
25.02	Complete a job application form.			
25.03	Demonstrate competencies in job-interview techniques.			
26.0	Monitor air quality--The student will be able to:			
26.01	Identify important physical and chemical properties of air.		SC.912.P.8.2	
26.02	Identify present and potential sources of air pollution.		SC.912.L.17.15,16 SC.912.N.4.2, SC.912.E.6.6, SC.912.P.8.2	

CTE Standards and Benchmarks		FS-M/LA	NGSS-Sci	National Standards
	26.03 Analyze and interpret lab results.		SC.912.L.17.16 SC.912.N.4.2, SC.912.E.6.6,	
27.0	Describe timber marketing procedures and techniques--The student will be able to:			
27.01	Identify the products made from trees and other natural resources and their value.		SC.912.L.17.11,19	
27.02	Select and mark trees to be removed in timber stand improvement.			
27.03	Conduct a simple cruise.	MAFS.912.A-SSE.1.1		
27.04	Calculate the volume and value of timber.	MAFS.912.A-SSE.1.1 MAFS.912.G-GMD.1.3		
27.05	Identify the components of timber sales contracts.			
27.06	Identify the methods of harvesting and erosion prevention.		SC.912.L.17.12	
28.0	Measure trees and forest volume--The student will be able to:			
28.01	Identify and describe the use of tree measuring tools and instruments, such as dendrometers, hypsometers, increment borers, prisms, volume tables, and logger's tape.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.N.1.1	
28.02	Measure trees and forests, using selected forest measurement tools.		SC.912.N.1.1	
29.0	Perform preventive maintenance, checks, and services for forestry equipment--The student will be able to:			
29.01	Perform daily operator maintenance checks for equipment.		SC.912.N.1.1	
29.02	Determine the preventive maintenance procedures, using the equipment operator manuals.	MAFS.912.A-REI.4.1 MAFS.912.A-APR.4.6	SC.912.N.1.1	
29.03	Perform scheduled preventive maintenance procedures.		SC.912.N.1.1	
29.04	Interpret and perform operator's troubleshooting procedures as described in the operator's manual.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.N.1.1	
29.05	Keep records of the maintenance and servicing of equipment.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9		

**Florida Department of Education
Student Performance Standards**

Course Title: Forestry and Natural Resources 3
Course Number: 8118320
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 #
30.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Forestry.	
	30.01 Key Ideas and Details	
	30.01.1 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	
	30.01.2 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	
	30.01.3 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	
	30.02 Craft and Structure	
	30.02.1 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	
	30.02.2 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	30.02.3 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 #
30.03	Integration of Knowledge and Ideas	
30.03.1	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	
30.03.2	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	
30.03.3	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	
30.04	Range of Reading and Level of Text Complexity	
30.04.1	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.	
30.04.2	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	
31.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Forestry.	
31.01	Text Types and Purposes	
31.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
31.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
31.02	Production and Distribution of Writing	
31.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
31.02.2	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	
31.02.3	Use technology, including the Internet, to produce, publish, and update	

Florida Standards		Correlation to CTE Program Standard #
	individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
31.03 Research to Build and Present Knowledge		
31.03.1	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	
31.03.2	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	
31.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
31.04 Range of Writing		
31.04.1	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	
32.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Forestry.	
32.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
32.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
32.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
32.04	Model with mathematics. MAFS.K12.MP.4.1	
32.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
32.06	Attend to precision. MAFS.K12.MP.6.1	
32.07	Look for and make use of structure.	

Florida Standards	Correlation to CTE Program Standard #	
	MAFS.K12.MP.7.1	
32.08 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-LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
33.0 Apply forestry and natural resources safety--The student will be able to:			
33.01 Comply with Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) safety rules and regulations.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.N.1.1, SC.912.E.6.6	
33.02 Describe Florida's "Right-to-Know" law (as recorded in the Florida Statutes, Chapter 442).			
34.0 Operate, maintain, and repair machinery, equipment, and facilities according to forestry industry standards.--The student will be able to:			
34.01 Keep records of the maintenance and repair of equipment and machinery.		SC.912.N.1.1	
34.02 Prepare equipment for storage.		SC.912.N.1.1	
34.03 Maintain and repair facilities.		SC.912.N.1.1	
35.0 Identify the major ecosystems in Florida--The student will be able to:			
35.01 Define "ecosystem" and identify the major ecosystems in Florida.		SC.912.E.7.4, SC.912.N.1.1	
35.02 Identify common plant and animal species of the major ecosystems.		SC.912.E.7.4, SC.912.L.17.4	
35.03 Identify environmental factors affecting each ecosystem in Florida.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.E.7.4, SC.912.N.1.1 SC.912.L.17.4,16,17	
35.04 Identify habitats of the most threatened and endangered plant and animal species in Florida.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.E.7.4, SC.912.N.1.1, SC.912.L.17.4,17	
35.05 Identify the hydrologic cycle of and the major uses for water.		SC.912.E.7.1,8 SC.912.E.17.10	
36.0 Perform monitoring of water resources--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
36.01 Determine stream flow.	MAFS.912.A-CED.1.4 MAFS.912.G-GMD.1.3	SC.912.E.7.8, SC.912.P.12.2	
36.02 Monitor water levels of rivers, streams, ponds, and lakes.	MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7		
36.03 Identify and monitor erosion hazards and environmental quality.		SC.912.L.17.16, SC.912.N.1.1	
37.0 Assist in controlling and using fire in forests and other lands--The student will be able to:			
37.01 Identify the major causes of wildfire.		SC.912.N.1.1	
37.02 Assist in determining fire danger in forests and other lands.	MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7	SC.912.E.7.5	
37.03 Describe personal safety procedures for wildland fire fighters.			
37.04 Identify and describe the use of basic tools for wildland firefighting.		SC.912.N.1.1	
37.05 Explain the uses of prescribed burning in forestry, natural resources, and wildlife management.		SC.912.E.7.5	
37.06 Identify the different types of burning assistance that are available through agencies or vendors.		SC.912.N.1.1	
38.0 Assist in managing forest pests--The student will be able to:			
38.01 Identify common forest pests, insects, and diseases.		SC.912.N.1.1, SC.912.L.17.6	
38.02 Assist with common forest pest control.	MAFS.912.G-GMD.1.3	SC.912.L.17.6	
38.03 Assist with chemical, mechanical, and other controls of undesirable species.		SC.912.L.17.8	
39.0 Identify applicable local, state, and federal rules and regulations and assistance programs--The student will be able to:			
39.01 Locate applicable portions of comprehensive plans.			
39.02 Identify agencies affecting land and wildlife utilization.		SC.912.L.17.13,	
39.03 Identify agencies regulating employee/employer relations (e.g., the Occupational Safety and Health Administration [OSHA]).		SC.912.N.1.1	
39.04 Identify public- and private-assistance programs for private-land owners.		SC.912.L.17.13	
39.05 Describe applicable local, state, and federal rules and regulations.		SC.912.L.17.13	
40.0 Apply multi-use principles to forests and other lands--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
40.01 Assist in preparing a multi-use plan for forests and other lands.		SC.912.L.17.13,17	
41.0 Use aerial photographs and maps--The student will be able to:			
41.01 Use maps and aerial photographs for determining acreage.	MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7	SC.912.L.17.13	
41.02 Use aerial photographs to identify major timber types and land features.		SC.912.L.17.13	
42.0 Collect and test water samples--The student will be able to:			
42.01 Collect, store, and label water samples.		SC.912.N.1.1,4, SC.912.P.8.11	
43.0 Interpret soil survey data--The student will be able to:			
43.01 Apply soil survey information to silvicultural practices and environmental management.	MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9	SC.912.N.1.1,6	
44.0 Apply the principles of Best Management Practices (BMP)--The student will be able to:			
44.01 Define the terms used in Best Management Practices (BMP).		SC.912.L.18.12	
44.02 Determine erosion and slope coefficients, using the BMP manual.	MAFS.912.S.ID.3.7	SC.912.L.18.12	
44.03 Solve problems in land use, applying the principles found in the BMP manual.	MAFS.912.G-MG.1.1	SC.912.L.18.12 SC.912.N.1.1 SC.912.N.4.2	
45.0 Identify technological advances in the industry--The student will be able to:			
45.01 Identify satellite surveying operations and laser systems.		SC.912.N.1.1	
45.02 Identify satellite thermal infrared imagery.		SC.912.N.1.1	
45.03 Identify computer mapping systems and geographic information systems.		SC.912.N.1.1	
45.04 Use electronic communication devices.		SC.912.N.1.1	
45.05 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications.		SC.912.N.1.1	
45.06 Employ computer operations applications to access, create, manage, integrate, and store information.		SC.912.N.1.1	
45.07 Employ collaborative/groupware applications to facilitate group work.		SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
46.0 Identify wildlife population management practices--The student will be able to:			
46.01 Identify appropriate management practices for a wildlife habitat.		SC.912.L.15.13 SC.912.L.17.5,13,17	
46.02 Identify species of Florida's common wildlife (land and aquatic) and classify them as game, non-game, endangered, or threatened.		SC.912.N.1, SC.912.L.15.4,6,13, SC.912.L.17.5, 6,13,17	
47.0 Identify multi-use principles for forest and other lands--The student will be able to:			
47.01 Identify the different types of leases and their necessary components.		SC.912.N.1.1 SC.912.N.4.1, SC.912.L.17.12	
48.0 Apply basic financial management skills--The student will be able to:			
48.01 Calculate interest on loans.	MAFS.912.A-SSE.2.3		
48.02 Complete selected income tax return forms.			
49.0 Demonstrate leadership and management skills--The student will be able to:			
49.01 Demonstrate knowledge of how to make job changes appropriately.			
49.02 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.			
49.03 Describe the importance of a drug free workplace and the industry policies regarding drug use.			
49.04 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 issues that remain unresolved. LAFS.1112.RST.2.6	

Florida Standards		Correlation to CTE Program Standard #
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	
30.02	Production and Distribution of Writing	
30.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
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	

Florida Standards		Correlation to CTE Program Standard #
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	
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	

Florida Standards		Correlation to CTE Program Standard #
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-LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
50.0 Apply the principles of basic nursery operations--The student will be able to:			
50.01 Select the method of, and assist in, site preparation.			
50.02 Care for seedlings from the nursery to planting.			
50.03 Plant tree seedlings, using a hand or mechanical planter.			
50.04 Explain the requirements for reforestation.			
51.0 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	
51.01 Assist in selecting, planting, and transplanting trees in the urban landscape.			
51.02 Demonstrate proper tree pruning, trimming, and fertilization techniques.			
51.03 Describe the procedure for an urban tree inventory.			
51.04 Develop a vegetative plan for improving wildlife habitat in urban areas.			
51.05 Develop a plan for the basic maintenance of tree health.			
52.0 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	
52.01 Identify business liability and the use of liability insurance.			
52.02 Identify eligibility requirements for greenbelt, bluebelt, and homestead tax exemptions.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
52.03 Identify the characteristics of legal documents (such as contracts, deeds, and leases).			
53.0 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	
53.01 Identify basic silvicultural systems.			
53.02 Conduct a site evaluation.			
53.03 Select tree species according to the site evaluation.			
53.04 Explain the requirements for tree growth for effective forest management.			
53.05 Determine site quality and growth rate for a timber stand.			
53.06 Prepare a basic forest management plan, including cost and profit analyses.			
54.0 Prescribe burning for forest management--The student will be able to:		SC.912.E.7.5	
54.01 Develop a plan for a prescribed burning, including permits, maps, and descriptions of desirable burning conditions and fire lines.			
54.02 Prepare a smoke management plan.			
54.03 Describe the requirements for obtaining different types of burning authorization and the applicable restrictions.			
54.04 Prepare a sample prescribed burning authorization request using the phone or website.			
54.05 Explain the effects of fuel characteristics and weather factors on fire behavior.			
54.06 Identify the precautions to be followed in using fire as a management tool.			

Additional Information

Laboratory Activities

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

Extended Student Supervision

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

Career and Technical Student Organization (CTSO)

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

Additional Resources

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

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

Florida Department of Education
Curriculum Framework

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

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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	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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

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

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

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

Program Structure

This program is a planned sequence of instruction 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	Graduation Requirement
A	8106810	Agriscience Foundations 1	1 credit	37-1012	3	EQ
	8121510	Introductory Horticulture 2	1 credit		3	PA
	8121520	Horticulture Science 3	1 credit		3	PA
B	8121310	Landscape and Turf Science 4	1 credit	37-1012	2	VO
	8121320	Landscape and Turf Science 5	1 credit		2	VO
	8121330	Landscape Operations 6	1 credit		2	VO

Academic Alignment Table

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

This program is daggered and will not be aligned to academic courses.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Agriscience Foundations 1	14/67 21%	4/75 5%	8/54 15%	11/46 24%	11/45 24%	11/45 24%	11/45 24%

** 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.

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.

Flagged for Deletion

Florida Department of Education
Student Performance Standards

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

Course Description:

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

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

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	

Florida Standards		Correlation to CTE Program Standard #
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 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 Agritechnology.	
02.01 Text Types and Purposes		
02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	

Florida Standards		Correlation to CTE Program Standard #
02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
02.02	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 Agritechology.	
03.01	Make sense of problems and persevere in solving them.	

Florida Standards	Correlation to CTE Program Standard #
	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
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;	CS.10.02.01
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures--The student will be able to:		SC.912.L.14.6; SC.912.L.15.4;	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.06.03.01.a CS.07.04.01.c.
05.02 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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.03 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.07.04.01
05.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02. b ESS.04.05.01
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;	CS.07.03.01.c
06.01 Employ scientific measurement skills.			
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 CS.10.01.01.a
06.03 Identify the parts and functions of plant and animal cells.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		BS.02.02.01 ESS.01.01.02. b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.01.02.01.c AS.02.02.02.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.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		PS.01.02.01.b. AS.02.02.03.b
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4		CS.11.01.01 CS.11.02.01
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		BS.02.05.03.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	BS.01.01.03.a.
07.01 Research how different climactic and geological activity influences agriculture.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.02.06.09 CS.05.03.02
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
07.06 Identify conservation practices related to natural resources.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.b AS.08.01.01.c
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:		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;	PS.03.04.01.a
08.01 Identify and describe the specializations within the plant science	LAFS910.SL.1.1 LAFS.1112.SL.1.1		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
industry.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to industry and scientific standards.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc....	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.03.01 PS.01.03.02
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.02.03.01
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.02.03.04
08.07 Investigate the impacts of various pests and propose solutions for their control.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.01.03 PS.03.01.02
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.03.02 PS.03.03.03 PS.03.03.04
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		FPP01.01.01.a
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.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Analyze commercially important livestock breeds in Florida.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.02.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.01.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
09.04 Compare and contrast animal welfare issues.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		AS.02.01.02.a AS.05.02.01.a
09.05 Investigate the nature and properties of food, fiber, and by-products from 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.
09.06 Explore career opportunities in animal science.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
10.01 Select and demonstrate proper use of hand tools in agriculture.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		AS.06.02.01.a FPP01.01.01.a
10.02 Operate service and maintain agriscience equipment, and instruments.			AS.01.01.02.b.
10.03 Manage facilities and supplies.			
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			CS.08.01.01.b PST.02.02.02. b.
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		PST.03.04.01. b PST.03.03.02. a.
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		PST.04.04.03. a PST.04.04.06. a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.08.03.01.c PST.03.02.03.c PST.01.03.01. a.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
11.06 Demonstrate good listening skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.09.02.01.b CS.10.01.01.a.
12.0 Apply leadership and citizenship skills--The student will be able to:			CS.03.01.03.b.
12.01 Identify and describe leadership characteristics.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.02 Identify opportunities to apply acquired leadership skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.03 Identify and demonstrate ways to be an active citizen.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.04 Participate in community based learning activities.			
12.05 Demonstrate the ability to work cooperatively.			CS.01.06.01.a.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		CS.02.02.02.b.
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.05.02.c.
12.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.			
13.0 Discuss components of food safety and handling practices in agriculture - The student will be able to:			
13.01 Demonstrate proper safety precautions and use of personal protective equipment.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.02 Evaluate the food safety responsibilities that occur along the food supply chain.			
13.03 Explain techniques and procedures for the safe handling of food products.			
13.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
13.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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).	

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 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	
02.02	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 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	
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	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 Identify and classify plants – 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	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
15.01 Identify plants by scientific and common names.			PS.01.01.02.b PS.01.01.02.c
15.02 Classify plants botanically.			PS.01.01.01.c
15.03 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 to:		SC.912.L.18.12 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			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
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	
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	

Florida Standards		Correlation to CTE Program Standard #
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	
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	
24.02 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	
24.02.2	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.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 Landscape 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. MAFS.K12.MP.4.1	
25.05	Use appropriate tools strategically.	

Florida Standards	Correlation to CTE Program Standard #
	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.			
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
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.			
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
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.			
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

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	
24.02.3	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	
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	
25.02 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,	

Florida Standards		Correlation to CTE Program Standard #
	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	
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.	

Florida Standards	Correlation to CTE Program Standard #
	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.			
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	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		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

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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: 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

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	
48.01 Perform maintenance inspection of the project.			
48.02 Determine water requirements and apply at proper rates.			
48.03 Identify weeds and apply herbicides safely.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
48.04 Determine fertilization requirements and apply at proper rates.			
48.05 Identify plant pest and disease problems and apply corrective measures.			
48.06 Trim and prune landscape plants.			
48.07 Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash.			
48.08 Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.			
48.09 Cultivate and mulch plants.			
48.10 Brace and repair trees.			
48.11 Provide protection for plants from adverse weather conditions.			
48.12 Comply with local, state, and federal regulations regarding landscape maintenance and pesticide applications.			
48.13 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 that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

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. 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.

Additional Resources

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

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

Daggered for Deletion

Florida Department of Education
Curriculum Framework

Program Title: Sports and Recreational Turf Operations
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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	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)

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	Graduation Requirement
A	8106810	Agriscience Foundations 1	1 credit	37-1012	3	EQ
	8121510	Introductory Horticulture 2	1 credit		3	PA
	8121520	Horticulture Science 3	1 credit		3	PA
B	8121310	Landscape and Turf Science 4	1 credit	37-1012	2	VO
	8121320	Landscape and Turf Science 5	1 credit		2	VO
	8121410	Sports and Recreational Turf Operations 6	1 credit		2	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

This program is daggered and will not be aligned to academic courses.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Agriscience Foundations 1	14/67 21%	4/75 5%	8/54 15%	11/46 24%	11/45 24%	11/45 24%	11/45 24%

** 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.

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.

Flagged for Deletion

**Florida Department of Education
Student Performance Standards**

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

Course Description:

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

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

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	

Florida Standards		Correlation to CTE Program Standard #
	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 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 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	

Florida Standards		Correlation to CTE Program Standard #
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 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	

Florida Standards	Correlation to CTE Program Standard #
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

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;	CS.10.02.01
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures--The student will be able to:		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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.06.03.01.a CS.07.04.01.c.
05.02 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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.03 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.07.04.01
05.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02. b ESS.04.05.01
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;	CS.07.03.01.c
06.01 Employ scientific measurement skills.			
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 CS.10.01.01.a
06.03 Identify the parts and functions of plant and animal cells.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		BS.02.02.01 ESS.01.01.02. b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.01.02.01.c AS.02.02.02.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		PS.01.02.01.b. AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4		CS.11.01.01 CS.11.02.01
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		BS.02.05.03.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	BS.01.01.03.a.
07.01 Research how different climactic and geological activity influences agriculture.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.02.06.09 CS.05.03.02
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
07.06 Identify conservation practices related to natural resources.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.b AS.08.01.01.c
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:		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;	PS.03.04.01.a
08.01 Identify and describe the specializations within the plant science industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to	LAFS.910.W.2.4 LAFS.1112.W.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
industry and scientific standards.			
08.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc....	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.03.01 PS.01.03.02
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.02.03.01
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.02.03.04
08.07 Investigate the impacts of various pests and propose solutions for their control.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.01.03 PS.03.01.02
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.03.02 PS.03.03.03 PS.03.03.04
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		FPP01.01.01.a
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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Analyze commercially important livestock breeds in Florida.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.02.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.01.c
09.04 Compare and contrast animal welfare issues.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4		AS.02.01.02.a AS.05.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.SL.2.4		
09.05 Investigate the nature and properties of food, fiber, and by-products from 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.
09.06 Explore career opportunities in animal science.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
10.01 Select and demonstrate proper use of hand tools in agriculture.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		AS.06.02.01.a FPP01.01.01.a
10.02 Operate service and maintain agriscience equipment, and instruments.			AS.01.01.02.b.
10.03 Manage facilities and supplies.			
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			CS.08.01.01.b PST.02.02.02. b.
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		PST.03.04.01. b PST.03.03.02. a.
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		PST.04.04.03. a PST.04.04.06. a
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.08.03.01.c PST.03.02.03.c .

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			PST.01.03.01.a.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
11.06 Demonstrate good listening skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.09.02.01.b CS.10.01.01.a.
12.0 Apply leadership and citizenship skills--The student will be able to:			CS.03.01.03.b.
12.01 Identify and describe leadership characteristics.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.02 Identify opportunities to apply acquired leadership skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.03 Identify and demonstrate ways to be an active citizen.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.04 Participate in community based learning activities.			
12.05 Demonstrate the ability to work cooperatively.			CS.01.06.01.a.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		CS.02.02.02.b.
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.05.02.c.
12.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.			
13.0 Discuss components of food safety and handling practices in agriculture - The student will be able to:			
13.01 Demonstrate proper safety precautions and use of personal protective equipment.			
13.02 Evaluate the food safety responsibilities that occur along the food supply chain.			
13.03 Explain techniques and procedures for the safe handling of food products.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
13.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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).	

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 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	
02.02	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 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	
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	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 Identify and classify plants – 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	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
15.01 Identify plants by scientific and common names.			PS.01.01.02.b PS.01.01.02.c
15.02 Classify plants botanically.			PS.01.01.01.c
15.03 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 to:		SC.912.L.18.12 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			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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	
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	

Florida Standards		Correlation to CTE Program Standard #
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	
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	
24.02 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	
24.02.2	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.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 Sports and Recreational Turf 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. MAFS.K12.MP.4.1	
25.05	Use appropriate tools strategically.	

Florida Standards	Correlation to CTE Program Standard #
	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.			
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			
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

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	
24.02 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	
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	

Florida Standards		Correlation to CTE Program Standard #
	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 Sports and Recreational Turf 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. MAFS.K12.MP.4.1	
25.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	

Florida Standards	Correlation to CTE Program Standard #
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
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.			
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	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
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.			

Daggered for Deletion

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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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:

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.N.2.4, 5	
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 that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students

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. 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.

Additional Resources

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

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

Daggered for Deletion

**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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

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

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

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

Program Structure

This program is a planned sequence of instruction 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	Graduation Requirement
A	8106810	Agriscience Foundations 1	1 credit	37-1012	3	EQ
	8121510	Introductory Horticulture 2	1 credit		3	PA
	8121520	Horticulture Science 3	1 credit		3	PA
B	8121610	Horticulture Science and Services 4	1 credit	19-1013	2	VO
	8121620	Horticulture Science and Services 5	1 credit		2	VO
	8121630	Horticulture Science and Services 6	1 credit		2	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth- Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Agriscience Foundations 1	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%
Introductory Horticulture 2	4/87 5%	5/80 6%	39/83 47%	6/69 7%	24/67 39%	9/70 13%	7/69 10%	38/82 46%	7/66 11%	28/74 38%	4/72 6%
Horticulture Science 3	26/87 30%	23/80 29%	19/83 23%	26/69 38%	4/67 6%	30/70 43%	26/69 38%	18/82 22%	24/66 36%	9/74 12%	21/72 29%
Horticulture Science and Services 4	23/87 26%	23/80 29%	14/83 17%	25/69 26%	3/67 4%	23/70 33%	29/69 38%	11/82 13%	20/66 30%	6/74 8%	22/72 31%
Horticulture Science and Services 5	3/87 3%	6/80 7%	15/83 18%	7/69 10%	4/67 6%	10/70 14%	9/69 13%	13/82 16%	9/66 14%	8/74 11%	4/72 6%
Horticulture Science and Services 6	1/87 1%	7/80 9%	5/83 6%	6/69 7%	5/67 7%	8/70 11%	2/69 0%	5/82 6%	7/66 11%	10/74 14%	7/72 10%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Agriscience Foundations 1	14/67 21%	4/75 5%	8/54 15%	11/46 24%	11/45 24%	11/45 24%	11/45 24%
Introductory Horticulture 2	**	**	**	**	**	**	**
Horticulture Science 3	**	**	**	**	**	**	**
Landscape and Turf Science 4	**	**	**	**	**	**	**
Landscape and Turf Science 5	**	**	**	**	**	**	**
Sports & Recreational Turf Operations 6	**	**	**	**	**	**	**

** 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.

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 Discuss components of food safety and handling practices in agriculture.
- 14.0 Describe the horticulture industry.
- 15.0 Identify safety procedures in the workplace.
- 16.0 Identify and classify plants.
- 17.0 Demonstrate plant propagation techniques.
- 18.0 Identify growing media and fertilizers.
- 19.0 Explain irrigation techniques for plants and turf.
- 20.0 Describe Integrated Pest Management approaches.
- 21.0 Describe the principles and requirements of plant growth.
- 22.0 Apply best management practices in the horticulture industry.
- 23.0 Identify principles of landscape design.
- 24.0 Describe varieties and care of indoor plants.
- 25.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Horticulture Science and Services.
- 26.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Horticulture Science and Services.
- 27.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services.
- 28.0 Apply safety procedures in the workplace.
- 29.0 Classify plants based on scientific principles.
- 30.0 Demonstrate proper use of growing media and fertilizers
- 31.0 Demonstrate Integrated Pest Management approaches.

- 32.0 Identify the principles and requirements of plant growth.
- 33.0 Apply best management practices in landscape design.
- 34.0 Demonstrate customer service skills that are essential in dealing with clients.
- 35.0 Apply principles of landscape design and maintenance.
- 36.0 Harvest, transport, and install plant materials.
- 37.0 Identify procedures to operate, repair, and maintain tools and equipment.
- 38.0 Identify emerging technologies in the horticulture industry.
- 39.0 Demonstrate leadership, employability, communications and human relations skills.
- 40.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling
- 41.0 Propagate plants.
- 42.0 Operate, repair, and maintain tools and equipment.
- 43.0 Prepare growing media.
- 44.0 Irrigate plants.
- 45.0 Maintain and analyze records
- 46.0 Apply proper fertilizer application components.
- 47.0 Classify plants.
- 48.0 Irrigate plants using an irrigation system.
- 49.0 Maintain and analyze financial records. .
- 50.0 Fertilize plant material.
- 51.0 Control Pests.
- 52.0 Operate tools and equipment.
- 53.0 Maintain irrigation systems.
- 54.0 Maintain and analyze production records.
- 55.0 Manage and use fertilization schedules.
- 56.0 Use a pest control system

**Florida Department of Education
Student Performance Standards**

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

Course Description:

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

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

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 Sciences & 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	

Florida Standards		Correlation to CTE Program Standard #
	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 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 Horticulture Sciences & 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	

Florida Standards		Correlation to CTE Program Standard #
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 Horticulture Sciences & 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	

Florida Standards		Correlation to CTE Program Standard #
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 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;	CS.10.02.01
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures--The student will be able to:		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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.06.03.01.a CS.07.04.01.c.
05.02 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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.03 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.07.04.01
05.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02. b ESS.04.05.01
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;	CS.07.03.01.c
06.01 Employ scientific measurement skills.			
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 CS.10.01.01.a
06.03 Identify the parts and functions of plant and animal cells.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		BS.02.02.01 ESS.01.01.02. b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.01.02.01.c AS.02.02.02.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		PS.01.02.01.b. AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4		CS.11.01.01 CS.11.02.01
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		BS.02.05.03.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	BS.01.01.03.a.
07.01 Research how different climactic and geological activity influences agriculture.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.02.06.09 CS.05.03.02
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
07.06 Identify conservation practices related to natural resources.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.b AS.08.01.01.c
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:		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;	PS.03.04.01.a
08.01 Identify and describe the specializations within the plant science industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to	LAFS.910.W.2.4 LAFS.1112.W.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
industry and scientific standards.			
08.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc....	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.03.01 PS.01.03.02
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.02.03.01
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.02.03.04
08.07 Investigate the impacts of various pests and propose solutions for their control.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.01.03 PS.03.01.02
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.03.02 PS.03.03.03 PS.03.03.04
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		FPP01.01.01.a
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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Analyze commercially important livestock breeds in Florida.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.02.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.01.c
09.04 Compare and contrast animal welfare issues.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4		AS.02.01.02.a AS.05.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.SL.2.4		
09.05 Investigate the nature and properties of food, fiber, and by-products from 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.
09.06 Explore career opportunities in animal science.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
10.01 Select and demonstrate proper use of hand tools in agriculture.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		AS.06.02.01.a FPP01.01.01.a
10.02 Operate service and maintain agriscience equipment, and instruments.			AS.01.01.02.b.
10.03 Manage facilities and supplies.			
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			CS.08.01.01.b PST.02.02.02. b.
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		PST.03.04.01. b PST.03.03.02. a.
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		PST.04.04.03. a PST.04.04.06. a
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.08.03.01.c PST.03.02.03.c .

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			PST.01.03.01.a.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
11.06 Demonstrate good listening skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.09.02.01.b CS.10.01.01.a.
12.0 Apply leadership and citizenship skills--The student will be able to:			CS.03.01.03.b.
12.01 Identify and describe leadership characteristics.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.02 Identify opportunities to apply acquired leadership skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.03 Identify and demonstrate ways to be an active citizen.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.04 Participate in community based learning activities.			
12.05 Demonstrate the ability to work cooperatively.			CS.01.06.01.a.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		CS.02.02.02.b.
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.05.02.c.
12.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.			
13.0 Discuss components of food safety and handling practices in agriculture - The student will be able to:			
13.01 Demonstrate proper safety precautions and use of personal protective equipment.			
13.02 Evaluate the food safety responsibilities that occur along the food supply chain.			
13.03 Explain techniques and procedures for the safe handling of food products.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
13.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			

**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	
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 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	
02.02 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 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	
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
14.0 Describe the horticulture industry – the student will be able to:			
14.01 Describe the importance of horticulture to the American and global economies.			
14.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers.			
14.03 Describe Florida laws and regulation as they apply to the horticulture industry.			
14.04 Describe the importance of horticulture to the environment, including sustainability practices			
15.0 Identify safety procedures in the workplace – the student will be able to:		SC.912.L.17.14, 17	
15.01 Identify the common causes of accidents in the horticulture industry.			
15.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry.			
15.03 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.			
16.0 Identify and classify plants – 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	
16.01 Identify plants by botanical and common names.			PS.01.01.02.b PS.01.01.02.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.02 Classify plants botanically.			PS.01.01.01.c
16.03 Write botanical names for plants.			
17.0 Demonstrate plant propagation techniques – the student will be able to:		SC.912.L.14.7, 8 SC.912.L.16.3, 12, 14, 16	
17.01 Identify propagating and growing facilities and structures.			
17.02 Prepare propagation media.			PS.02.02.01.c
17.03 Select and collect propagation materials.			
17.04 Demonstrate propagation by sexual and asexual methods.			PS.03.01.02.a PS.03.01.03.a
17.05 Demonstrate environmental controls for propagation materials.			
17.06 Identify and select proper rooting hormones based on plant characteristics.			
18.0 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	
18.01 Identify soil and media materials and appropriate containers.			PS.02.02.01.b
18.02 Identify nutritional needs of plants.			PS.02.03.01.a
18.03 Identify symptoms of nutritional deficiencies and toxicities of plants.			PS.02.03.01.b
18.04 Identify types and kinds of fertilizers.			
18.05 Identify methods of distributing fertilizers.			PS.02.03.04.a
18.06 Interpret information on a label of fertilizer used in Florida.			
19.0 Explain irrigation techniques for plants and turf – the student will be able to:		SC.912.L.18.12 SC.912.E.7.1	
19.01 Identify water needs of plants.			
19.02 Irrigate plants at recommended rates.			
19.03 Identify the symptoms of excessive water and water stress in plants.			
19.04 Describe the basic irrigation systems and principles used in the			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
landscape and nursery.				
20.0	Describe Integrated Pest Management approaches – the student will be able to:		SC.912.L.14.9	
20.01	Identify common pests and pathogens of plants.			PS.03.03.01.a
20.02	Describe life cycles of common pests and pathogens of plants.			PS.03.03.02.c PS.03.03.02.b
20.03	Recognize signs of damage from pests and pathogens.			PS.03.03.02.a
21.0	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	
21.01	Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis and respiration.			PS.01.03.01.b
21.02	Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature.			PS.01.03.01.c
21.03	Explain the process of respiration and transpiration and describe the flow of energy in plants.			PS.01.03.02.b PS.01.03.02.c
21.04	Describe the influence of light and temperature on plant growth including phototropism.			PS.01.03.04.b
22.0	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	
22.01	Identify and apply Best Management Practices to reduce pollution and conserve water.			
22.02	Identify and apply Best Management Practices on fertilizer recommendations for Florida plants including turf.			
22.03	Explain the concept of nonpoint source pollution, and the watershed environment.			
23.0	Identify principles of landscape design – the student will be able to:		SC.912.L.17.17	
23.01	Conduct a customer interview to determine needs and personal tastes of client.			
23.02	Compare and contrast the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
23.03	Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.01.a
23.04	Identify points of emphasis and major design areas in the residential landscape.			PS.04.01.01.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
23.05 Identify plant selection for a residential landscape using Florida Friendly Landscape Principles.			
23.06 Read and interpret a landscape plan.			
23.07 Develop skills for drawing and identifying symbols.			
23.08 Draw and design a landscape plan for a small garden.			
23.09 Construct a landscape display.			
24.0 Describe varieties and care of indoor plants – the students should be able to:			
24.01 Identify common indoor plants			
24.02 Describe the lighting and environmental needs of indoor plants.			
24.03 Describe water, cleaning, and fertilizations needs for plants used indoors.			
24.04 Describe the most common problems with indoor foliage including pathogens, pests, and cultural damage.			
24.05 Analyze the air quality benefits of indoor plants.			

**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 #
25.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Horticulture Science and Services.	
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 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	
25.03	Integration of Knowledge and Ideas	
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. LAFS.1112.RST.3.7	
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. LAFS.1112.RST.3.8	
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. LAFS.1112.RST.3.9	
25.04	Range of Reading and Level of Text Complexity	
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.	
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. LAFS.1112.RST.4.10	
26.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Horticulture Science and Services.	
26.01	Text Types and Purposes	
26.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
26.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
26.02	Production and Distribution of Writing	
26.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
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	

Florida Standards		Correlation to CTE Program Standard #
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	
26.03 Research to Build and Present Knowledge		
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	
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	
26.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
26.04 Range of Writing		
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	
27.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Horticulture Science and Services.	
27.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
27.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
27.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
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	

Florida Standards	Correlation to CTE Program Standard #
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	National Standards
28.0 Apply safety procedures in the workplace – the student will be able to:			
28.01 Describe emergency procedures in the horticulture workplace.			
28.02 Create preventive measures to avoid hazardous situations.			
28.03 Identify appropriate PPE (Personal Protective Equipment) for all activities.			
28.04 Use MSDS for all materials used.			
28.05 Identify specific hazards with industry specific equipment, and conduct equipment care and maintenance.			
28.06 Apply problem solving skills to correct a hazardous situation.			
29.0 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	
29.01 Describe principles of plant biology and growth.			PS.01.03.03.c
29.02 Explain the role of plants in the ecosystem.			
29.03 Describe the major classifications of plants based on life cycle.			PS.01.01.01.c
29.04 Demonstrate the use of botanical and common names of plants including genus and specific epithet and cultivar.			
29.05 Demonstrate proper use of botanical names.			
30.0 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	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.P.8.5, 7, 11	
30.01 Apply information on a label of fertilizer, including updated BMP rules, used in Florida.			
30.02 Apply fertilizer and soil amendments.			Ps.02.03.04.b PS.02.03.04.c
30.03 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
30.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.			
30.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.			PS.02.03.01.a
30.06 Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.			
31.0 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	
31.01 Classify insects according to feeding habits.			
31.02 Describe IMP (Integrated Pest Management) methods of controlling plant pests.			PS.03.03.03.a
31.03 Diagnose and outline a plan for controlling pests on a horticultural crop.			PS.03.03.02.c
31.04 Describe methods of controlling nematode pests on ornamental plants, and use BMPs to prevent infestation..			
31.05 Develop a pest control program for a horticultural crop using Integrated Pest Management.			
31.06 Identify specific cultural, mechanical, chemical, and biological methods of weed management.			
31.07 Identify evasive and poisonous plants in Florida.			
31.08 Identify types of weeds common to Florida.			
32.0 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	
32.01 Demonstrate methods of pruning plants.			
32.02 Identify appropriate time to prune plants.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
32.03 Identify and select pruning tools.			
32.04 Demonstrate proper use of pruning tools and care.			
32.05 Demonstrate sanitation of tools to prevent the spread of disease.			
32.06 Identify Plant Growth Regulators and their use on horticulture and landscape plants.			PS.01.03.04.a
32.07 Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.			
32.08 Identify appropriate pruning techniques to achieve plant size, form, and shape.			
33.0 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	
33.01 Identify and apply Best Management Practices for the design and installation of landscapes.			
33.02 Identify and apply Best Management Practices on the management and handling of pesticides.			PS.03.03.04.b
34.0 Demonstrate customer service skills that are essential in dealing with clients.- the student will be able to:			
34.01 Demonstrate ability to communicate clearly with the client.			
34.02 Conduct a walk through and interview with client to assure clear vision.			
34.03 Identify future expectations of the client relationship.			
35.0 Apply principles of landscape design and maintenance – the student will be able to:		SC.912.L.17.17	
35.01 Demonstrate the use of line, form, texture and color in designing landscapes.			PS.04.01.01.b
35.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.			PS.04.01.02.b
35.03 Apply points of emphasis and major design areas in the commercial landscape.			
35.04 Identify plant selection for a commercial and residential landscape using Florida Friendly Landscape Principles.			
35.05 Create a landscape plan for a residential or commercial property.			PS.04.01.02.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
35.06 Calculate materials needed according to the identified landscape plan.			PS.04.01.01.c
35.07 Identify factors in selecting turf for landscape installation.			
36.0 Harvest, transport, and install plant materials – the student will be able to:		SC.912.L.17.4, 15, 17	
36.01 Determine requirements for preserving plant viability.			
36.02 Demonstrate proper landscape plant establishment techniques.			
36.03 Select and prepare plants for transporting and transplanting.			
36.04 Select horticultural products according to Florida grades and standards.			PS.03.05.04.b
37.0 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	
37.01 Perform equipment pre-operational check.			
37.02 Identify, maintain, and operate hand tools and power tools.			PS.03.05.01.c
38.0 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	
38.01 Investigate DNA and genetic applications in horticulture including the theory of probability.			PS.03.01.05
38.02 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
38.03 Investigate ways that GIS, Remote sensing, and precision agriculture, and UAV (Unmanned Aerial Vehicles) are used in the Horticulture industry.			
39.0 Demonstrate leadership, employability, communications and human relations skills – the student will be able to:		SC.912.N.1.7	
39.01 Identify appropriate work habits and personal characteristics.			
39.02 Identify proper employee hygiene habits.			
39.03 Identify or demonstrate appropriate responses to criticism from employer,			
39.04 Describe the importance of employee industry certifications.			
39.05 Discuss education opportunities available in the area of Horticulture.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
40.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling. – the student will be able to:			
40.01 Demonstrate proper customer communication techniques.			
40.02 Determine your products pricing structure.			
40.03 Discuss components of customer satisfaction.			

**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 #
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 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 Horticulture 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	
24.02	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	
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	

Florida Standards		Correlation to CTE Program Standard #
	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 Horticulture 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	
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.	

Florida Standards	Correlation to CTE Program Standard #
	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
41.0 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	
41.01 Prepare propagation materials (seeds, cuttings, etc.) for planting.			PS.03.01.03.a
41.02 Discuss cultural requirements for propagations including temperature, light, and moisture.			
41.03 Demonstrate sanitation and safety practices when propagating.			
42.0 Operate, repair, and maintain tools and equipment – the student will be able to:		SC.912.N.1.1	
42.01 Identify, operate, and maintain tractor and power equipment.			
43.0 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
43.01 Sterilize rooting, potting, and growing media.			
43.02 Adjust pH and nutritional levels of media.			PS.02.03.02.c
43.03 Fill and level benches and pots with media.			
43.04 Demonstrate sanitation practices when handling and storing plant media materials.			
44.0 Irrigate plants – the student will be able to:		SC.912.E.7.1 SC.912.N.1.1	
44.01 Identify the components of irrigation systems.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
44.02 Design an irrigation system for a propagation area.			
44.03 Design an irrigation system for a growing structure.			
44.04 Design an irrigation system for a retail display.			
44.05 Design a microirrigation system			
44.06 List problems associated with improper design, installation, and maintenance.			
44.07 Explain and apply Best Management Practices as they apply to irrigation.			
44.08 Apply general knowledge of appropriate state laws to irrigation practices.			
45.0 Maintain and analyze records – the student will be able to:	MAFS.912.S-IC.2	SC.912.N.1.1	
45.01 Create a plant and inventory supply list.			
45.02 Maintain current plant and supply inventory.			
45.03 Maintain job records, daily log sheets, and inventory.			
45.04 Calculate labor costs involved with product pricing.			
46.0 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	
46.01 Determine proper application based on characteristics of plant species.			PS.02.03.04.a
46.02 Examine how fertilizer application affects the water bodies in Florida..			

**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
47.0 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	
47.01 Identify plants appropriate to a region.			
47.02 Classify plants according to growth habit.			
47.03 Supply growth stimulants to propagation materials			
47.04 Prepare flats and seedbeds and plant seeds.			
48.0 Irrigate plants using an irrigation system – the student will be able to:		SC.912.N.1.1 SC.912.N.2.4	
48.01 Use various types of irrigation systems (low volume, ebb and flow, drip, mat, re-circulating, etc.).			
49.0 Maintain and analyze records – the student will be able to:		SC.912.N.1.1 SC.912.N.2.4	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
49.01 Prepare and maintain financial records.			
50.0 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	
50.01 Collect soil and leaf tissue samples for analysis.			PS.02.03.03.a
50.02 Demonstrate proper handling and storage of fertilizers, observing safety precautions.			
50.03 Evaluate, operate, and maintain fertilizer distribution equipment.			
50.04 Create fertilizer schedule and/ or record of applications.			PS.02.03.03.c
51.0 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 Conduct a scouting in a nursery or landscape setting.			
43.02 Report insect and disease damage.			PS.03.03.02.a
43.03 Describe the differences between common and exotic pests.			
43.04 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
52.0 Operate 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	
52.01 Load, secure, and transport equipment.			
53.0 Maintain irrigation systems– the student will be able to:		SC.912.N.1.1 SC.912.N.2.4	
53.01 Maintain and repair an irrigation system.			
53.02 Assemble a drip/mist irrigation system for an ornamental crop.			
54.0 Maintain and analyze production records – the student will be able to:		SC.912.N.1.1 SC.912.N.2.4	
54.01 Analyze and maintain production and sales records.			
54.02 Determine plant production costs.			
54.03 Prepare a budget.			
55.0 Manage and use fertilization schedules – 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	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.P.8.11 SC.912.P.12.12	
55.01 Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.			
55.02 Develop a fertilization schedule for various plant species.			
55.03 Calculate rates of fertilizer application for turf, ornamental plants, and palms.			
56.0 Use a pest control system – 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	
56.01 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.			
56.02 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.			

Additional Information

Laboratory Activities

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

Extended Student Supervision

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

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization 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. 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.

Additional Resources

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

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

**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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

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

The content includes but is not limited to 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	Graduation Requirement
A	8106810	Agriscience Foundations 1	1 credit	35-1012	3	EQ
	8129210	Food Science Applications 2	1 credit		2	PA
	8129220	Food Science Applications 3	1 credit	19-1012	2	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Ag. Foundations	29/87 33%	18/80 23%	55/83 66%	11/69 16%	36/67 54%	30/70 42%	20/69 29%	49/82 60%	25/66 38%	38/74 51%	12/72 16%
Food Science Applications 2	6/87 7%	5/80 6%	25/83 30%	4/69 6%	22/67 33%	5/70 7%	6/69 9%	23/82 28%	7/66 11%	21/74 28%	4/72 6%
Food Science Applications 3	27/87 31%	28/80 35%	8/83 10%	30/69 43%	6/67 9%	26/70 37%	24/69 35%	10/82 12%	24/66 36%	11/74 15%	27/72 38%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Agriscience Foundations 1	14/67 21%	4/75 5%	8/54 15%	11/46 24%	11/45 24%	11/45 24%	11/45 24%
Food Science Applications 2	6/67 9%	7/75 9%	**	**	**	**	**
Food Science Applications 3	13/67 19%	13/75 17%	**	**	**	**	**

** 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.

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 Discuss components of food safety and handling practices in agriculture.
- 14.0 Evaluate the significance and implications of changes and trends in the food products and processing industry.
- 15.0 Analyze the dangers of food hazards.
- 16.0 Apply safety and sanitation procedures in the handling, processing and storing of food products.
- 17.0 Discuss the role of regulatory agencies in the food industry.
- 18.0 Manage operational procedures and create equipment and facility maintenance plans.
- 19.0 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.
- 20.0 Demonstrate worker safety procedures with food product and processing equipment and facilities.
- 21.0 Describe the biological composition and processing of foods.
- 22.0 Summarize the procedures for food service operations.
- 23.0 Explain the daily operations of a food service facility.
- 24.0 Demonstrate leadership, employability, communications and human relations skills.
- 25.0 Write lab reports to record, interpret and evaluate data
- 26.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy
- 27.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 28.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Food Science Applications.
- 29.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Food Science Applications.
- 30.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Food Science Applications.
- 31.0 Utilize harvesting, selection and inspection techniques to obtain quality food products for processing.

- 32.0 Describe how proteins, carbohydrates, lipids, vitamins and minerals are digested and how food preparation impacts nutritional value and quality.
- 33.0 Describe the chemical composition and processing of foods.
- 34.0 Describe the physical composition and processing of foods.
- 35.0 Evaluate, grade and classify processed food products.
- 36.0 Identify the importance of raw agricultural products to the food science industry.
- 37.0 Apply principles of science to food processing to provide a safe, wholesome and nutritious food supply.
- 38.0 Process, preserve, package and present food and food products for sale and distribution.
- 39.0 Explain the process of food product development.
- 40.0 Analyze the components of the marketing chain.
- 41.0 Explain the process of food product development.
- 42.0 Discuss food production distribution.
- 43.0 Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry.
- 44.0 Describe the economic and cultural impact of a global food market.
- 45.0 Discuss environmental issues impacting the production and processing of foods.
- 46.0 Write lab reports to record, interpret and evaluate data.
- 47.0 Explain the components of the American business system.
- 48.0 Investigate agricultural cooperatives structure and function.
- 49.0 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.

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

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.	
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	

Florida Standards		Correlation to CTE Program Standard #
	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 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 Food Science.		
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	

Florida Standards		Correlation to CTE Program Standard #
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 Food Science.	
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	

Florida Standards		Correlation to CTE Program Standard #
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

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;	CS.10.02.01
04.01 Investigate the origin and history of agriculture and its relationship to science and technology.	LAFS.910.W.3.7 LAFS.1112.W.3.7		
04.02 Analyze the impact of agriculture on the local, state, national and global economy.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
04.03 Identify significant career patterns/shifts in the history of the agricultural industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
04.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
05.0 Practice agriscience safety skills and procedures--The student will be able to:		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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.06.03.01.a CS.07.04.01.c.
05.02 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.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		FPP.01.02.01. a FPP.02.01.01. a FPP.02.02.02. a FPP.02.03
05.03 Identify proper disposal of hazardous waste materials and biohazards.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		CS.07.04.01
05.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		ESS.04.02.02. b ESS.04.05.01
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;	CS.07.03.01.c
06.01 Employ scientific measurement skills.			
06.02 Demonstrate safe and effective use of common laboratory equipment.			BS.02.02.01 CS.10.01.01.a
06.03 Identify the parts and functions of plant and animal cells.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		BS.02.02.01 ESS.01.01.02. b
06.04 Describe the phases of cell reproduction.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1		PS.01.02.01.c AS.02.02.02.b
06.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8		PS.01.02.01.b. AS.02.02.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.06 Interpret, analyze, and report data.	LAFS.910.W.2.4 LAFS.1112.W.2.4		CS.11.01.01 CS.11.02.01
06.07 Investigate DNA and genetics applications in agriscience including the theory of probability.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
06.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).	LAFS.910.W.3.7 LAFS.1112.W.3.7		BS.02.05.03.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	BS.01.01.03.a.
07.01 Research how different climactic and geological activity influences agriculture.	LAFS.910.W.3.8 LAFS.1112.W.3.8		
07.02 Describe various ecosystems as they relate to the agriculture industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.02.06.09 CS.05.03.02
07.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		NRS.01.01.02.
07.04 Identify regulatory agencies that impact agricultural practices.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6		PS.03.02.04.c PS.02.01.01.a PS.02.02.02.c
07.05 Apply Best Management Practices that enhance the natural environment.	LAFS.910.W.2.4 LAFS.1112.W.2.4		
07.06 Identify conservation practices related to natural resources.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		PS.03.04.01.b AS.08.01.01.c
08.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:		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;	PS.03.04.01.a
08.01 Identify and describe the specializations within the plant science industry.	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
08.02 Categorize plants based on specific characteristics according to	LAFS.910.W.2.4 LAFS.1112.W.2.4		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
industry and scientific standards.			
08.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc....	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.01.01.c.
08.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.01.03.01 PS.01.03.02
08.05 Analyze information from a fertilizer label.	LAFS.910.RI.1.1 LAFS.1112.RI.1.1		PS.02.03.01
08.06 Propagate and grow plants through sexual and/or asexual reproduction.			PS.02.03.04
08.07 Investigate the impacts of various pests and propose solutions for their control.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.01.03 PS.03.01.02
08.08 Investigate the nature and properties of food, fiber, and by-products from plants.	LAFS.910.W.2.4 LAFS.1112.W.2.4		PS.03.03.02 PS.03.03.03 PS.03.03.04
08.09 Explore career opportunities in plant science.	LAFS.910.W.3.7 LAFS.1112.W.3.7		FPP01.01.01.a
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.	LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4		
09.02 Analyze commercially important livestock breeds in Florida.	LAFS.910.W.2.4 LAFS.1112.W.2.4		AS.02.01.02.c
09.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.	LAFS.910.L.3.6 LAFS.1112.L.3.6		AS.02.01.01.c
09.04 Compare and contrast animal welfare issues.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4		AS.02.01.02.a AS.05.02.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	LAFS.1112.SL.2.4		
09.05 Investigate the nature and properties of food, fiber, and by-products from 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.
09.06 Explore career opportunities in animal science.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		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
10.0 Demonstrate the use of agriscience tools, equipment, and instruments-- The student will be able to		SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9;	AS.06.01.02.a AS.06.01.02.b AS.06.01.02.c
10.01 Select and demonstrate proper use of hand tools in agriculture.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		AS.06.02.01.a FPP01.01.01.a
10.02 Operate service and maintain agriscience equipment, and instruments.			AS.01.01.02.b.
10.03 Manage facilities and supplies.			
11.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:			CS.08.01.01.b PST.02.02.02. b.
11.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).	LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4		PST.03.04.01. b PST.03.03.02. a.
11.02 Utilize a record keeping system to collect, interpret, and analyze data.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		PST.04.04.03. a PST.04.04.06. a
11.03 Enhance oral communications through telephone, interview and presentation skills.	LAFS.910.SL.2.6 LAFS.1112.SL.2.6		CS.08.03.01.c PST.03.02.03.c .

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
			PST.01.03.01.a.
11.04 Enhance written communication by developing resumes and business letters.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2		
11.05 Demonstrate interpersonal (nonverbal) communication skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		
11.06 Demonstrate good listening skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.09.02.01.b CS.10.01.01.a.
12.0 Apply leadership and citizenship skills--The student will be able to:			CS.03.01.03.b.
12.01 Identify and describe leadership characteristics.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.02 Identify opportunities to apply acquired leadership skills.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.03.01.01 CS.03.01.02
12.03 Identify and demonstrate ways to be an active citizen.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.02.02
12.04 Participate in community based learning activities.			
12.05 Demonstrate the ability to work cooperatively.			CS.01.06.01.a.
12.06 Conduct formal and informal meetings using correct parliamentary procedure skills.	LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6		CS.02.02.02.b.
12.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.	LAFS910.SL.1.1 LAFS.1112.SL.1.1		CS.01.05.02.c.
12.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks.			
13.0 Discuss components of food safety and handling practices in agriculture - The student will be able to:			
13.01 Demonstrate proper safety precautions and use of personal protective equipment.			
13.02 Evaluate the food safety responsibilities that occur along the food supply chain.			
13.03 Explain techniques and procedures for the safe handling of food products.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
13.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).			
13.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.			

**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). 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 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	
02.02 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.	

Florida Standards		Correlation to CTE Program Standard #
	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	
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.	

Florida Standards	Correlation to CTE Program Standard #
	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-LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
14.0 Evaluate the significance and implications of changes and trends in the food products and processing industry – the student will be able to:			
14.01 Discuss the history and describe and explain the components. (e.g., processing, distribution, byproducts) of the food products and processing industry.)			FPP.01.01.01.a
14.02 Evaluate changes and trends in the food products and processing industry.		SC.912.N.1.1	FPP.01.01.01.b
14.03 Predict trends and implications in the food products and processing industry.		SC.912.N.1.1	FPP.01.01.01.c
14.04 Identify and explain environmental and safety concerns about the food supply.		SC.912.L.17.20	FPP.01.01.02.a
14.05 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).		SC.912.L.16.10 SC.912.L.17.20 SC.912.L.14.6	FPP.01.01.02.b
14.06 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.		SC.912.N.1.1	FPP.01.01.02.c
15.0 Analyze the dangers of food hazards – the student will be able to:			
15.01 Explain types of biological hazards.		SC.912.L.14.6	FPP.02.02.01.a
15.02 Explain types of chemical hazards.		SC.912.L.14.6	FPP.02.02.01.a
15.03 Explain types of physical hazards.		SC.912.L.14.6	FPP.02.02.01.a
15.04 Identify the roles food allergens play in food safety.		SC.912.L.14.6	FPP.02.02.01.b
16.0 Apply safety and sanitation procedures in the handling, processing and storing of food products – the student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
16.01 <i>Explain techniques and procedures for the safe handling of food products.</i>			FPP.02.03.01.a
16.02 <i>Evaluate food product handling procedures.</i>		SC.912.N.1.1	FPP.02.03.01.b
16.03 <i>Demonstrate approved food product handling techniques.</i>			FPP.02.03.01.c
16.04 <i>Describe the importance of performing quality-assurance tests on food products.</i>	MAFS.912.S-IC.2.3		FPP.02.03.02.a
16.05 <i>Perform quality-assurance tests on food products.</i>	MAFS.912.S-IC.2.4 MAFS.912.S-IC.2.5		FPP.02.03.02.b
16.06 <i>Interpret quality-assurance test results and apply corrective procedures.</i>	MAFS.912.S-IC.2.6	SC.912.N.1.1	FPP.02.03.02.c
16.07 <i>Describe the effects food-borne pathogens have on food products and humans.</i>		SC.912.L.14.6	FPP.02.03.03.a
16.08 <i>Explain the importance of microbiological tests in food product preparation, listing common spoilage and pathogenic microorganisms.</i>	MAFS.912.S-IC.2.3	SC.912.L.14.6	FPP.02.03.03.b
16.09 <i>Conduct and interpret microbiological tests for food-borne pathogens and implement corrective procedures.*</i>	MAFS.912.S-IC.2.6	SC.912.N.1.1	FPP.02.03.03.c
16.10 <i>Explain the importance of record keeping in a food products and processing system.</i>			FPP.02.03.04.a
16.11 <i>Discuss documentation procedures in food products and processing system.</i>			FPP.02.03.04.b
16.12 <i>Demonstrate proper record keeping in a food products and processing system.</i>	MAFS.912.N-Q.1.3		FPP.02.03.04.c
17.0 Discuss the role of regulatory agencies in the food industry – the student will be able to:			
17.01 Describe the basic requirements of Hazard Analysis and Critical Control Points (HAACP) in food processing.		SC.912.L.14.6	FPP.02.02.01.b
17.02 Identify food safety regulatory agencies.		SC.912.L.14.6	FPP.01.02.01.a
17.03 Examine the chemical, physical and biological categories of food safety and sanitation.			FPP.02.02.01.a
17.04 Discuss the role of sanitation during food processing.			FPP.02.01.03.a
17.05 Describe regulations governing the food industry and how they are enforced.			FPP.01.02.01.c
17.06 Describe the importance of self-regulation in controlling food quality and safety.			FPP.02.02.01.c

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
18.0 <i>Manage operational procedures and create equipment and facility maintenance plans – the student will be able to:</i>			
18.01 <i>Explain the importance of developing and maintaining Sanitation Standard Operating Procedures (SSOP).</i>			FPP.02.01.01.a
18.02 <i>Evaluate the SSOP of a food products and processing company.</i>		SC.912.N.1.1	FPP.02.01.01.b
18.03 <i>Develop SSOP for food products and processing company.</i>		SC.912.N.1.1	FPP.02.01.01.c
18.04 <i>Explain the purpose of Good Manufacturing Practices (GMP).</i>			FPP.02.01.02.a
18.05 <i>Evaluate the GMP of food products and processing company.</i>		SC.912.N.1.1	FPP.02.01.02.b
18.06 <i>Implement GMP for food products and processing company.</i>		SC.912.N.1.1	FPP.02.02.01.c
18.07 <i>Identify reasons for using a planned maintenance program to maintain equipment and facilities.</i>		SC.912.N.1.1	FPP.02.01.03.a
18.08 <i>Develop a basic equipment and facility maintenance program.</i>		SC.912.N.1.1	FPP.02.01.03.b
18.09 <i>Perform basic equipment and facility maintenance in food products and processing operation.</i>			FPP.02.01.03.c
19.0 <i>Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters – the student will be able to:</i>			
19.01 <i>Describe contamination hazards (physical, chemical and biological) associated with food products and processing.</i>			FPP.02.02.01.a
19.02 <i>Outline procedures to eliminate possible contamination hazards associated with food products and processing.</i>		SC.912.N.1.1	FPP.02.02.01.b
19.03 <i>Analyze the effectiveness of food products and processing company's Critical Control Point (CCP) procedures.</i>		SC.912.N.1.1	FPP02.02.01.c
19.04 <i>Identify the seven principles of HACCP.</i>		SC.912.L.15.4	FPP.02.02.02.a
19.05 <i>Explain the implementation of the seven principles of HACCP.</i>			FPP.02.02.02.b
19.06 <i>Implement an HACCP program for a food products and processing facility.</i>		SC.912.N.1.1 SC.912.L.14.6	FPP.02.02.02.c
20.0 <i>Demonstrate worker safety procedures with food product and processing equipment and facilities – the student will be able to:</i>			
20.01 <i>Explain safety standards that must be observed in facility design and equipment use.*</i>		SC.912.N.1.1	FPP.02.04.01.a
20.02 <i>Outline guidelines for personnel safety in the food products and processing industry.*</i>		SC.912.N.1.1	FPP.02.04.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
20.03 <i>Evaluate a facility to determine the implementation of safety procedures.*</i>		SC.912.N.1.1	FPP.02.04.01.c
21.0 Describe the biological composition and processing of foods – the student will be able to:			
21.01 Explain microbiology and its application to food processing.		SC.912.L.14.6	FPP.02.03.03.b
21.02 Describe the effects of microbes on food spoilage.		SC.912.L.14.6	FPP.02.02.03.b
21.03 Analyze the relationship between time and temperature control. (See current Food Code for recommended temperatures)	MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3; MAFS.912.F-LE.1.4; MAFS.912.F-LE.2.5	SC.912.N.1.1 SC.912.L.14.6	FPP.02.03.03.c
21.04 Recognize characteristics of spoiled food. .		SC.912.L.14.6	FPP.02.03.03.a
21.05 Apply the principles of managing Food, Acid, Time, Temperature, Oxygen, and Moisture (FATTOM) in controlling food spoilage.		SC.912.L.14.6	FPP.02.03.03.c
21.06 Test the effects of yeasts, bacteria, molds and enzymes in food processing.	MAFS.912.S-ID.1.1; MAFS.912.S-ID.1.4	SC.912.N.1.1	FPP.02.03.03.c
22.0 <i>Summarize the procedures for food service operations – the student will be able to:</i>			
22.01 <i>Develop criteria for purchasing considerations.</i>		SC.912.N.1.1	FPP.02.03.01a FPP.02.03.01.b
22.02 <i>Develop criteria for receiving considerations</i>		SC.912.N.1.1	FPP.02.03.01a FPP.02.03.01.b
22.03 <i>Facilitate proper use of current general inspection guidelines.</i>			FPP.02.03.01.c
22.04 <i>Select proper criteria for inspecting specific types of food.</i>		SC.912.N.1.1	FPP.04.01.01.a
22.05 <i>Explain general storage guidelines.</i>			FPP.04.01.02.c
22.06 <i>Compare storage guidelines for specific types of food.</i>			FPP.04.03.06.a FPP.04.03.06.b
22.07 <i>Demonstrate proper food preparation techniques.</i>			FPP.04.03.04.a
22.08 <i>Explain proper procedures for cook food. (See current Food Code for temperature information)</i>		SC.912.L.14.6	FPP.04.03.04.a
22.09 <i>Recommend proper cooling and reheating procedures for various food items. (See current Food Code for temperatures)</i>		SC.912.L.14.6	
22.10 <i>Explain procedures for holding food for service.</i>		SC.912.L.14.6	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
22.11 <i>Demonstrate proper techniques in serving food.</i>		SC.912.L.14.6	
22.12 <i>Develop a plan for offsite service handling of food.</i>		SC.912.N.1.1 SC.912.L.14.6	
23.0 <i>Explain the daily operations of a food service facility – the student will be able to:</i>			
23.01 <i>Discuss proper use of food safety management systems.</i>			FPP.02.04.01.a
23.02 <i>Determine procedures for active managerial control.</i>		SC.912.N.1.1	FPP.02.04.01.a
23.03 <i>Develop a plan for crisis management.</i>		SC.912.N.1.1	FPP.02.04.01.a
23.04 <i>Design a plan for operating safely.</i>		SC.912.N.1.1	FPP.02.04.01.a
23.05 <i>Explain considerations for other areas of the facility.</i>			FPP.02.04.01.b
23.06 <i>Develop criteria for equipment selection.</i>		SC.912.N.1.1	FPP.02.04.01.a
23.07 <i>Describe procedures for installing and maintaining kitchen equipment.</i>			FPP.02.04.01.a
23.08 <i>Describe the operations utilities structure.</i>			FPP.02.04.01.a
23.09 <i>Demonstrate proper procedures for cleaning.</i>			FPP.02.04.01.c
23.10 <i>Demonstrate proper procedures for sanitizing.</i>			FPP.02.04.01.c
23.11 <i>Demonstrate proper procedures for dish washing.</i>			FPP.02.04.01.c
23.12 <i>Demonstrate proper procedures for cleaning the premises.</i>			FPP.02.04.01.c
23.13 <i>Develop a cleaning program.</i>		SC.912.N.1.1	FPP.02.04.01.b
23.14 <i>Explain the importance of (IPM) Integrated Pest Management programs.</i>		SC.912.L.14.6	NRS.04.03.01.b
23.15 <i>Identify pests.</i>		SC.912.L.15.4 SC.912.L.14.6	NRS.04.03.01.b
23.16 <i>Explain the importance of working with a pest control operator.</i>		SC.912.L.14.6	NRS.04.03.01.b
23.17 <i>Describe pest treatments.</i>			NRS.04.03.01.c
23.18 <i>Explain procedures for using and storing pesticides in the facility.</i>			NRS.04.03.01.c

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
24.0 Demonstrate leadership, employability, communications and human relations skills – the student will be able to:			
24.01 Investigate career opportunities in the food industry and identify educational experiences necessary to prepare for those careers.		SC.912.N.1.1	CS.04.01.01.a
24.02 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.			CS.04.01.01.a
24.03 Describe methods of training staff.			CS.04.01.01.b
25.0 Write lab reports to record, interpret and evaluate data – the student will be able to:			
25.01 Explain the importance of scientific exploration of food.			FPP.01.01.01.a
25.02 Identify and use the basic units of the metric system of measurement.		SC.912.N.1.1	FPP.04.03.01.a
25.03 Demonstrate effective manipulation of scientific materials and equipment in the food science laboratory.		SC.912.N.1.1	FPP.02.01.03.c ESS.01.01.02.b
25.04 Practice the expected safety procedures and care while working in the food science laboratory.			FPP.02.01.03.c ESS.01.01.02.b
26.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to:			
26.01 Assess the agricultural impact upon the US gross national product and the total global economy.			FPP.01.02.01.a
26.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses.		SC.912.N.1.1	FPP.01.02.02.b
26.03 Identify and describe the primary government agencies involved with agriculture.			FPP.01.02.01.c
26.04 Research new and emerging technologies and their impact on the economy.		SC.912.N.1.1	FPP.03.01.01.c
26.05 Recognize the value of the food and agribusiness industry.			FPP.03.01.01.a
27.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy – the student will be able to:			
27.01 Define and explore agriculture and agribusinesses and their role in the economy.			ABS.01.02.01.a
27.02 Evaluate and explore the agribusiness career opportunities in agriculture.		SC.912.N.1.1	ABS.01.02.01.b
27.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services.			ABS.02.01.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
27.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society.			ABS.01.02.01.c

**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 #
28.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Food Science Applications	
28.01	Key Ideas and Details	
28.01.1	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	
28.01.2	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	
28.01.3	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	
28.02	Craft and Structure	
28.02.1	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	
28.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
28.02.3	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	
28.03 Integration of Knowledge and Ideas		
28.03.1	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	
28.03.2	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	
28.03.3	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	
28.04 Range of Reading and Level of Text Complexity		
28.04.1	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.	
28.04.2	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	
29.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Food Science Applications		
29.01 Text Types and Purposes		
29.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
29.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
29.02 Production and Distribution of Writing		
29.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
29.02.2	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.	

Florida Standards		Correlation to CTE Program Standard #
	LAFS.1112.WHST.2.5	
29.02.3	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	
29.03	Research to Build and Present Knowledge	
29.03.1	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	
29.03.2	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	
29.03.3	Draw evidence from informational texts to support analysis, reflection, and research.	
	LAFS.1112.WHST.3.9	
29.04	Range of Writing	
29.04.1	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	
30.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Food Science Applications	
30.01	Make sense of problems and persevere in solving them.	
	MAFS.K12.MP.1.1	
30.02	Reason abstractly and quantitatively.	
	MAFS.K12.MP.2.1	
30.03	Construct viable arguments and critique the reasoning of others.	
	MAFS.K12.MP.3.1	
30.04	Model with mathematics.	
	MAFS.K12.MP.4.1	
30.05	Use appropriate tools strategically.	
	MAFS.K12.MP.5.1	
30.06	Attend to precision.	

Florida Standards	Correlation to CTE Program Standard #
	MAFS.K12.MP.6.1
30.07 Look for and make use of structure.	MAFS.K12.MP.7.1
30.08 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-LA

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.0 Utilize harvesting, selection and inspection techniques to obtain quality food products for processing – the student will be able to:			
31.01 Identify quality and yield grades of food products.		SC.912.N.1.1	FPP.04.01.01.a
31.02 Discuss factors that affect quality and yield grades of food products.		SC.912.N.1.1	FPP.04.01.01.b
31.03 Assign quality and yield grades to food products according to industry standards.	MAFS.912.N-Q 1.2 MAFS.912.N-Q 1.3	SC.912.N.1.1	FPP.04.01.01.c
31.04 Select raw food products based on yield grades, quality grades and related selection criteria.	MAFS.912.N-Q 1.1	SC.912.N.1.1	FPP.04.01.02.a
31.05 Perform quality-control inspections of raw food products for processing.		SC.912.N.1.1	FPP.04.01.02.b
31.06 Implement procedures to maintain original food quality and yield.		SC.912.N.1.1	FPP.04.01.02.c
31.07 Identify and describe accepted animal treatment and harvesting techniques.		SC.912.N.1.1	FPP.04.01.03.a
31.08 Compare and contrast accepted animal treatment and harvesting techniques.		SC.912.N.1.1	FPP.04.01.03.b
31.09 Harvest animals using regulatory agency- approved or industry approved techniques.		SC.912.N.1.1	FPP.04.01.03.c
31.10 Describe the importance of premortem and post-mortem inspections of animals for harvest.		SC.912.N.1.1	FPP.04.01.04.a
31.11 Explain desirable and undesirable characteristics of both premortem and post-mortem animals in relation to the production of food products.		SC.912.N.1.1	FPP.04.01.04.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
31.12 Conduct pre-mortem and postmortem inspections of animals.		SC.912.N.1.1	FPP.04.01.04.c
32.0 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:			
32.01 Discuss the functions of carbohydrates, fats, proteins, minerals, vitamins, water and caloric needs in the body.		SC.912.L.18.1 SC.912.L.18.2 SC.912.L.18.3 SC.912.L.18.4	FPP.03.01.04.a
32.02 Compare and contrast food sources of carbohydrates, fats, proteins, minerals, vitamins, water and caloric needs in the body.		SC.912.L.18.1 SC.912.L.18.2 SC.912.L.18.3 SC.912.L.18.4	FPP.03.01.04.b
32.03 Identify the effects of preparation methods on nutritional content and food quality.	MAFS.912.F-LE 1.1 MAFS.912.F-LE 1.5 MAFS.912.S-IC.2.5 MAFS.912.S-IC.2.6 MAFS.912.S-IC.1.1 MAFS.912.S-IC.1.2	SC.912.N.1.1	FPP.03.01.02.b
33.0 Describe the chemical composition and processing of foods – the student will be able to:			
33.01 Explain the use of color in food processing.		SC.912.N.1.1	FPP.03.01.02.a
33.02 Explain the use of flavor in food processing.		SC.912.N.1.1	FPP.03.01.02.a
33.03 Explain the use of preservatives in food processing.		SC.912.N.1.1	FPP.03.01.02.a
33.04 Explain the use of textural agents in food processing.		SC.912.N.1.1	FPP.03.01.02.a
33.05 Examine methods of manipulating color and ripeness of fresh produce.		SC.912.N.1.1	FPP.03.01.05.a
33.06 Analyze the molecular structure of carbohydrates.		SC.912.L.18.	FPP.03.01.04.c
33.07 Analyze the molecular structure of fats.		SC.912.L.18.1	FPP.03.01.04.c
33.08 Analyze the molecular structure of proteins.		SC.912.L.18.1	FPP.03.01.04.c
33.09 Explain the concepts of pH and buffers as they relate to foods.		SC.912.P.8.11	FPP.03.01.05.a
33.10 Examine the effects of processing and preparation on the chemical composition of foods.		SC.912.L.18.1 SC.912.L.18.2 SC.912.L.18.3 SC.912.L.18.4	FPP.03.01.05.c

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
33.11 Explain the use of proteins, fats and carbohydrates.		SC.912.L.18.1 SC.912.L.18.2 SC.912.L.18.3 SC.912.L.18.4	FPP.03.01.04.b
34.0 Describe the physical composition and processing of foods – the student will be able to:			
34.01 Describe materials handling in the food industry.		SC.912.N.1.1	FPP.02.03.01.a
34.02 Describe factors and processes related to heat transfer.		SC.912.N.1.1	FPP.04.03.03.a FPP.04.03.06.c
34.03 Compare and contrast methods of moisture content manipulations.		SC.912.N.1.1	FPP.04.03.03.a FPP.04.03.06.c
34.04 Examine techniques used in producing formed foods.		SC.912.N.1.1 SC.912.P.8.1	FPP.04.03.03.a FPP.04.03.06.c
34.05 Examine methods for separating food products.		SC.912.N.1.1 SC.912.P.8.1 SC.912.L.18.12	FPP.04.03.03.a FPP.04.03.06.c
34.06 Analyze factors related to product mixing.		SC.912.N.1.1 SC.912.P.8.1 SC.912.P.10.1	FPP.04.03.03.a FPP.04.03.06.c
34.07 Analyze mechanical factors influencing product preparation.		SC.912.N.1.1	FPP.04.03.05.c
34.08 Compare processing methods used to enhance shelf life of fresh produce.		SC.912.N.1.1	FPP.04.03.06.b
35.0 Evaluate, grade and classify processed food products – the student will be able to:			
35.01 Identify and describe foods derived from meat, egg, poultry, fish and dairy products.		SC.912.L.18.1	FPP.04.02.01.a
35.02 Discuss desirable qualities of processed meat, egg, poultry, fish and dairy products.		SC.912.N.1.1	FPP.04.02.01.b
35.03 Evaluate, grade and classify processed meat, egg, poultry, fish and dairy products.		SC.912.N.1.1	FPP.04.02.01.c
35.04 Identify and describe products derived from fruits and vegetables.		SC.912.L.18.1	FPP.04.02.02.a
35.05 Discuss desirable qualities of fruit and vegetable products.		SC.912.N.1.1	FPP.04.02.02.b
35.06 Evaluate, grade and classify processed products from fruits and vegetables.		SC.912.N.1.1	FPP.04.02.02.c
35.07 Identify and describe products derived from grains, legumes and oilseeds.		SC.912.L.18.1	FPP.04.02.03.a

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
35.08 Discuss desirable qualities of grain, legume and oilseed products.		SC.912.N.1.1	FPP.04.02.03.b
35.09 Evaluate, grade and classify finished products derived from grains, legumes and oilseeds.		SC.912.N.1.1	FPP.04.02.03.c
36.0 Identify the importance of raw agricultural products in the food science industry – the student will be able to:			
36.01 Identify wholesale plant, dairy, meat, poultry and aquatic animal food products.		SC.912.N.1.1	FPP.04.02.01.a FPP.04.02.02.a
36.02 Analyze the factors that impact food grades and grading.		SC.912.N.1.1	FPP.04.01.01.b
36.03 Identify plant production practices that impact food product quality, quantity and consistency.		SC.912.N.1.1	FPP.04.01.03.a
36.04 Examine nutritional content of plant food products.	MAFS.912.N-Q.1.2	SC.912.N.1.1	FPP.03.01.03.b
36.05 Compare and contrast consumption trends of plant products in the United States.	MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 ; MAFS.912.F-LE.1.3; MAFS.912.F-LE.1.4; MAFS.912.F-LE.2.5	SC.912.N.1.1	FPP.01.01.01.b
36.06 Compare the relative economic value of plant food products.		SC.912.N.1.1	FPP.01.01.01.c
37.0 Apply principles of science to food processing to provide a safe, wholesome and nutritious food supply – the student will be able to:			
37.01 Discuss how research and industry developments lead to improvements in the food products and processing industry.		SC.912.N.1.1 SC.912.N.4.1	FPP.03.01.01.a
37.02 Design a research project in food science using the scientific method.		SC.912.N.1.1	FPP.03.01.01.b
37.03 Conduct research in food science and interpret results to improve food products.		SC.912.N.1.1	FPP.03.01.01.c
37.04 Explain the application of chemistry and physics to food science.	MAFS.912.S-IC.2.3; MAFS.912.S-IC.2.4 MAFS.912.S-IC.2.6	SC.912.N.1.1	FPP.03.01.02.a
37.05 Explain how the chemical and physical properties of foods influence nutritional value and eating quality.		SC.912.N.1.1 SC.912.L.18.1	FPP.03.01.02.b
37.06 Determine the chemical and physical properties of food products.		SC.912.L.18.1	FPP.03.01.02.c
37.07 Explain the Food Guide Pyramid in relation to essential nutrients for the human diet.		SC.912.N.1.1	FPP.03.01.03.a
37.08 Compare and contrast the nutritive value of food and food groups.		SC.912.N.1.1	FPP.03.01.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
37.09 Design a daily food guide for a healthful diet.		SC.912.N.1.1	FPP.03.01.03.c
37.10 Discuss common food constituents (e.g., proteins, carbohydrates, fats, vitamins, minerals).		SC.912.L.18.1	FPP.03.01.04.a
37.11 Compare and contrast food constituents and their relative value to product taste, appearance, etc.		SC.912.N.1.1	FPP.03.01.04.b
37.12 Analyze food products to identify food constituents.		SC.912.N.1.1	FPP.03.01.04.c
37.13 Identify common food additives (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors).		SC.912.N.1.4	FPP.03.01.05.a
37.14 Describe the purpose of common food additives.		SC.912.N.1.1 SC.912.L.18.1	FPP.03.01.05.b
37.15 Formulate and explain incorporation of additives into food products.		SC.912.N.1.1	FPP.03.01.05.c
37.16 Explain the importance of food labeling to the consumer.		SC.912.N.1.1	FPP.03.01.06.a
37.17 Explain the required components of a food label.		SC.912.N.1.1	FPP.03.01.06.b
37.18 Prepare and label foods according to the established standards of regulatory agencies.		SC.912.N.1.1	FPP.03.01.07.c
37.19 Describe factors in planning and developing a new food product (e.g., regulation, creativity, and economics).		SC.912.N.1.1	FPP.03.01.07.a
37.20 Plan and create a new food product.		SC.912.N.1.1	FPP.03.01.07.b
37.21 Perform sensory-testing and marketing functions to characterize and determine consumer preference and market potential.	MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.3 MAFS.912.S-IC.1.1 MAFS.912.S-IC.1.2	SC.912.N.1.1 SC.912.N.4.1	FPP.03.01.07.c
38.0 Process, preserve, package and present food and food products for sale and distribution – the student will be able to:			
38.01 Identify and explain common weights and measures used in the food products and processing industry.	MAFS.912.N-Q.1.3	SC.912.N.1.1	FPP.04.03.01.a
38.02 Weigh and measure food products and perform conversions between units of measure.	MAFS.912.N-Q.1.2	SC.912.N.1.1	FPP.04.03.01.b
38.03 Use weights and measures to formulate and package food products.	MAFS.912.N-Q.1.1	SC.912.N.1.1	FPP.04.03.01.c
38.04 Explain methods and materials for processing foods for sale as fresh-food products.		SC.912.N.1.1	FPP.04.03.02.a
38.05 Prepare foods for sale and distribution as fresh-food products.		SC.912.N.1.1	FPP.04.03.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
38.06 Evaluate foods prepared for the fresh food market based on factors such as shelf life, shrinkage, appearance and weight.	MAFS.912.S-IC.1.2	SC.912.N.1.1	FPP.04.03.02.c
38.07 Identify methods of food preservation and give examples of foods preserved by each method.		SC.912.N.1.1	FPP.04.03.03.a
38.08 Explain the processes of food preservation methods.		SC.912.N.1.1	FPP.04.03.03.b
38.09 Preserve foods using various methods and techniques.		SC.912.N.1.1	FPP.04.03.03.c
38.10 Explain techniques for preparing ready-to-eat food products.		SC.912.N.1.1	FPP.04.03.04.a
38.11 Demonstrate techniques of preparing ready-to-eat food products.		SC.912.N.1.1	FPP.04.03.04.b
38.12 Evaluate ready-to-eat food products.		SC.912.N.1.1	FPP.04.03.04.c
38.13 Explain materials and methods of food packaging and presentation.		SC.912.N.1.1	FPP.04.03.05.a
38.14 Select and utilize packaging materials in storing processed foods and raw food products.		SC.912.N.1.1	FPP.04.03.05.b
38.15 Analyze the foods stored in various packaging materials to determine which materials retain desirable food qualities.		SC.912.N.1.1	FPP.04.03.05.c
38.16 Identify and explain storage conditions to preserve product quality.		SC.912.N.1.1	FPP.04.03.06.a
38.17 Select methods and conditions for storing raw and processed food products.		SC.912.N.1.1	FPP.04.03.06.b
38.18 Compare and contrast foods stored under varying conditions for quality, shelf life and intended use.		SC.912.N.1.1	FPP.04.03.06.c
39.0 Explain the process of food product development – the student will be able to:			
39.01 Explain how ideas for new products are developed.		SC.912.N.1.1 SC.912.N.1.6 SC.912.N.1.7	FPP.03.01.07.a
39.02 Describe new product development procedures.		SC.912.N.1.1	FPP.03.01.07.a
39.03 Explain consumer response tests.		SC.912.N.1.1 SC.912.N.1.7	FPP.03.01.07.c
39.04 Explain the role of test marketing with new products.		SC.912.N.1.1 SC.912.N.1.7	FPP.03.01.07.c
39.05 Explain sensory analysis.		SC.912.L.14.50	FPP.03.01.07.c
39.06 Compare the categories of sensory properties.		SC.912.L.14.50	FPP.03.01.07.c

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
39.07 Assess why the food industry conducts sensory testing.		SC.912.N.1.1 SC.912.N.1.7	FPP.03.01.07.c
40.0 Analyze the components of the marketing chain – the student will be able to:			
40.01 Identify the five features of food labels.		SC.912.N.1.1	FPP.03.01.06.b
40.02 Identify USDA regulations regarding food labeling.		SC.912.N.1.1	FPP.03.01.06.a
40.03 Design a food label.		SC.912.N.1.1	FPP.03.01.06.c
40.04 Develop a food product logo and slogan.		SC.912.N.1.1	FPP.03.01.07.b
40.05 Apply basic principles of advertisement.		SC.912.N.1.1	ABS.06.02.01.a
40.06 Design a print advertisement.		SC.912.N.1.1	ABS.06.01.04.b
40.07 Develop a video or audio advertisement.		SC.912.N.1.1	ABS.06.01.04.b
40.08 Explain how package design and size influence consumer acceptance.		SC.912.N.1.1	ABS.06.01.04.b
40.09 Explore the relationship between value-added products and profitability.		SC.912.N.1.1	ABS.06.01.02.c
40.10 Analyze the economic significance of converting raw products into value-added food products.		SC.912.N.1.1	ABS.06.01.02.c
40.11 Discuss retail store layout and product placement.		SC.912.N.1.1	ABS.07.02.02.c
40.12 Analyze retail-marketing strategies.		SC.912.N.1.1	ABS.06.02.01.b
41.0 Explain the process of food product development – the student will be able to:			
41.01 Develop a new food product.		SC.912.N.1.1 SC.912.L.18.1	FPP.03.01.07.b
41.02 Conduct and analyze a food market test.		SC.912.N.1.1	FPP.03.01.07.c
41.03 Apply sensory analysis techniques.		SC.912.N.1.1 SC.912.L.14.50	FPP.03.01.07.c
41.04 Conduct a cost analysis for a new food product.	MAFS.912.A-CED.1.1 MAFS.912.A-CED.1.2; MAFS.912.A-CED.1.3; MAFS.912.A-CED.1.4 MAFS.912.F-LE.2.5	SC.912.N.1.1	FPP.03.01.07.b FPP.03.01.07.c
42.0 Discuss food production distribution – the student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.01 Explain the impact of transportation on food cost and availability.		SC.912.N.1.1	
42.02 Determine the relationship between transportation and packaging needs.			
42.03 Compare modes of food product transportation.			
42.04 Describe the various levels of the food distribution chain.			
42.05 Analyze the factors that influence profit at various levels of the distribution chain.		SC.912.N.1.1	
42.06 Describe the challenges associated with distributing perishable products.			FPP.04.01.03.c
43.0 Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry – the student will be able to:			
43.01 Explain the purposes of organizations that are part of or regulate the food products and processing industry.			APP. 01.02.01.a
43.02 Evaluate the changes in the food products and processing industry brought about by industry organizations or regulatory agencies.		SC.912.N.1.1	APP. 01.02.01.b
43.03 Interact effectively with organizations, groups and regulatory agencies that affect the food products and processing industry.		SC.912.N.1.1	APP. 01.02.01.c
43.04 Explain the importance and usage of industry standards in food products and processing.			APP. 01.02.02.a
43.05 Discuss the application of industry standards in the food products and processing industry.			APP. 01.02.02.b
43.06 Prepare a plan for implementation of industry standards in food products and processing programs.		SC.912.N.1.1	APP. 01.02.02.c
44.0 Describe the economic and cultural impact of a global food market – the student will be able to:			
44.01 Analyze the influence of culture on American food preferences.		SC.912.N.1.1	APP. 01.01.01.a
44.02 Analyze national and international food preferences on food production in the United States.		SC.912.N.1.1	APP. 01.01.01.b
44.03 Explain the political nature of the world's food supply.			APP. 01.01.01.b
44.04 Explain the relationships between global population growth and food supply needs.		SC.912.L.17.20 SC.912.L.17.18	APP. 01.01.01.b
44.05 Discuss possible causes of world hunger.			APP. 01.01.01.c
45.0 Discuss environmental issues impacting the production and processing of			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
foods – the student will be able to:			
45.01 Describe the requirements of water used in food processing.		SC.912.L.18.12	APP.02.03.03.a APP.03.01.04.b
45.02 Discuss methods used in food processing for disposing of solid wastes.			APP.02.03.03.a APP.03.01.04.b
45.03 Compare and contrast methods of wastewater management used in food processing.			APP.02.03.03.a APP.03.01.04.b
46.0 Demonstrate leadership, employability, communications and human relations skills – the student will be able to:			
46.01 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.			CS.01.06.01c
46.02 Identify acceptable work habits and personal characteristics.			FPP.02.04.01.b
46.03 Identify acceptable employee hygiene habits.			FPP.02.04.01.b
46.04 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.		SC.912.N.1.1	FPP.02.04.01.b
46.05 Describe the importance of industry certifications.			
46.06 Conduct small informal and formal group meetings.		SC.912.N.1.1	FPP.01.02.01.c
47.0 Write lab reports to record, interpret and evaluate data – the student will be able to:			
47.01 Apply the steps of the scientific methods.		SC.912.N.1.1	CS.11.02.01.a FPP.03.01.01.b FPP.03.01.01c
47.02 Design and write reports of food science laboratory experiments including mathematical and statistical examples for evaluation of collected data.		SC.912.N.1.1	FPP.03.01.01.b FPP.03.01.01c
48.0 Explain the components of the American business system – the student will be able to:			
48.01 Describe the five basic ways American business is organized.			ABS.01.01.01a ABS.01.01.01.b
48.02 Distinguish and identify between the characteristics of each method of doing business.			ABS.01.01.01a ABS.01.01.01.b
48.03 Evaluate the advantages and disadvantages provided by each business method.		SC.912.N.1.1	ABS.01.01.01a ABS.01.01.01.b
48.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses.		SC.912.N.1.1	ABS.01.01.01a ABS.01.01.01.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
49.0 Investigate agricultural cooperatives structure and function – the student will be able to:			
49.01 Explain the definition of a cooperative.			ABS. 01.02.01.a ABS.01.02.01.b
49.02 Understand the history of cooperative principles and practices.			ABS. 01.02.01.a ABS.01.02.01.b
49.03 Describe the five areas that classify cooperative structure.			ABS. 01.02.01.a ABS.01.02.01.b
49.04 Distinguish and identify between the five types of cooperative structure and their functions.		SC.912.N.1.1	ABS. 01.02.01.a ABS.01.02.01.b

Additional Information

Laboratory Activities

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

Special Notes

Standards and benchmarks that are in italics are components in food safety certifications.

Career and Technical Student Organization (CTSO)

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

Additional Resources

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

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

**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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

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.

Program Structure

This program is a planned sequence of instruction consisting of one course.

The following table illustrates the secondary program structure:

Course Number	Course Title	Length	Level	Graduation Requirement
8500395	Food Science Safety & Technology	1 credit	2	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth- Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Food Science Safety & Technology	10/87 11%	5/80 6%	27/83 33%	5/69 7%	22/67 33%	5/70 7%	7/69 10%	25/82 30%	7/66 32%	24/74 32%	4/72 6%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Food Science Safety & Technology	6/67 9%	7/75 9%	#	**	**	**	**

** 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.

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 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 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 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	
02.02 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 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. 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-/LA

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:			FPP.01.01.01.a
04.01 Discuss the history and describe and explain the components. (e.g., processing, distribution, byproducts) of the food products and processing industry.)			FPP.01.01.01.b
04.02 Evaluate changes and trends in the food products and processing industry.		SC.912.N.1.1	FPP.01.01.01.c
04.03 Predict trends and implications in the food products and processing industry.		SC.912.N.1.1	FPP.01.01.02.a
04.04 Identify and explain environmental and safety concerns about the food supply.		SC.912.L.17.20	FPP.01.01.02.b
04.05 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation).		SC.912.L.16.10 SC.912.L.17.20 SC.912.L.14.6	FPP.01.01.02.c
04.06 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply.		SC.912.N.1.1	
05.0 Analyze the dangers of food hazards – the student will be able to:			FPP.02.02.01.a
05.01 Explain types of biological hazards.		SC.912.L.14.6	FPP.02.02.01.a
05.02 Explain types of chemical hazards.		SC.912.L.14.6	FPP.02.02.01.a
05.03 Explain types of physical hazards.		SC.912.L.14.6	FPP.02.02.01.b
05.04 Identify the roles food allergens play in food safety.		SC.912.L.14.6	
06.0 Apply safety and sanitation procedures in the handling, processing and storing of food products – the student will be able to:			FPP.02.03.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.01 Explain techniques and procedures for the safe handling of food products.			FPP.02.03.01.b
06.02 Evaluate food product handling procedures.		SC.912.N.1.1	FPP.02.03.01.c
06.03 Demonstrate approved food product handling techniques.			FPP.02.03.02.a
06.04 Describe the importance of performing quality-assurance tests on food products.	MAFS.912.S-IC.2.3		FPP.02.03.02.b
06.05 Perform quality-assurance tests on food products.	MAFS.912.S-IC.2.4 MAFS.912.S-IC.2.5		FPP.02.03.02.c
06.06 Interpret quality-assurance test results and apply corrective procedures.	MAFS.912.S-IC.2.6	SC.912.N.1.1	FPP.02.03.03.a
06.07 Describe the effects food-borne pathogens have on food products and humans.		SC.912.L.14.6	FPP.02.03.03.b
06.08 Explain the importance of microbiological tests in food product preparation, listing common spoilage and pathogenic microorganisms.	MAFS.912.S-IC.2.3	SC.912.L.14.6	FPP.02.03.03.c
06.09 Conduct and interpret microbiological tests for food-borne pathogens and implement corrective procedures.	MAFS.912.S-IC.2.6	SC.912.N.1.1	FPP.02.03.04.a
06.10 Explain the importance of record keeping in a food products and processing system.			FPP.02.03.04.b
06.11 Discuss documentation procedures in a food products and processing system.			FPP.02.03.04.c
06.12 Demonstrate proper record keeping in a food products and processing system.	MAFS.912.N-Q.1.3		
07.0 Manage operational procedures and create equipment and facility maintenance plans – the student will be able to:			FPP.02.01.01.a
07.01 Explain the importance of developing and maintaining Sanitation Standard Operating Procedures (SSOP).			FPP.02.01.01.b
07.02 Evaluate the SSOP of a food products and processing company.		SC.912.N.1.1	FPP.02.01.01.c
07.03 Develop SSOP for a food products and processing company.		SC.912.N.1.1	FPP.02.01.02.a
07.04 Explain the purpose of Good Manufacturing Practices (GMP).			FPP.02.01.02.b
07.05 Evaluate the GMP of a food products and processing company.		SC.912.N.1.1	FPP.02.02.01.c
07.06 Implement GMP for a food products and processing company.		SC.912.N.1.1	FPP.02.01.03.a
07.07 Identify reasons for using a planned maintenance program to maintain equipment and facilities.		SC.912.N.1.1	FPP.02.01.03.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
07.08 Develop a basic equipment and facility maintenance program.		SC.912.N.1.1	FPP.02.01.03.c
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 – the student will be able to:			FPP.02.02.01.a
08.01 Describe contamination hazards (physical, chemical and biological) associated with food products and processing.			FPP.02.02.01.b
08.02 Outline procedures to eliminate possible contamination hazards associated with food products and processing.		SC.912.N.1.1 SC.912.L.14.6	FPP02.02.01.c
08.03 Analyze the effectiveness of a food products and processing company's Critical Control Point (CCP) procedures.	MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3; MAFS.912.F-LE.1.4; MAFS.912.F-LE.2.5	SC.912.N.1.1 SC.912.L.14.6	FPP.02.02.02.a
08.04 Identify the seven principles of HACCP.		SC.912.L.15.4	FPP.02.02.02.b
08.05 Explain the implementation of the seven principles of HACCP.			FPP.02.02.02.c
08.06 Implement an HACCP program for a food products and processing facility.	MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.4	SC.912.N.1.1 SC.912.L.14.6	
09.0 Demonstrate worker safety procedures with food product and processing equipment and facilities – the student will be able to:			FPP.02.04.01.a
09.01 Explain safety standards that must be observed in facility design and equipment use.		SC.912.N.1.1 SC.912.L.14.6	FPP.02.04.01.b
09.02 Outline guidelines for personnel safety in the food products and processing industry.		SC.912.N.1.1 SC.912.L.14.6	FPP.02.04.01.c
09.03 Evaluate a facility to determine the implementation of safety procedures.		SC.912.N.1.1 SC.912.L.14.6	
10.0 Summarize the procedures for food service operations – the student will be able to:			FPP.02.03.01a FPP.02.03.01.b
10.01 Develop criteria for purchasing considerations.		SC.912.N.1.1	FPP.02.03.01a FPP.02.03.01.b
10.02 Develop criteria for receiving considerations		SC.912.N.1.1	FPP.02.03.01.c
10.03 Facilitate proper use of current general inspection guidelines.			FPP.04.01.01.a
10.04 Select proper criteria for inspecting specific types of food.		SC.912.N.1.1	FPP.04.01.02.c
10.05 Explain general storage guidelines.			FPP.04.03.06.a FPP.04.03.06.b

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
10.06 Compare storage guidelines for specific types of food.			FPP.04.03.04.a
10.07 Demonstrate proper food preparation techniques.			FPP.04.03.04.a
10.08 Explain proper procedures for cook food. (See current Food Code for temperature information)		SC.912.L.14.6	
10.09 Recommend proper cooling and reheating procedures for various food items. (See current Food Code for temperatures)		SC.912.L.14.6	
10.10 Explain procedures for holding food for service.		SC.912.L.14.6	
10.11 Demonstrate proper techniques in serving food.		SC.912.L.14.6	
10.12 Develop a plan for offsite service handling of food.		SC.912.N.1.1 SC.912.L.14.6	
11.0 Explain the daily operations of a food service facility – the student will be able to:			FPP.02.04.01.a
11.01 Discuss proper use of food safety management systems.		SC.912.N.1.1	FPP.02.04.01.a
11.02 Determine procedures for active managerial control.		SC.912.N.1.1	FPP.02.04.01.a
11.03 Develop a plan for crisis management.		SC.912.N.1.1	FPP.02.04.01.a
11.04 Design a plan for operating safely.			FPP.02.04.01.b
11.05 Explain considerations for other areas of the facility.		SC.912.N.1.1	FPP.02.04.01.a
11.06 Develop criteria for equipment selection.			FPP.02.04.01.a
11.07 Describe procedures for installing and maintaining kitchen equipment.			FPP.02.04.01.a
11.08 Describe the operations utilities structure.			FPP.02.04.01.c
11.09 Demonstrate proper procedures for cleaning.			FPP.02.04.01.c
11.10 Demonstrate proper procedures for sanitizing.			FPP.02.04.01.c
11.11 Demonstrate proper procedures for dish washing.			FPP.02.04.01.c
11.12 Demonstrate proper procedures for cleaning the premises.		SC.912.N.1.1	FPP.02.04.01.b
11.13 Develop a cleaning program.		SC.912.L.14.6	NRS.04.03.01.b

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
11.14	Explain the importance of (IPM) Integrated Pest Management programs.		SC.912.L.15.4 SC.912.L.14.6	NRS.04.03.01.b
11.15	Identify pests.		SC.912.L.14.6	NRS.04.03.01.b
11.16	Explain the importance of working with a pest control operator.			NRS.04.03.01.c
11.17	Describe pest treatments.			NRS.04.03.01.c
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:			FPP.02.03.03.b
12.01	Compare the beneficial and detrimental effects of microorganisms on food.		SC.912.L.14.6	FPP.02.03.03.b
12.02	Identify the characteristic of selected microorganisms and related food borne diseases.		SC.912.L.14.6	FPP.02.03.03.b
12.03	Describe the environmental conditions necessary for the growth of selected microorganisms.		SC.912.L.14.6	FPP.02.03.01.a FPP.02.03.01.b FPP.02.03.01.c
12.04	Explain and demonstrate the cause and effect relationship between using accepted food handling procedures and preventing food borne diseases.		SC.912.L.14.6	FPP.03.01.01.c
12.05	Conduct and appraise scientific experimentation of the biological magnification of certain classified microorganisms, such as yeast, mold and bacteria.	MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.4	SC.912.L.14.6 SC.912.N.1.1	
13.0	Compare and contrast the different methods of food preservation – the student will be able to:			FPP.04.03.03.b
13.01	Describe and give methods of how fermentation is useful in preserving foods.		SC.912.L.18.8	FPP.04.03.03.b
13.02	Describe and give examples of how chemicals are useful in preserving foods.		SC.912.P.8.2	FPP.04.03.03.b
13.03	Describe and give examples of temperature-related methods used in preservation of foods.		SC.912.P.8.2	FPP.04.03.03.c
13.04	Conduct an experiment in fermentation, chemical, or temperature-related method of food preservation.	MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.4	SC.912.N.1.1 SC.912.P.8.2 SC.912.L.18.8	
14.0	Describe relationships between diet and a healthy body – the student will be able to:			FPP. 03.01.03.a
14.01	Describe the processes used by the body in utilization of the six basic nutrients.		SC.912.L.18.1 SC.912.L.18.2 SC.912.L.18.3	FPP. 03.01.03.a

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
		SC.912.L.18.4	
14.02 Define anabolism and catabolism as two opposing processes of metabolism.			FPP. 03.01.03.c
14.03 Analyze the relationship between food intake, energy use, and body weight.	MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3 MAFS.912.F-LE.1.4		FPP. 03.01.03.c
14.04 Explain the interrelationship between diet and individual medical conditions.	MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3 MAFS.912.F-LE.1.4 MAFS.912.F-LE.2.5		FPP. 03.01.03.c
14.05 Describe the characteristics of a healthy diet.			FPP.01.01.01.a

Additional Information

Laboratory Activities

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

Career and Technical Student Organization (CTSO)

FFA and FCCLA are the intercurricular career and technical student organizations 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. 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.

Additional Resources

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

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

Florida Department of Education
Curriculum Framework

Program Title: Land Resources Technology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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	8913000
CIP Number	0715059902
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2 WSP OPER @7 G BIO 1
CTSO	FFA
SOC Codes (all applicable)	17-3025 - Environmental Engineering Technicians
CTE Program Resources	http://www.fl DOE.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the land resources sector of the Agriculture, Food and 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	Graduation Requirement
A	8913010	Introduction to Environmental Technology	1 credit	17-3025	2	VO
	8913020	Environmental Technology 2	1 credit		2	VO
B	8913030	Land Resources 3	1 credit	17-3025	3	VO
	8913040	Land Resources 4	1 credit		3	VO

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

This program is daggered and will not be aligned to academic courses.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth-Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Introduction to Environmental Technology	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%
Environmental Technology 2	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%
Land Resources 3	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%
Land Resources 4	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%

** Alignment pending review

Alignment attempted, but no correlation to academic course

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Introduction to Environmental Technology	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%
Environmental Technology 2	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%
Land Resources 3	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%
Land Resources 4	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%

** 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.

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.

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	

Florida Standards		Correlation to CTE Program Standard #
	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.	
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	
02.02	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 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	
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-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.		SC.912.E.7.3	
04.02 Explain surface water systems.		SC.912.E.7.8 SC.912.L.17.16	ESS.03.03.03.b
04.03 Explain ground water systems.		SC.912.E.6.4 SC.912.E.7.8 SC.912.L.17.16	ESS.03.03.03.b
04.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.	MAFS.912.A-SSE.1.1, 2 MAFS.912.A-SSE.2.3	SC.912.L.17.10 SC.912.E.7.1 SC.912.N.3.5	
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.		SC.912.E.7.8 SC.912.E.6.4 SC.912.N.3.5	
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.		SC.912.L.14.6	
05.02 Identify and utilize safe work practices.		SC.912.L.14.6	
05.03 Identify physical, chemical, biological, and zoological hazards.		SC.912.L.14.6	
05.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental		SC.912.L.14.6 SC.912.L.17.13	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Agency (OSHA), and Hazard Communication (HAZCOM) regulations.			
05.05 Determine, review, and follow regulations.		SC.912.L.17.13	
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.		SC.912.L.14.6	
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.		SC.912.N.1.1	
06.02 Operate, calibrate, and maintain sampling equipment.		SC.912.N.1.1	
06.03 Develop sampling strategy.	MAFS.912.S-IC.1.1, 2	SC.912.N.1.1 SC.912.N.3.5	
06.04 Perform applicable field measurements.		SC.912.N.1.1	
06.05 Appropriately preserve, document, and dispose of samples.	MAFS.912.S-ID.1.1, 2, 3 MAFS.912.S-CP.1.5	SC.912.N.1.1	
06.06 Identify cross-contamination and other risks associated with sampling.		SC.912.N.1.1	
06.07 Describe, plan, and utilize quality assurance practices.	MAFS.912.S-ID.3.9	SC.912.N.1.1 SC.912.N.3.5	
06.08 Submit samples for analysis.		SC.912.N.1.1	
06.09 Perform periodic follow-up sampling.		SC.912.N.1.1	
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.		SC.912.L.17.13	
07.02 Describe the Florida Administrative Code’s (F.A.C.) impact on environmental issues.		SC.912.L.17.13	
07.03 Discuss the Clean Water Act.		SC.912.L.17.13	

CTE Standards and Benchmarks	FS-M/LA	NGSS-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.		SC.912.L.17.13	
07.05 Research how rules and laws are made and mandated.		SC.912.L.17.13	
07.06 Research and report how endangered species get listed.		SC.912.L.17.13	
07.07 Describe permitting procedures.		SC.912.L.17.13	
07.08 Identify regulation resources.		SC.912.L.17.13	
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.		SC.912.N.1.1	
08.02 Describe required documentation.			
08.03 Identify the phases of site assessment.		SC.912.N.1.1	
08.04 Obtain background design information			
08.05 Verify blueprint accuracy.	MAFS.912.N-Q.1.2, 4 MAFS.912.G-GMD.2.4 MAFS.912.G-SRT.1.1	SC.912.N.3.5	
08.06 Conduct manual survey.	MAFS.912.G-CO.4.12	SC.912.N.1.1 SC.912.N.3.5	
08.07 Obtain physical and performance measurements.	MAFS.912.N-Q.1.2, 3 MAFS.912.G-GMD.2.4 MAFS.912.G-SRT.1.1	SC.912.N.1.1	
08.08 Determine system safety impacts.			
08.09 Determine possible nature and extent of exposure.		SC.912.L.14.6	
08.10 Assess needed equipment and processes.			
08.11 Identify type of mechanical systems required.			
08.12 Determine operational criteria.		SC.912.N.3.5	
08.13 Recommend corrective action.		SC.912.L.17.17	
09.0 Describe related geologic principles – the student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
09.01 Explain the geological history of Florida.		SC.912.E.7.3 SC.912.N.3.5 SC.912.E.6.2, 4	
09.02 Create a soil profile and describe the associated components.		SC.912.E.7.3 SC.912.N.3.5 SC.912.E.6.4	
09.03 Evaluate soil profiles, land-capability classes, and soil conservation practices.	MAFS.912.A-SSE.1.1 MAFS.912.F-IF.2.5	SC.912.E.7.3 SC.912.N.3.5 SC.912.E.6.4	
09.04 Interpret legal descriptions of land.		SC.912.L.17.13	
09.05 Identify mapping and surveying techniques and equipment.	MAFS.912.N-Q.1.2, 3 MAFS.912.G-GMD.2.4 MAFS.912.G-SRT.1.1 MAFS.912.G-CO.4.12	SC.912.N.1.1 SC.912.N.3.5 SC.912.E.6.2	
10.0 Manage wetlands – the student will be able to:			
10.01 Identify ecosystems.		SC.912.L.17.7, 9 SC.912.N.3.5	
10.02 Discuss the structure and function of wetlands.		SC.912.L.17.2, 9 SC.912.N.3.5	
10.03 Define limits of wetlands.		SC.912.L.17.2, 4, 13	
10.04 Discuss habitat value.		SC.912.L.17.7, 8, 17	
10.05 Identify fauna and flora.		SC.912.L.17.9	
10.06 Determine desirable vs. nuisance plant and animal species.		SC.912.L.17.6, 8	
11.0 Manage wildlife – the student will be able to:			
11.01 Identify and compare wildlife species.		SC.912.L.17.6	
11.02 Identify and describe life histories of game species.		SC.912.L.17.6	
11.03 Identify and describe life histories of non-game species.		SC.912.L.17.6	
11.04 Discuss urban wildlife management.		SC.912.L.17.6, 13, 17 SC.912.N.3.5	
11.05 Describe community ecology.		SC.912.L.17.1, 5, 6	
11.06 Identify and practice wildlife techniques and principles.		SC.912.N.1.1	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
		SC.912.L.17.1, 5, 17	
11.07 Discuss population dynamics.	MAFS.912.S-MD.2.5, 6, 7 MAFS.912.S-CP.1.2, 3, 5 MAFS.912.G-MG.1.2	SC.912.L.17.1, 5	
12.0 Manage forests – the student will be able to:			
12.01 Describe dendrology.		SC.912.L.17.4, 19	
12.02 Describe silviculture.	MAFS.912.G-SRT.3.8 MAFS.912.G-SRT.4.11 MAFS.912.G-SRT.2.5 MAFS.912.G-SRT.1.3 MAFS.912.G-MG.1.2	SC.912.L.17.4, 8 SC.912.E.7.8 SC.912.N.3.5	
12.03 Identify and demonstrate replanting techniques.		SC.912.L.17.4, 17, 19	
12.04 Discuss harvesting techniques.		SC.912.L.17.8, 19 SC.912.E.7.8 SC.912.N.3.5	
12.05 Identify timber stand improvement.		SC.912.L.17.8, 19	
12.06 Identify timber and forest products.		SC.912.L.17.8, 19	
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.		SC.912.L.17.11, 16, 20 SC.912.N.3.5	
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.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			

Daggered for Deletion

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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	

Florida Standards		Correlation to CTE Program Standard #
	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.	
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	
02.02	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 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	
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-LA

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.		SC.912.N.3.5	CS.08.01.01.a
14.02 Handle compressed gasses, solids, and liquids safely.		SC.912.P.8.1	CS.07.04.02.a
14.03 Summarize “Right of Access” law.			CS.08.01.01.a
14.04 Summarize “Confined Space” regulations.			CS.08.01.01.a
14.05 Identify Zero Tolerance policies.			CS.07.04.01.a
14.06 Identify employee limitations.			CS.07.04.01.a
14.07 Identify appropriate decontamination procedures.		SC.912.N.3.5	
14.08 Identify principles of toxicology.		SC.912.L.14.6, 52	
14.09 Identify routes of exposure.		SC.912.L.14.6, 52	
14.10 Identify respirator safety procedures.			
14.11 Discuss history of hazardous materials and hazardous categories.		SC.912.L.14.6 SC.912.N.4.2	
14.12 Discuss common chemical compatibility.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
15.0 Discuss related standards and regulations – the student will be able to:			
15.01 Identify appropriate agencies and their functions		SC.912.L.17.13	
15.02 Describe the role of environmental protection.		SC.912.L.17.13	
15.03 Interpret the Regulatory File System.		SC.912.N.3.5	
15.04 Create, evaluate and present a well-head protection plan.		SC.912.N.3.5	
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.		SC.912.N.3.5	
17.0 Describe water treatment techniques – the student will be able to:			
17.01 Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater.		SC.912.L.17.11, 14, 15, 16, 17, 20 SC.912.N.3.5 SC.912.N.4.2	
17.02 Describe disposal options.		SC.912.L.17.11, 13, 14, 15, 16, 17, 20	
17.03 Identify septic tanks types and functions.		SC.912.L.17.11, 14, 15, 16	
18.0 Describe stormwater systems – the student will be able to:			
18.01 Research current construction trends and methods of stormwater systems.		SC.912.L.17.2, 11, 14, 15, 16	
18.02 Define topography and its effects on stormwater.		SC.912.L.17.11, 14, 20 SC.912.N.3.5	
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.	MAFS.912.G-GMD.2.4	SC.912.N.3.5	
19.02 Identify possible funding sources.			
19.03 Prepare budgets and purchase orders.		SC.912.N.3.5	
19.04 Prepare a time management plan.			

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
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.		SC.912.E.7.3 SC.912.E.6.2	PST.05.03.01.a
20.02 Use GIS software.	MAFS.912.G-GMD.2.4	SC.912.E.7.3 SC.912.E.6.2, 4 SC.912.L.17.15	PST.05.03.01.a
20.03 Learn GIS applications.	MAFS.912.G-GMD.2.4	SC.912.E.7.3 SC.912.L.17.15	PST.05.03.01.a
20.04 Download LANDSTAT Satellite system into GIS.	MAFS.912.G-GMD.2.4	SC.912.N.3.5	PST.05.03.01.a
20.05 Develop a GIS model.	MAFS.912.G-GMD.2.4	SC.912.E.7.3 SC.912.N.3.5 SC.912.L.17.15 SC.912.E.6.4	
20.06 Define GPS and its function.		SC.912.E.7.3 SC.912.L.17.15	PST.05.03.01.a
20.07 Collect GPS data and load on GIS.	MAFS.912.G-GMD.2.4	SC.912.E.7.3 SC.912.L.17.15	PST.05.03.01.a
20.08 Research and identify other remote sensing tools.		SC.912.N.3.5 SC.912.E.7.3	PST.05.03.01.a
21.0 Manage hazardous materials – the student will be able to:			
21.01 Describe flow and life cycles of materials.		SC.912.N.4.4 SC.912.N.3.5	
21.02 Identify proper chemical handling and storage guidelines.		SC.912.L.17.14, 17	
21.03 Describe material management procedures.		SC.912.L.17.14 SC.912.N.3.5	
21.04 Identify waste minimization, pollution prevention and alternatives to disposal.		SC.912.L.17.14, 17 SC.912.N.4.1, 2	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
21.05 Describe waste determination procedures.		SC.912.L.17.14, 17	
21.06 Describe storage tank procedures.		SC.912.L.17.14, 17	
21.07 Identify biochemical/medical waste.		SC.912.L.17.14 SC.912.L.14.6	
21.08 Describe shipping and transportation procedures of hazardous materials.		SC.912.L.17.14	
21.09 Identify and interpret phase I and II audits.		SC.912.N.3.5	
21.10 Interpret closure reports.		SC.912.N.3.5	
21.11 Write contamination assessment reports.		SC.912.L.17.17 SC.912.N.3.5	
22.0 Control incidents – the student will be able to:			
22.01 Identify and describe reasons for controlling incidents.		SC.912.L.17.11, 14, 16	
22.02 Describe levels of response.			
22.03 Determine and use proper chain of command.			
22.04 Determine methods of control.		SC.912.L.17.11 SC.912.N.3.5	
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.		SC.912.E.7.6, 8	
22.10 Identify media protocol and procedures for communicating with the public.			
22.11 Prepare a press release for a mock incident		SC.912.N.3.5	
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.		SC.912.L.17.13	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
23.03 Identify possible contamination zones.			
23.04 Create contention plans for hurricane, tornadoes, floods, fires, and nuclear accidents.		SC.912.E.7.6, 8	
23.05 Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act (EPCRA) regulations.		SC.912.L.17.13	
23.06 Create plan for deployment.			
23.07 Evaluate contingency plans.			
23.08 Write a contingency plan.		SC.912.N.3.5	
23.09 Conduct mock disaster activities.		SC.912.N.3.5	
24.0 Perform remediation – the student will be able to:			
24.01 Research appropriate cleaning methods.		SC.912.L.17.14	
24.02 Create a plan for a disaster clean up including needed materials and equipment.		SC.912.N.3.5 SC.912.L.17.14	
24.03 Conduct entry and closure methods.			
24.04 Identify contamination removal procedures.		SC.912.L.17.14	
24.05 Design a site/system cleanliness verification procedure.		SC.912.N.3.5	
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.		SC.912.L.17.13, 14	
25.02 Identify types of waste.		SC.912.L.17.14	
25.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.)		SC.912.L.17.14, 16, 17 SC.912.N.3.5	
26.0 Identify continuing education needs and opportunities – the student will be able to:			
26.01 Determine continuing education needs/goals.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
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.			

Daggered for Deletion

**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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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	
28.02 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,	

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.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. MAFS.K12.MP.4.1	
29.05	Use appropriate tools strategically.	

Florida Standards	Correlation to CTE Program Standard #
	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-LA

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.		SC.912.L.17.11, 15, 17, 18	NRS.02.06.07.c
30.02 Discuss mitigation techniques		SC.912.L.17.15	NRS.02.05.02.b ESS.03.04.03.b
30.03 Evaluate impacts on wetlands.		SC.912.L.17.2, 13, 14, 17	ESS03.04.03.b
31.0 Evaluate wildlife management procedures – the student will be able to:			
31.01 Discuss basic mammalogy.			AS.02.01.02.a
31.02 Discuss basic ornithology.			NRS.01.02.03.b
31.03 Discuss basic herpetology.			NRS.01.02.03.b
31.04 Use a dichotomous key.		SC.912.N.3.5	NRS.01.02.03.a
31.05 Conduct experimental design and statistical analysis.	MAFS.912.S-MD.1.1, 2	SC.912.N.1.1	ESS.01.01.01.a
31.06 Conduct biological data collection.		SC.912.N.1.1	ESS.01.01.01.a
31.07 Interpret data.	MAFS.912.S-CP.1.5	SC.912.N.1.1	
31.08 Investigate system evolution.		SC.912.L.15.1, 13, 14, 15	

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
31.09 Identify common wildlife diseases and parasites.		SC.912.L.17.6	NRS.04.02.02.a
32.0 Evaluate forest management techniques – the student will be able to:			
32.01 Identify surveying techniques.	MAFS.912.N-Q.1.2, 3 MAFS.912.G-GMD.2.4 MAFS.912.G-SRT.1.1 MAFS.912.G-CO.4.12	SC.912.L.17.15	NRS.03.01.01.a
32.02 Perform timber cruising activity.	MAFS.912.G-SRT.3.8 MAFS.912.G-SRT.4.11 MAFS.912.G-SRT.2.5 MAFS.912.G-SRT.1.3 MAFS.912.G-MG.1.1	SC.912.L.17.17	NRS.03.01.01.a
32.03 Perform a pacing exercise.		SC.912.L.17.17	
32.04 Calculate area using chains.		SC.912.L.17.15	
32.05 Calculate timber volumes using a Biltmore stick.	MAFS.912.G-MG.1.1, 2, 3 MAFS.912.G-GMD.1.3	SC.912.L.17.17	NRS.03.01.01.a NRS.02.04.02.c
32.06 Identify and discuss Forestry Best Management Practices (BMP).		SC.912.E.7.8	NRS.02.04.02.c NRS.03.01.01.c
32.07 Research forestry/nursery production practices.		SC.912.E.7.8	NRS.02.04.02.b
32.08 Discuss marketability of forests.		SC.912.N.4.2	NRS.02.04.02.b
32.09 Identify timber marketing strategies.		SC.912.N.4.2	NRS.02.04.02.c
32.10 Identify related forestry equipment.		SC.912.L.17.17	NRS.03.01.01.a
33.0 Collect and dispose of solid waste – the student will be able to:			
33.01 Demonstrate the construction of artificial reefs.		SC.912.L.17.17, 19	NRS.02.01.02.c
33.02 Identify disposal methods of hazardous and biomedical waste.		SC.912.L.17.14	NRS.02.01.02.b
33.03 Describe recycling methods.		SC.912.N.4.2 SC.912.N.3.5	
33.04 Visit a Materials Recycling Facility.		SC.912.N.4.2	
34.0 Manage fires – the student will be able to:			
34.01 Describe the history of fire usage in Florida.		SC.912.E.7.3	NRS.04.01.01.a
34.02 Discuss the effects of prescribed burns and wildfires on communities in Florida.		SC.912.L.17.20	NRS.04.01.01.a

CTE Standards and Benchmarks	FS-M/LA	NGSS-Sci	National Standards
34.03 Identify and discuss safety equipment and practices related to fire management.			NRS.04.01.01.b
34.04 Identify and discuss wildfire suppression techniques.		SC.912.E.7.3, 8	NRS.04.01.01.b
34.05 Describe prescribed burn techniques.		SC.912.N.3.5 SC.912.E.7.3, 8	NRS.04.01.01.b
34.06 Evaluate site for prescribed burn.	MAFS.912.A-SSE.1.1	SC.912.E.7.3, 8	NRS.04.01.01.b
34.07 Discuss fire weather behavior.		SC.912.E.7.3, 8	NRS.04.01.01.a
34.08 Discuss seasonal ecological effects of burning.		SC.912.E.7.3, 8	NRS.04.01.01.a
34.09 Write a prescription for a prescribed burn.		SC.912.N.3.5 SC.912.E.7.3, 8	NRS.04.01.01.c
34.10 Visit a prescribed burn site.		SC.912.E.7.3, 8	NRS.04.01.01.c
34.11 Evaluate the burn.		SC.912.E.7.3, 8	NRS.04.01.01.c
35.0 Manage pests – the student will be able to:			
35.01 Discuss botany and plant taxonomy.			NRS.01.02.01.b NRS.01.02.02.b
35.02 Discuss common pests.			NRS.04.03.01.a
35.03 Classify insects using a dichotomous key		SC.912.N.3.5	NRS.04.03.01.a
35.04 Describe life cycles of common pests.		SC.912.L.17.8	NRS.04.03.01.a
35.05 Describe biological, chemical, and cultural methods of managing plant pests.		SC.912.L.17.8	NRS.04.03.01.c
35.06 Identify and select an appropriate control for each type of pest and/or weed.		SC.912.L.17.8	NRS.04.03.01.b
35.07 Describe the principles and benefits of integrated pest management.		SC.912.L.17.8, 15, 17	NRS.04.03.01.c
36.0 Manage ecosystems – the student will be able to:			
36.01 Identify habitat types of Florida.		SC.912.E.7.3	NRS.01.01.02.a
36.02 Identify archeological and historical perspectives of ecosystems.		SC.912.E.7.3	NRS.01.01.02.a
36.03 Describe specific species associations for habitats.		SC.912.E.7.3	NRS.01.01.02.b

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
36.04 Describe how ecosystems interrelate.		SC.912.E.7.3	NRS.01.01.02.b
36.05 Research associated species.		SC.912.E.7.3	NRS.01.01.02.b
36.06 Identify management techniques.		SC.912.L.17.17	NRS.01.01.02.c
37.0 Plan and administer land use – the student will be able to:			
37.01 Discuss the geography of the area.		SC.912.E.7.3	
37.02 Review historical information of the area.			
37.03 Review section, township, and range maps.	MAFS.912.G-SRT.1.1		
37.04 Review aerial maps.	MAFS.912.G-SRT.1.1	SC.912.L.17.15	
37.05 Interpret topographical and flood plain maps.	MAFS.912.G-GMD.2.4	SC.912.E.7.3	
37.06 Forecast demographic patterns.	MAFS.912.G-MD.2.6 MAFS.912.G-MD.1.4 MAFS.912.C-CP.1.5 MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5	SC.912.L.17.1	
37.07 Discuss population dynamics.	MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5	SC.912.L.17.1, 18	
37.08 Conduct population studies.	MAFS.912.S-CP.1.5 MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5	SC.912.L.17.1	
37.09 Discuss growth management.	MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5 MAFS.912.F-LE.2.5	SC.912.L.17.20	
37.10 Discuss coastal management issues.		SC.912.L.17.17	
37.11 Describe special protection zones.		SC.912.L.17.17	
37.12 Research per capita land consumption	MAFS.912.S-MD.1.4 MAFS.912.S-MD.2.6 MAFS.912.G-GMD.1.2	SC.912.L.17.20	
37.13 Compare consumptive and non-consumptive land uses.		SC.912.L.17.17, 20	
37.14 Describe and compare land uses including commercial, residential, recreational and agricultural uses.		SC.912.L.17.17	
37.15 Design a balanced land use plan.		SC.912.L.17.17	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
38.0 Protect resources – the student will be able to:			
38.01 Identify and discuss archeological sites.		SC.912.L.17.18	
38.02 Describe Endangered Species Act.		SC.912.L.17.13	
38.03 Research regulations regarding protection of wildlife resources.		SC.912.L.17.13	
38.04 Research wetland protection practices.		SC.912.L.17.12, 13	
38.05 Identify soil protection practices.		SC.912.L.17.17 SC.912.E.6.4	
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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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.	

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 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	
28.02	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	

Florida Standards		Correlation to CTE Program Standard #
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. MAFS.K12.MP.4.1	

Florida Standards	Correlation to CTE Program Standard #
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

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.		SC.912.L.17.1, 6	
40.02 Assess environmental impact of pests.		SC.912.L.17.1, 6	
40.03 Conduct pest population studies.	MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5	SC.912.L.17.1	
40.04 Discuss pesticide safety/regulations.			
40.05 Discuss basic toxicology.		SC.912.L.14.6 SC.912.L.17.17	
40.06 Identify chemicals used in pest management.		SC.912.L.14.6 SC.912.L.17.17	
40.07 Collect biological data.		SC.912.N.1.1	
41.0 Manage ecosystems – the student will be able to:			
41.01 Describe political, biological, economical, and sociological impacts on managing ecosystems.		SC.912.L.17.13, 17	
41.02 Describe the effects of manipulation of species composition.		SC.912.L.17.1, 5	
41.03 Compare population dynamics.	MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5	SC.912.L.17.1	
41.04 Discuss the effects of genetic isolation.		SC.912.L.15.14	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
41.05 Discuss bio-diversity.		SC.912.L.17.8	
41.06 Evaluate how external factors affect communities.	MAFS.912.S-IC.2.4, 5		
41.07 Research public use.			
41.08 Identify remote sensing techniques.		SC.912.L.17.15, 17	
41.09 Identify vegetative monitoring techniques		SC.912.L.17.15, 17	
41.10 Conduct vegetation analysis.		SC.912.N.3.5 SC.912.L.17.17	
41.11 Perform sampling, management, and analysis of data.	MAFS.912.S-MD.2.6, 7 MAFS.912.S-IC.2.6	SC.912.L.17.17	
41.12 Practice ecological ethics.		SC.912.N.1.2 SC.912.N.4.1, 2	
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.		SC.912.L.17.19	
42.07 Discuss the effects of drainage on resources.		SC.912.L.17.19	
42.08 Discuss unique environmental features.		SC.912.L.17.11	
42.09 Analyze sanitary sewer, water supply, and sewer needs.	MAFS.912.S-IC.2.6 MAFS.912.G-MG.1.2, 3	SC.912.L.17.14	
42.10 Discuss the need for inter-group coordination activities.			
42.11 Conduct a compatibility analysis.			
42.12 Prepare and write a conservation plan for a specific parcel of land.		SC.912.N.1.1	
42.13 Write a capital improvement plan.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
42.14 Project maintenance management costs.	MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5		
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.		SC.912.L.17.20	
43.04 Perform public awareness activities.			
43.05 Design educational materials.		SC.912.N.3.5	
44.0 Discuss restoration ecology – the student will be able to:			
44.01 Review geology, pedology, and hydrology.			
44.02 Research of vegetation dynamics.		SC.912.L.17.19	
44.03 Determine requirements for preserving plant viability.		SC.912.L.17.19	
44.04 Propagate and grow plants through sexual and/or asexual reproduction.		SC.912.L.17.19	
44.05 Select and prepare plants for transporting and transplanting.		SC.912.L.17.19	
44.06 Install plant materials.		SC.912.L.17.19	
44.07 Describe restoration techniques.		SC.912.L.17.8	
44.08 Research wetlands reclamation and uplands restoration.		SC.912.L.17.8	
44.09 Diagnose restoration from a systems approach.		SC.912.L.17.8	
44.10 Discuss mine reclamation.		SC.912.L.17.8	
44.11 Identify related equipment.			
44.12 Research applicable monitoring techniques.			

Additional Information

Laboratory Activities

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

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. 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.

Additional Resources

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

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

Daggered for Deletion

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
CTE Program Resources	http://www.fl DOE.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the land resources sector of the Agriculture, Food and 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	VO
	8913020	Environmental Technology 2	1 credit		2	VO
B	8916010	Water Quality Resources 3	1 credit	17-3025	3	VO
	8916020	Water Quality Resources 4	1 credit		3	VO

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics, VO= Career and Technical Education)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

This program is daggered and will not be aligned to academic courses.

Courses	Anatomy/ Physiology Honors	Astronomy Solar/Galactic Honors	Biology 1	Chemistry 1	Earth- Space Science	Environmental Science	Genetics	Integrated Science	Marine Science 1 Honors	Physical Science	Physics 1
Introduction to Environmenta l Technology	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%
Environmenta l Technology 2	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%
Water Quality Resources 3	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%
Water Quality Resources 4	0/87 0%	0/80 0%	0/83 0%	0/69 0%	0/67 0%	0/70 0%	0/69 0%	0/82 0%	0/66 0%	0/74 0%	0/72 0%

** Alignment pending review

Alignment attempted, but no correlation to academic course

This program is daggered and will not be aligned to academic courses.

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
Introduction to Environmental Technology	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%
Environmental Technology 2	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%
Water Quality Resources 3	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%
Water Quality Resources 4	0/67 0%	0/75 0%	0/54 0%	0/46 0%	0/45 0%	0/45 0%	0/45 0%

** 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.

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 Water Resources Technology.
- 02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Water Resources Technology.
- 03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Water 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 Water Resources Technology.
- 28.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Water Resources Technology.
- 29.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Water 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.

Flagged for Deletion

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.

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

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 Water 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	

Florida Standards		Correlation to CTE Program Standard #
	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.	
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 Water 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	
02.02	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 Water 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	
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

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.
05.08	Perform lifting activities safely.
05.09	Identify ladder safety and fall protection.

CTE Standards and Benchmarks

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 statures.
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:

CTE Standards and Benchmarks

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:
10.01	Identify ecosystems.
10.02	Discuss the structure and function of wetlands.

CTE Standards and Benchmarks

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:
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.

CTE Standards and Benchmarks

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.

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

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 Water 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	

Florida Standards		Correlation to CTE Program Standard #
	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.	
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 Water 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	
02.02	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 Water 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	
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

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
15.02	Describe the role of environmental protection.
15.03	Interpret the Regulatory File System.

CTE Standards and Benchmarks

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.

19.10 Identify suppliers and technical resources.

20.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems--The student will be able to:

CTE Standards and Benchmarks

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:

22.01 Identify and describe reasons for controlling incidents.

22.02 Describe levels of response.

CTE Standards and Benchmarks

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.
24.02	Create a plan for a disaster clean up including needed materials and equipment.
24.03	Conduct entry and closure methods.

CTE Standards and Benchmarks

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.

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

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 Water 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.	

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 Water 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	
28.02	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	

Florida Standards		Correlation to CTE Program Standard #
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 Water 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. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
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:
32.01	Analyze local mineral resources.
32.02	Describe lithological descriptions of local units/formations.

CTE Standards and Benchmarks

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.
35.02	Identify necessary equipment for water distribution purposes.
35.03	Read and maintain meters.

CTE Standards and Benchmarks

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.

38.02 Identify appropriate temperatures and other external conditions.

38.03 Identify the effect of weather conditions and changes.

CTE Standards and Benchmarks

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.

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

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 Water 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.	

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 Water 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	
28.02	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	

Florida Standards		Correlation to CTE Program Standard #
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 Water 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. MAFS.K12.MP.4.1	

Florida Standards		Correlation to CTE Program Standard #
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.
43.04	Identify aquaculture and mariculture practices.
43.05	Identify hatchery management.

CTE Standards and Benchmarks

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.

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.

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	FFA	
SOC Codes (all applicable)	31-9096 - Veterinary Assistants and Laboratory Animal Caretakers 29-2056 - Veterinary Technologists and Technicians	
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml	
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.

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	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.

Florida Department of Education
Student Performance Standards

Program Title: **Veterinary Assisting**
PSAV Number: **A010512**

Benchmarks that appear in bold within the framework are skills or competencies that have been taken directly from the FVMA Skills Competency Validation list. The most up to date validation list can be found on the FVMA website.

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	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:
15.04.1	Identify the general function of the respiratory system and the major organs.

15.04.2	Identify the general function of the skeletal system and the major bones of the axial and appendicular skeleton.
15.04.3	Identify the general function of the muscular system and major groups of muscles.
15.04.4	Identify the general function of the digestive system and the major organs.
15.04.5	Identify the general function of the cardiovascular system and the major organs.
15.04.6	Identify the general function of the respiratory system and the major organs.
15.04.7	Identify the general function of the endocrine and the major organs.
15.04.8	Identify the general function of the urinary system and the major organs.
15.04.9	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.
28.09.1	Keep assigned work areas clean and organized.
28.09.2	Explain sanitary procedures including physical cleaning, disinfecting, and sterilizing.
28.09.3	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).
28.09.4	List precautions to take when mixing or using multiple cleaning and disinfecting agents i.e. NEVER mix bleach with ammonia containing cleaners or disinfectants.
28.09.5	Change bedding materials in a timely and efficient manner.
28.09.6	Demonstrate of the proper disposal of bedding and waste materials.
28.09.7	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:
29.02.1	List methods for urine collection commonly used in the veterinary practice.
29.02.2	Collect a free-caught urine sample using proper techniques for dogs.
29.02.3	Identify time and storage parameters for urine samples.
29.02.4	List precautions and safety factors in handling urine samples including personal protection equipment.

29.03	Explain fecal test including:
29.03.1	Explain methods of collecting fecal samples.
29.03.2	Identify time and storage parameters for fecal samples.
29.03.3	Identify appropriate volume of feces for each method of testing.
29.03.4	Demonstrate the correct technique for handling and preparing the fecal samples for analysis by flotation, sedimentation, and direct smear.
29.03.5	Explain appropriate method of placing sample on microscope slide or cover slip.
29.03.6	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.
29.05.1	Discuss restrictions from radiation exposure for pregnant women and minors.
29.05.2	Explain what a dosimeter badge does and who wears it and when.
29.05.3	Demonstrate the area of exposure in the radiology room including direct beam and scatter radiation.
29.05.4	Explain the correct use of personal protection equipment including lead-shielded gowns, lead gloves, lead thyroid shield, lead glasses, and other lead protective wear.
29.05.5	Explain methods of restraint for positioning for radiographs including no-hold positioning.
29.05.6	Explain the proper handling of radiographic film including safe light use.
29.05.7	Demonstrate the appropriate labeling of a radiograph including date, patient name, view or side of patient, machine calibrations, and film developing.
29.05.8	Maintain radiograph log and filing of films.
29.05.9	Explain how digital radiography differs from film.
29.06	Explain a necropsy and discuss disposal of dead animal- esp. how to handle rabies suspect.
29.06.1	List the common species which may transmit rabies to humans.
29.06.2	Explain the methods of transmission of rabies to animals and humans.
29.06.3	List the symptoms associated with rabies.
29.06.4	Explain the proper safety measures to follow when handling an animal suspected of having rabies.

29.06.5	Explain the procedure for euthanasia suitable as an explanation for a pet owner.
29.06.6	Discuss the grief process that an owner may experience on the loss of the pet.
29.06.7	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 an 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.

	<ul style="list-style-type: none"> • 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 investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

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. The most up to date validation list can be found on the FVMA website.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization(s) 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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

Florida Department of Education
Curriculum Framework

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

NOTE: This program has been daggered for deletion with 2015-2016 being the last cohort of students permitted to enroll in the program. **After 2015-2016, 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	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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
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.

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

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. **After 2014-2015, 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.

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.).

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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	Cultivate and mulch plants.
21.10	Prune trees based on ANSI (American National Standard Institute) standards.
21.11	Provide protection for plants from adverse weather conditions.
21.12	Comply with local, state, and federal regulations regarding landscape maintenance and pesticide applications.
21.13	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.

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Course Number: ORH0887
Occupational Completion Point: C
Landscape Contractor – 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 investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

Daggered for Deletion

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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
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.

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 Demonstrate plant propagation techniques
- 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 safety procedures in the workplace
- 12.0 Classify plants based on scientific principles
- 13.0 Demonstrate proper use of growing media and fertilizers
- 14.0 Demonstrate Integrated Pest Management approaches
- 15.0 Identify the principles and requirements of plant growth
- 16.0 Apply best management practices in landscape design
- 17.0 Apply principles of landscape design and maintenance
- 18.0 Harvest, transport, and install plant materials
- 19.0 Identify procedures to operate, repair, and maintain tools and equipment
- 20.0 Identify emerging technologies in the horticulture industry
- 21.0 Demonstrate leadership, employability, communications and human relations skills
- 22.0 Apply knowledge to identify and classify plants.
- 23.0 Control pests.
- 24.0 Operate tools and equipment.
- 25.0 Prepare growing media.
- 26.0 Irrigate plants.
- 27.0 Demonstrate proper fertilizing techniques.
- 28.0 Demonstrate abilities to maintain and analyze records
- 29.0 Maintain tools and equipment
- 30.0 Demonstrate application of chemicals and calibrate spray equipment
- 31.0 Develop irrigation and drainage plan.
- 32.0 Raise crop to point of sale.
- 33.0 Prune and shape nursery stock.
- 34.0 Harvest, process, and ship nursery stock.
- 35.0 Market nursery stock.
- 36.0 Operate, repair, and maintain nursery equipment and facilities
- 37.0 Identify business principles

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.
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.
04.0	Demonstrate plant propagation techniques – 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 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.
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.
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.
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.
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 safety procedures in the workplace – the student will be able to:
11.01	Describe emergency procedures in the horticulture workplace.
11.02	Create preventive measures to avoid hazardous situations.
11.03	Apply problem solving skills to correct a hazardous situation.
12.0	Classify plants based on scientific principles – the student will be able to:
12.01	Describe principles of plant biology and growth.
12.02	Explain the role of plants in the ecosystem.
12.03	Describe the major classifications of plants based on life cycle.
12.04	Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.
12.05	Demonstrate proper use of scientific names.

13.0	Demonstrate proper use of growing media and fertilizers – the student will be able to:
13.01	Apply information on a label of fertilizer used in Florida.
13.02	Apply fertilizer and soil amendments.
13.03	Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.
13.04	Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.
13.05	Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.
13.06	Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.
14.0	Demonstrate Integrated Pest Management approaches – the student will be able to:
14.01	Classify insects according to feeding habits.
14.02	Describe biological, chemical, and cultural methods of controlling plant pests.
14.03	Diagnose and outline a plan for controlling pests on a horticultural crop.
14.04	Describe methods of controlling nematode pests on ornamental plants.
14.05	Develop a pest control program for a horticultural crop using Integrated Pest Management.
15.0	Identify the principles and requirements of plant growth – the student will be able to:
15.01	Demonstrate methods of pruning plants.
15.02	Identify appropriate time to prune plants.
15.03	Identify and select pruning tools.
15.04	Demonstrate proper use of pruning tools and care.
15.05	Identify Plant Growth Regulators and their use on horticulture and landscape plants.
15.06	Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.
15.07	Identify specific cultural, mechanical, chemical, and biological methods of weed management.
16.0	Apply best management practices in landscape design – the student will be able to:
16.01	Identify and apply Best Management Practices for the design and installation of landscapes.

16.02	Identify and apply Best Management Practices on the management and handling of pesticides.
17.0	Apply principles of landscape design and maintenance – the student will be able to:
17.01	Demonstrate the use of line, form, texture and color in designing landscapes.
17.02	Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.
17.03	Apply points of emphasis and major design areas in the commercial landscape.
17.04	Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.
17.05	Create a landscape plan for a residential or commercial property.
17.06	Calculate materials needed according to the identified landscape plan.
17.07	Identify factors in selecting turf for landscape installation.
18.0	Harvest, transport, and install plant materials – the student will be able to:
18.01	Determine requirements for preserving plant viability.
18.02	Demonstrate proper landscape plant establishment techniques.
18.03	Select and prepare plants for transporting and transplanting.
18.04	Select horticultural products according to Florida grades and standards.
19.0	Identify procedures to operate, repair, and maintain tools and equipment – the student will be able to:
19.01	Perform equipment pre-operational check.
19.02	Identify, maintain, and operate hand tools and power tools.
20.0	Identify emerging technologies in the horticulture industry – the student will be able to:
20.01	Investigate DNA and genetics applications in horticulture including the theory of probability.
20.02	Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).
21.0	Demonstrate leadership, employability, communications and human relations skills – the student will be able to:
21.01	Identify acceptable work habits and personal characteristics.
21.02	Identify acceptable employee hygiene habits.

21.03 Identify or demonstrate appropriate responses to criticism from employer,

21.04 Describe the importance of industry certifications.

Course Number: ORH0863
Occupational Completion Point: B
Nursery and Greenhouse Managers 1– 450 Hours – SOC Code 11-9013

22.0 Apply knowledge to identify and classify plants – the student will be able to:

22.01 Classify plants as monocots or dicots.

22.02 Classify plants as annuals, biennials, and perennials.

22.03 Identify plants appropriate to a region.

22.04 Classify plants according to growth habit.

22.05 Prepare propagation materials (seeds, cuttings, etc.) for planting.

22.06 Apply growth stimulants to propagation materials.

22.07 Demonstrate sanitation and safety practices when propagating.

22.08 Prepare flats and seedbeds and plant seeds.

23.0 Control pests – the student will be able to:

23.01 Report insect and disease damage.

23.02 Identify chemical spray damage.

23.03 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds.

23.04 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program.

24.0 Operate tools and equipment – the student will be able to:

24.01 Identify, operate, and maintain tractor and power equipment.

24.02 Load, secure, and transport equipment.

25.0	Prepare growing media – the student will be able to:
25.01	Sterilize rooting, potting, and growing media.
25.02	Adjust pH and nutritional levels of media.
25.03	Fill and level benches and pots with media.
25.04	Demonstrate sanitation practices when handling and storing plant media materials.
26.0	Irrigate plants – the student will be able to:
26.01	Set up an irrigation system for a propagation area.
26.02	Set up an irrigation system for a growing structure.
26.03	Set up an irrigation system for a retail display.
26.04	Maintain and repair an irrigation system.
26.05	Identify and use various types of irrigation systems (low volume, ebb and flow, drip, mat, recirculating, etc.).
26.06	Explain and apply Best Management Practices as they apply to irrigation.
27.0	Demonstrate proper fertilizing techniques – the student will be able to:
27.01	Collect soil and leaf tissue samples for analysis.
27.02	Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions.
27.03	Demonstrate proper handling and storage of fertilizers, observing safety precautions.
27.04	Evaluate, operate, and maintain fertilizer distribution equipment.
27.05	Develop a fertilization schedule for various plant species.
27.06	Determine rate of fertilizer application.
28.0	Demonstrate abilities to maintain and analyze records – the student will be able to:
28.01	Create a plant and inventory supply list.
28.02	Maintain current plant and supply inventory.
28.03	Maintain job records, daily log sheets, and inventory.

28.04	Calculate labor costs involved with product pricing.
28.05	Analyze and maintain production and sales records.
28.06	Determine plant production costs.
28.07	Prepare a budget.
29.0	Maintain tools and equipment – the student will be able to:
29.01	Maintain oil level in engines of power equipment.
29.02	Check and maintain tire air pressure on equipment.
29.03	Maintain fuel levels using proper fuel or fuel mixtures.
29.04	Demonstrate proper equipment operations.
29.05	Identify, operate, and maintain tractor and power equipment.

Course Number: ORH0864	
Occupational Completion Point: C	
Nursery and Greenhouse Managers 2– 150 Hours – SOC Code 11-9013	
30.0	Demonstrate application of chemicals and calibrate spray equipment – the student will be able to:
30.01	Select, mix, and apply a non-restricted chemical according to the label and local, state, federal, and EPA regulations.
30.02	Discuss appropriate responses to chemical or fertilizer spills.
30.03	Identify and report insect and disease damage on plants and turf.
30.04	Diagnose a plant or disease problem on turf.
31.0	Develop irrigation and drainage plan – the student will be able to:
31.01	Identify drainage components for different types of drainage systems.
31.02	Install irrigation systems with control valves and clocks.
31.03	Set up an irrigation system for a growing area.
31.04	Comply with local, state and federal conservation guidelines.

32.0	Raise crop too point of sale – the student will be able to:
32.01	Choose plant, container, media, and growing structure.
32.02	Apply sound cultural practices.
32.03	Use chemicals to raise crop (i.e. fertilizer, growth retardants, pesticides).
32.04	Schedule crop for sale.
32.05	Maintain production records
33.0	Prune and shape nursery stock – the student will be able to:
33.01	Prune plants to achieve desired growth and shape.
33.02	Select and use chemical growth regulators.
33.03	Identify techniques for pruning specialty items (topiary, bonsai).
33.04	Set up an irrigation system for a growing area.
34.0	Harvest, process, and ship nursery stock – the student will be able to:
34.01	Determine customer needs per landscape plan.
34.02	Grade and harvest field-grown plants (ball, burlap, bare-root, "grow bags").
34.03	Identify mechanical techniques for harvesting field-grown plants (tree spade and mechanical digger).
34.04	Select and assemble container-grown plants using industry-accepted grades and standards.
34.05	Prepare for shipment, loading, and transporting harvested plant materials.
34.06	Comply with regulations regarding the inspection and movement of plant materials.
34.07	Demonstrate safety practices when harvesting, processing, and shipping nursery stock.
34.08	Determine proper shipping environment.
35.0	Market nursery stock – the student will be able to:
35.01	Label and merchandise plants including plant care tags, bar codes, and shipping instructions.
35.02	Maintain clean and attractive merchandising and display areas safely.

35.03	Use various advertising methods to promote sales.
35.04	Take telephone orders.
35.05	Use sales catalog.
35.06	Greet customers and close sales.
35.07	Describe care and use of plants and related products to customers.
35.08	Handle customer complaints and problems.
36.0	Operate, repair, and maintain nursery equipment and facilities – the student will be able to:
36.01	Determine equipment needs for the job.
36.02	Order parts and supplies.
36.03	Perform simple electrical repairs.
36.04	Build or repair frames, benches, and other greenhouse or nursery facilities.
36.05	Demonstrate safety practices when working with equipment and facilities.
37.0	Identify business principles – the student will be able to:
37.01	Describe principles of business management.
37.02	Describe business organizational structures.
37.03	Cite financial management methods.
37.04	Interpret laws, regulations, and codes pertinent to the nursery industry.

Additional Information

Laboratory Activities

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

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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

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	FFA
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources 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
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

Special Notes

The **Cooperative Education Manual** is available on-line and 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/core/fileparse.php/3/urllt/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.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

Florida Department of Education
Curriculum Framework

Program Title: Sports and Recreational Turf Management
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. **After 2014-2015, 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	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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
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.

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.

Florida Department of Education
Student Performance Standards

Program Title: Sports and Recreational Turf Management
PSAV Number: A020607

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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.).

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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.

NOTE: This program has been daggered for deletion with 2014-2015 being the last cohort of students permitted to enroll in the program. After 2014-2015, 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.

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.

Daggered for Deletion

Additional Information

Laboratory Activities

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

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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

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.

Additional Resources

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

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

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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
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.

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 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.

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

Career and Technical Student Organization (CTSO)

Delta Epsilon Chi is the intercurricular 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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

**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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
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.

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 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.

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: ORH0614
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 – 150 Hours – 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 investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

Delta Epsilon Chi (postsecondary) is the intercurricular 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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

**Florida Department of Education
Curriculum Framework**

Program Title: Landscape & Turf Management
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

PSAV

Program Number	A200100
CIP Number	0101060703
Grade Level	30, 31
Standard Length	900 hours
Teacher Certification	AGRICULTUR 1 @2
CTSO	N/A
SOC Codes (all applicable)	45-2092- Farmworkers and Laborers, Crop, Nursery, and Greenhouse 37-3011 - Landscaping and Groundskeeping Workers 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
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.

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	ORH0802	Landscaping and Grounds keeping	450 hours	37-3011
C	ORH0803	Landscaping And Grounds keeping Supervisors	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 Demonstrate plant propagation techniques
- 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 safety procedures in the workplace
- 12.0 Classify plants based on scientific principles
- 13.0 Demonstrate proper use of growing media and fertilizers
- 14.0 Demonstrate Integrated Pest Management approaches
- 15.0 Identify the principles and requirements of plant growth
- 16.0 Apply best management practices in landscape design
- 17.0 Apply principles of landscape design and maintenance
- 18.0 Harvest, transport, and install plant materials
- 19.0 Identify procedures to operate, repair, and maintain tools and equipment
- 20.0 Identify emerging technologies in the horticulture industry
- 21.0 Demonstrate leadership, employability, communications and human relations skills
- 22.0 Maintain tools and equipment
- 23.0 Demonstrate application of chemicals and calibrate spray equipment
- 24.0 Classify plants and turfgrass
- 25.0 Demonstrate fertilization skills
- 26.0 Irrigate plants and turf
- 27.0 Layout and install landscape and/or interiorscape
- 28.0 Maintain landscape
- 29.0 Maintain customer relations and observe follow-up procedures
- 30.0 Analyze and design landscape
- 31.0 Prepare estimates, contracts, and presentation
- 32.0 Lay out and install landscape and turf
- 33.0 Conduct final walk-through of landscape installation
- 34.0 Maintain tools and equipment
- 35.0 Identify components of athletic fields
- 36.0 Maintain athletic fields
- 37.0 Develop recreational areas

- 38.0 Maintain sports turf
- 39.0 Establish turfgrass
- 40.0 Tending and rejuvenating turf

Florida Department of Education
Student Performance Standards

Program Title: Landscape & Turf Management
PSAV Number: A200100

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.
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.
04.0	Demonstrate plant propagation techniques – 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 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.
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.
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.
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.
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 safety procedures in the workplace – the student will be able to:
11.01	Describe emergency procedures in the horticulture workplace.
11.02	Create preventive measures to avoid hazardous situations.
11.03	Apply problem solving skills to correct a hazardous situation.
12.0	Classify plants based on scientific principles – the student will be able to:
12.01	Describe principles of plant biology and growth.
12.02	Explain the role of plants in the ecosystem.
12.03	Describe the major classifications of plants based on life cycle.
12.04	Demonstrate the use of scientific and common names of plants including genus and specific epithet and cultivar.

12.05	Demonstrate proper use of scientific names.
13.0	Demonstrate proper use of growing media and fertilizers – the student will be able to:
13.01	Apply information on a label of fertilizer used in Florida.
13.02	Apply fertilizer and soil amendments.
13.03	Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.
13.04	Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.
13.05	Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.
13.06	Using references make fertilizer recommendations for ornamental plants, turf grass, and palms.
14.0	Demonstrate Integrated Pest Management approaches – the student will be able to:
14.01	Classify insects according to feeding habits.
14.02	Describe biological, chemical, and cultural methods of controlling plant pests.
14.03	Diagnose and outline a plan for controlling pests on a horticultural crop.
14.04	Describe methods of controlling nematode pests on ornamental plants.
14.05	Develop a pest control program for a horticultural crop using Integrated Pest Management.
15.0	Identify the principles and requirements of plant growth – the student will be able to:
15.01	Demonstrate methods of pruning plants.
15.02	Identify appropriate time to prune plants.
15.03	Identify and select pruning tools.
15.04	Demonstrate proper use of pruning tools and care.
15.05	Identify Plant Growth Regulators and their use on horticulture and landscape plants.
15.06	Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop.
15.07	Identify specific cultural, mechanical, chemical, and biological methods of weed management.
16.0	Apply best management practices in landscape design – the student will be able to:

16.01	Identify and apply Best Management Practices for the design and installation of landscapes.
16.02	Identify and apply Best Management Practices on the management and handling of pesticides.
17.0	Apply principles of landscape design and maintenance – the student will be able to:
17.01	Demonstrate the use of line, form, texture and color in designing landscapes.
17.02	Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.
17.03	Apply points of emphasis and major design areas in the commercial landscape.
17.04	Identify plant selection for a commercial landscape using Florida Friendly Landscape Principles.
17.05	Create a landscape plan for a residential or commercial property.
17.06	Calculate materials needed according to the identified landscape plan.
17.07	Identify factors in selecting turf for landscape installation.
18.0	Harvest, transport, and install plant materials – the student will be able to:
18.01	Determine requirements for preserving plant viability.
18.02	Demonstrate proper landscape plant establishment techniques.
18.03	Select and prepare plants for transporting and transplanting.
18.04	Select horticultural products according to Florida grades and standards.
19.0	Identify procedures to operate, repair, and maintain tools and equipment – the student will be able to:
19.01	Perform equipment pre-operational check.
19.02	Identify, maintain, and operate hand tools and power tools.
20.0	Identify emerging technologies in the horticulture industry – the student will be able to:
20.01	Investigate DNA and genetics applications in horticulture including the theory of probability.
20.02	Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.).
21.0	Demonstrate leadership, employability, communications and human relations skills – the student will be able to:
21.01	Identify acceptable work habits and personal characteristics.

21.02	Identify acceptable employee hygiene habits.
21.03	Identify or demonstrate appropriate responses to criticism from employer,
21.04	Describe the importance of industry certifications.

Course Number: ORH0802	
Occupational Completion Point: B	
Landscaping and Groundskeeping – 450 Hours – SOC Code 37-1011	
22.0	Maintain tools and equipment – the student will be able to:
22.01	Maintain oil level in engines of power equipment.
22.02	Check and maintain tire air pressure on equipment.
22.03	Maintain fuel levels using proper fuel or fuel mixtures.
22.04	Operate manual transmissions.
22.05	Identify, operate, and maintain tractor and power equipment.
22.06	Service and maintain battery and electrical systems.
22.07	Perform minor tune-up on engines.
22.08	Load, secure, and transport equipment.
22.09	Demonstrate safety precautions while working with tools and equipment.
23.0	Demonstrate application of chemicals and calibrate spray equipment – the student will be able to:
23.01	Select, mix, and apply a non-restricted chemical according to the label and local, state, federal, and EPA regulations.
23.02	Calibrate spray and spread equipment.
23.03	Discuss appropriate responses to chemical or fertilizer spills.
23.04	Identify and report insect and disease damage on plants and turf.
23.05	Diagnose a plant or disease problem on turf.
23.06	Identify and report insect and disease damage.

23.07	Determine chemical compatibility.
23.08	Determine appropriate time frequency and method of chemical application.
24.0	Classify plants and turfgrass – the student will be able to:
24.01	Classify plants and turfgrass as annuals, biennials, and perennials.
24.02	Identify plants and turfgrass that are specific to a region.
24.03	Identify common weeds in Florida turf grasses.
25.0	Demonstrate fertilization skills – the students will be able to:
25.01	Develop a fertilization schedule.
25.02	Interpret fertilizer charts and develop recommendations according to turf species.
25.03	Calibrate fertilizer equipment.
26.0	Irrigate plants and turf – the student will be able to:
26.01	Identify various types of irrigation systems.
26.02	Install and maintain piping and water distribution components.
26.03	Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices.
26.04	Design a microirrigation system.
26.05	List problems associated with improper design, installation and maintenance.
27.0	Layout and install landscape and/or interiorscape – the student will be able to:
27.01	Prepare landscape and/or interiorscape
27.02	Prepare final grade.
27.03	Install mulch and perform final cleanup.
27.04	Calculate labor costs associated with installation.
27.05	Layout plants based on a landscape plan.
27.06	Plant site using sound cultural practices.

27.07	Install mulch and perform final cleanup.
28.0	Maintain landscape – the student will be able to:
28.01	Perform maintenance inspection of the project.
28.02	Determine water requirements and apply at proper rates.
28.03	Identify weeds and apply herbicides safely.
28.04	Determine fertilization requirements and apply at proper rates.
28.05	Identify plant pest and disease problems and apply corrective measures.
28.06	Trim and prune landscape plants.
28.07	Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash.
28.08	Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction.
28.09	Cultivate and mulch plants.
28.10	Prune trees based on ANSI (American National Standard Institute) standards.
28.11	Provide protection for plants from adverse weather conditions.
28.12	Comply with local, state, and federal regulations regarding landscape maintenance and pesticide applications.
28.13	Demonstrate sanitation and safety practices when maintaining landscape.
29.0	Maintain customer relations and observe follow-up procedures – the student will be able to:
29.01	Conduct walk-through of project with client to assure satisfaction.
29.02	Identify current and future maintenance requirements.
29.03	Analyze project records for profitability and employee performance.

Course Number: ORH0803
Occupational Completion Point: C
Landscape and Grounds keeping Supervisors– 150 Hours – SOC Code 37-1012

30.0 Analyze and design landscape – the student will be able to:

30.01 Analyze and interpret plans, specifications, and environmental conditions of the project.

30.02 Design the project.

30.03 Identify and locate project materials.

30.04 Determine personnel and equipment needs and safety requirements for the project.

30.05 Establish project schedule.

31.0 Prepare estimates, contracts, and presentation – the student will be able to:

31.01 Determine costs of materials, equipment, and labor.

31.02 Prepare a price for the project and terms of contract.

31.03 Prepare written contract, using standard rules of English, including punctuation, spelling, sentence structure and references.

31.04 Prepare and give oral presentation of the project design using standard rules of English, including punctuation and sentence structure.

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

32.0 Lay out and install landscape and turf – the student will be able to:

32.01 Locate existing utilities and secure a permit.

32.02 Prepare and rough grade the site.

32.03 Determine procedures for installation of large materials.

32.04 Install and test irrigation system.

32.05 Describe procedures for constructing hardscape (walls, walks, patios, drives, etc.).

33.0 Conduct final walk-through of landscape installation – the student will be able to:

33.01 Conduct walk-through of installation project with client to assure customer satisfaction.

33.02 Analyze project records for profitability and employee performance.

34.0 Maintain tools and equipment--The student will be able to:

34.01	Maintain oil level in engines of power equipment.
34.02	Check and maintain tire air pressure on equipment.
34.03	Maintain fuel levels using proper fuel or fuel mixtures.
34.04	Operate manual transmissions.
34.05	Identify, operate, and maintain tractor and power equipment.
34.06	Service and maintain battery and electrical systems.
34.07	Perform minor tune-up on engines.
34.08	Load, secure, and transport equipment.
34.09	Demonstrate safety precautions while working with tools and equipment.
35.0	Identify components of athletic fields – the student will be able to:
35.01	Identify turf selection for various athletic fields.
35.02	Identify appropriate dimensions for different athletic fields and specific requirements.
36.0	Maintain athletic fields – the student will be able to:
36.01	Apply proper line marks for athletic fields.
36.02	Painting fields (school logos or names)
36.03	Apply proper techniques for clay maintenance.
36.04	Mow grass to appropriate height for field use.
37.0	Develop recreational areas – the student will be able to:
37.01	Establish plant beds with annuals, biennials, and perennials.
37.02	Plant accent trees and shrubs in a recreational area.
37.03	Establish sports turf.
38.0	Maintain sports turf – the student will be able to:
38.01	Mow sport turf with reel mowers.

38.02	Irrigate turf.
38.03	Verticut turf.
38.04	Aerate turf and remove debris.
39.0	Establish turfgrass – the student will be able to:
39.01	Level seedbed.
39.02	Plant turf by sprigs, plugs or sod.
39.03	Remove sod with sod cutter.
40.0	Tending and rejuvenating turf – the student will be able to:
40.01	Apply top dressing.
40.02	Overseed turf.
40.03	Irrigate turf.
40.04	Aerate turf.
40.05	Apply fertilizer.

Additional Information

Laboratory Activities

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

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)

National FFA Organization (FFA) is/are the intercurricular career and technical student organization(s) 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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

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	
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml	
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.

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.

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.

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

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 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

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	
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml	
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.

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.

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.

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 potential 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 – 306 Hours – 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 *reactive* and *non-reactive* 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 *polar* and *non-polar* 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 investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

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 on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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

**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
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
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.

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.

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.

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

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 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.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

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

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