Florida Department of Education
Curriculum Framework

Program Title: **Automotive Collision Repair and Refinishing**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	8709000
CIP Number	0647060300
Grade Level	9-12, 30, 31
Standard Length	9 credits
Teacher Certification	AUTO BODY @7 7G AUTO IND @7 %7 %G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3021- Automotive Body and Related Repairers
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to basic trade skills; refinishing skills; sheetmetal repair skills; frame and unibody squaring and aligning; use of fillers; paint systems and undercoats; related welding skills; related mechanical skills; trim-hardware maintenance; glass servicing; and other miscellaneous repairs. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 five occupational completion points.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
	8709010	Automotive Collision Repair and Refinishing 1	1 credit		2	VO
	8709020	Automotive Collision Repair and Refinishing 2	1 credit		2	VO
A	8709030	Automotive Collision Repair and Refinishing 3	1 credit	49-3021	2	VO
B	8709040	Automotive Collision Repair and Refinishing 4	1 credit	49-3021	2	VO
C	8709050	Automotive Collision Repair and Refinishing 5	1 credit	49-3021	2	VO
	8709060	Automotive Collision Repair and Refinishing 6	1 credit		2	VO
D	8709070	Automotive Collision Repair and Refinishing 7	1 credit	49-3021	2	VO
	8709080	Automotive Collision Repair and Refinishing 8	1 credit		2	VO
E	8709090	Automotive Collision Repair and Refinishing 9	1 credit	49-3021	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
8709010	1/87 1%	#	1/83 1%	1/69 1%	1/67 1%	#	#	1/82 1%	#	2/74 3%	#
8709020	2/87 2%	2/80 3%	3/83 4%	4/69 6%	3/67 4%	#	3/69 4%	4/82 5%	2/66 3%	5/74 7%	2/72 3%
8709030	#	#	#	#	#	#	#	#	#	#	#
8709040	#	#	#	#	#	#	#	#	#	#	#
8709050	#	1/80 1%	#	1/69 1%	1/67 1%	#	1/69 1%	#	#	2/74 3%	2/72 3%
8709060	2/87 2%	3/80 4%	2/83 2%	6/69 9%	2/67 3%	2/70 3%	3/69 4%	4/82 5%	3/66 5%	6/74 8%	4/72 6%
8709070	3/87 3%	4/80 5%	3/83 4%	5/69 7%	3/67 4%	3/70 4%	3/69 4%	4/82 5%	3/66 5%	5/74 7%	4/72 6%

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
8709080	3/87 3%	4/80 5%	3/83 4%	6/69 9%	3/67 4%	3/70 4%	4/69 6%	4/82 5%	3/66 5%	9/74 12%	7/72 10%
8709090	2/87 2%	4/80 5%	2/83 2%	8/69 12%	2/67 3%	2/70 3%	3/69 4%	6/82 7%	3/66 5%	11/74 15%	9/72 13%

** *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
8709010	1/67 1%	#	1/54 2%	8/46 17%	8/45 18%	#	#
8709020	4/67 6%	1/75 1%	2/54 4%	8/46 17%	8/45 18%	#	#
8709030	#	#	#	#	#	#	#
8709040	#	#	#	#	#	2/45 4%	2/45 4%
8709050	#	#	6/54 11%	4/46 9%	4/45 9%	4/45 9%	4/45 9%
8709060	3/67 4%	1/75 1%	3/54 6%	#	#	#	#
8709070	2/67 3%	2/75 3%	2/54 4%	7/46 15%	7/45 16%	7/45 16%	7/45 16%
8709080	1/67 1%	1/75 1%	1/54 2%	7/46 15%	7/45 16%	7/45 16%	7/45 16%
8709090	3/67 4%	1/75 1%	2/54 4%	5/46 11%	5/45 11%	5/45 11%	5/45 11%

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

National Standards

Programs identified as having Industry or National Standards to the corresponding standards and/or benchmarks for the Automotive Collision Repair and Refinishing program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Automotive Collision Repair and Refinishing.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Automotive Collision Repair and Refinishing.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Automotive Collision Repair and Refinishing.
04.0 Demonstrate vehicle and industry knowledge, business management, and shop and occupational safety skills.
05.0 Prepare vehicles for repair and refinishing by applying creative techniques.
06.0 Creatively repair, replace and adjust outer body panels.
07.0 Perform welding operations that apply creativity and interpretation.
08.0 Evaluate and prepare surfaces for refinishing.
09.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Collision Repair and Refinishing.
10.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Collision Repair and Refinishing.
11.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Collision Repair and Refinishing.
12.0 Select and apply appropriate polishing compounds and detail techniques.
13.0 Setup vehicle for measuring and pulling.
14.0 Calculate, measure, and repair unibody vehicles.
15.0 Inspect and creatively repair frame type vehicle bodies.
16.0 Maintain and operate spray equipment.
17.0 Finish defects, causes and cures.
18.0 Prepare metal parts and panels for creative finishing.
19.0 Prepare and apply body fillers.
20.0 Perform miscellaneous repairs.
21.0 Repair fiberglass and plastic components.

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 1**
Course Number: **8709010**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for demonstrating shop and occupational safety skills and employability skills, and comprehending and complying with requirements concerning legal liability and consequent insurance implications.

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 Automotive Collision Repair and Refinishing.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Automotive Collision Repair and Refinishing.		
	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 Automotive Collision Repair and Refinishing.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: National Standards

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:			
04.01 Comply with safety rules established by OSHA, NIOSH, EPA, and DER regarding chemicals and hazardous materials.	LAFS.910.RI.1.2; 2.4; 3.7		
04.02 Comply with safety rules established by OSHA and NIOSH regarding personal clothing and devices.	LAFS.910.RI.1.2; 2.4; 3.7		
04.03 Comply with safety rules regarding hand tools and power equipment and use them properly, including fire extinguishers.	LAFS.910.RI.1.2; 2.4; 3.7		
04.04 Comply with locally developed shop safety rules and regulations.	LAFS.910.RI.1.2; 2.4; 3.7	SC.912.L.14.44	
04.05 Identify sources of airborne contamination and other hazards.	LAFS.910.RI.1.2; 2.4 LAFS.910.L.3.4	SC.912.P.12.10	
04.06 Select proper spray mask; inspect the spray mask to insure proper fit and operation; inspect the condition of the mask filters and other components.			
04.07 Explain the "Right to Know Law" as applicable to auto body repair occupations.	LAFS.910.L.3.6, 4 LAFS.910.W.3.7, 9 LAFS.910.SL.1.1		
04.08 Identify vehicle parts by name, location and function.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
04.09	Read and explain damage reports.	LAFS.910.RI.1.2; 2.4; 3.7 LAFS.910.L.3.4, 6 LAFS.910.W.3.7, 9 LAFS.910.SL.1.1		
05.0	Prepare vehicles for repair and refinishing by applying creative techniques-- The student will be able to:			
05.01	Remove, replace and align damaged outside trim and moldings.			
05.02	Remove, replace and align damaged or necessary inside trim and moldings.			
05.03	Remove, replace and align damaged, non-structural body panels and components that may interfere with or be damaged during repair.			
05.04	Protect panels and parts adjacent to repair area to prevent damage.			
05.05	Remove dirt, grease and wax from those areas to be repaired.			
05.06	Remove dirt, corrosion, under coatings, sealers, and/or other protective coatings necessary to perform repairs to structural areas.			
05.07	Remove, replace, and align repairable plastics and other parts that are recommended for off-car repair.			
05.08	Locate, read and interpret automobile manufacturers' data plates.	LAFS.910.RI.1.2 LAFS.910.L.3.4		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 2**
Course Number: **8709020**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for preparing vehicles for repair and refinishing and repair, replacement and adjustment of outer body panels.

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 Automotive Collision Repair and Refinishing.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Automotive Collision Repair and Refinishing.		
	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 Automotive Collision Repair and Refinishing.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: National Standards

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
06.0 Creatively repair, replace and adjust outer body panels--The student will be able to:			
06.01 Remove, replace and adjust a bolted panel or panel assembly.			
06.02 Remove, replace and align hoods, hood hinges and hood latches.			
06.03 Remove, replace and align deck lids, lid hinges and lid latches.			
06.04 Remove, replace and align doors, tailgates, hatches, lift gates and hinges.			
06.05 Remove and replace bumpers, reinforcements, guards, isolators, and mounting hardware (release pressure from gas- and oil-filled energy-absorbing-type bumper isolators that are being discarded).			
06.06 Check door hinge condition, replace hinge pins and bushings as needed, check door frames, check and adjust door clearances (where adjustable) along quarter panels, doors, rocker panels, fenders and tops.			
06.07 Check and adjust latch assemblies on all hinged components.			
07.0 Perform welding operations that apply creativity and interpretation --The student will be able to:			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
07.01	Apply welding safety procedures.	LAFS.910.RI.1.2; 2.4; 3.7 LAFS.910.L.3.4, 6 LAFS.910.W.3.7, 9 LAFS.910.SL.1.1		
08.0	Evaluate and prepare surfaces for refinishing--The student will be able to:			
08.01	Inspect and identify types of finishes and surface conditions and develop a plan for refinishing using one paint system from start to finish in conformance with paint system manufacturer specifications.			
08.02	Gain access to, remove and store trim and molding.			
08.03	Remove dirt, wax and road grime from areas to be refinished and adjacent surfaces including complete washing of the vehicle.			
08.04	Mask and protect other areas that will not be refinished.			
08.05	Mix primer, primer surfacer or primer sealer and spray onto the surface of repaired areas including two components and self-etching primers.	MAFS.912.G-MG.1.3 MAFS.912.N-Q.1.1, 2, 3	SC.912.P.8.2 SC.912.P.12.12	
08.06	Apply glazing putty to minor surface imperfections.			
08.07	Select proper abrasives and dry or wet sand area to which primer-surfacer and glazing putty have been applied.			
08.08	Compound around the edges of repaired areas to be refinished.			
08.09	Remove dust from areas to be refinished including cracks or moldings of adjacent areas.			
08.10	Clean area to be refinished with a proper solution.			
08.11	Remove, with a tack rag, any dust or lint particles from the areas to be refinished.		SC.912.P.12.12	

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 3**
Course Number: **8709030**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for applying appropriate paints and finishes.

Florida Standards			Correlation to CTE Program Standard #
09.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Collision Repair and Refinishing.		
	09.01 Key Ideas and Details		
	09.01.1	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	
	09.01.2	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	
	09.01.3	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	
	09.02 Craft and Structure		
	09.02.1	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	
	09.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	09.02.3	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 #
09.03	Integration of Knowledge and Ideas		
	09.03.1	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	
	09.03.2	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	
	09.03.3	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	
09.04	Range of Reading and Level of Text Complexity		
	09.04.1	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.	
	09.04.2	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	
10.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Collision Repair and Refinishing.		
10.01	Text Types and Purposes		
	10.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	10.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
10.02	Production and Distribution of Writing		
	10.02.1	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 #
	10.02.2	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	
	10.02.3	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	
	10.03	Research to Build and Present Knowledge	
	10.03.1	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	
	10.03.2	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	
	10.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	10.04	Range of Writing	
	10.04.1	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Collision Repair and Refinishing.		
	11.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	11.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	11.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
11.04 Model with mathematics. MAFS.K12.MP.4.1	
11.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
11.06 Attend to precision. MAFS.K12.MP.6.1	
11.07 Look for and make use of structure. MAFS.K12.MP.7.1	
11.08 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: National Standards

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
12.0 Select and apply appropriate polishing compounds and detail techniques--The student will be able to:			
12.01 Sand, buff and polish finishes.			
12.02 Clean and detail a vehicle after completion of refinishing.			

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 4**
Course Number: **8709040**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in procedures for occupational safety skills and prepare vehicles for repair.

Florida Standards			Correlation to CTE Program Standard #
09.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Collision Repair and Refinishing.		
	09.01 Key Ideas and Details		
	09.01.1	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	
	09.01.2	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	
	09.01.3	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	
	09.02 Craft and Structure		
	09.02.1	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	
	09.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	09.02.3	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 #
09.03	Integration of Knowledge and Ideas		
	09.03.1	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	
	09.03.2	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	
	09.03.3	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	
09.04	Range of Reading and Level of Text Complexity		
	09.04.1	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.	
	09.04.2	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	
10.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Collision Repair and Refinishing.		
10.01	Text Types and Purposes		
	10.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	10.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
10.02	Production and Distribution of Writing		
	10.02.1	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 #
	10.02.2	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	
	10.02.3	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	
	10.03	Research to Build and Present Knowledge	
	10.03.1	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	
	10.03.2	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	
	10.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	10.04	Range of Writing	
	10.04.1	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Collision Repair and Refinishing.		
	11.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	11.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	11.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
11.04 Model with mathematics. MAFS.K12.MP.4.1	
11.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
11.06 Attend to precision. MAFS.K12.MP.6.1	
11.07 Look for and make use of structure. MAFS.K12.MP.7.1	
11.08 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: National Standards

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
04.0 Demonstrate vehicle and industry knowledge, business management, and shop and occupational safety skills--The student will be able to:			
04.10 Operate basic office machines.			
04.11 Demonstrate basic keyboarding skills and computer usage.			
04.12 Determine acceptable parts to use new, used or aftermarket.			
04.13 Prepare damage reports manually to industry standards.	LAFS.1112.W.1.2		
04.14 Prepare damage reports to industry standards using a computer.	LAFS.1112.W.2.6		
05.0 Prepare vehicles for repair and refinishing by applying creative techniques--The student will be able to:			
05.09 Use specification and crash manuals including "P" pages.	LAFS.1112.W.2.6		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 5**
Course Number: **8709050**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for structural damage analysis and the repair of vehicle structure.

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: National Standards

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
04.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:			
04.15	Perform structural damage analysis and determine repair procedures.			
06.0	Repair, replace and adjust outer body panels--The student will be able to:			
06.08	Determine the extent of damage to structural body panels; repair, weld, or replace in accordance with manufacturers' specifications.			
13.0	Setup vehicle for measuring and pulling--The student will be able to:			
13.01	Determine and plan methods and order of repair.			
13.02	Mount vehicle on anchoring equipment.			
13.03	Measure vehicle damage using manufacturers' specifications.	MAFS.912.G-CO.1.1, 2, 3, 4, 5 MAFS.912.G-MG.1.3		
13.04	Attach pulling equipment, pull and re-measure.	MAFS.912.G-MG.1.3		
14.0	Calculate, measure and repair unibody vehicles--The student will be able to:			
14.01	Precisely measure unibody vehicles.	MAFS.912.G-MG.1.3		
14.02	Diagnose and measure unibody damage using self-centering and tram gauges.	MAFS.912.G-MG.1.3		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
14.03	Diagnose and measure unibody damage using a datum plane.	MAFS.912.G-MG.1.3		
14.04	Determine the location of all suspension, steering and power train component attaching point to the body.			
14.05	Clean, prime and apply protective coat to repaired unibody structural areas.			
14.06	Determine the extent of the direct and indirect damage and the direction of impact and plan the method and order of repair.			
14.07	Precisely measure unibody vehicles, check and adjust suspension mount points that effect four-wheel alignment.			
14.08	Diagnose and measure unibody damage using a dedicated (fixture) measuring system.	MAFS.912.G-MG.1.3		
14.09	Diagnose and measure unibody damage using a universal measuring system or a laser.	MAFS.912.G-MG.1.3		
14.10	Attach proper body anchoring devices.			
14.11	Identify procedures to straighten and align cowl assemblies.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
14.12	Identify procedures to straighten and align roof pillars and roof panels.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
14.13	Identify procedures to straighten and align doorposts, sills, floor pans and rocker panels.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
14.14	Identify procedures to straighten and align quarter panels, wheel-housing assemblies and rear body sections (including rail, suspension and power train panels).	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
14.15	Identify procedures to straighten/align front end sections (aprons, strut towers, upper/lower rails, steering, suspension and power train mounting points).	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
14.16	Recognize the limitations of applying heat to high strength steel structural components, use proper heat stress relief methods on high strength steel and weld in accordance with manufacturers' specifications.		SC.912.P.12.4, 12	
14.17	Use proper cold stress relief methods.		SC.912.P.12.4, 12	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
14.18	Remove folds, curves, creases and dents using power tools and hand tools to restore damaged areas to proper contours and dimensions.		SC.912.P.12.4, 12	
14.19	Determine the extent of damage to structural steel body panels and repair, weld or replace them in accordance with manufacturers' specifications.		SC.912.P.12.4, 12	
14.20	Determine the extent of damage to structural aluminum body panels in accordance with manufacturers' specifications.		SC.912.P.12.4, 12	
14.21	Cut out damaged sections of structural steel body panels and weld in new and/or used replacement in accordance with accepted industry standards.		SC.912.P.12.4, 12	
14.22	Recheck panel contour and alignment after pulling and correct or adjust as necessary.			
15.0	Inspect and creatively repair frame type vehicle bodies--The student will be able to:			
15.01	Diagnose and measure frame damage using self-centering and tram gauge.	MAFS.912.G-CO.1.1, 2, 3, 4, 5		
15.02	Determine the extent of direct and indirect damage and the direction of impact and plan methods and order of repairs.		SC.912.P.12.4, 5	
15.03	Clean, prime and protective coat repaired frame areas.			
15.04	Identify procedures to straighten and align mash damage.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4 MAFS.912.G-CO.1.1, 2, 3, 4, 5	SC.912.P.12.4, 5	
15.05	Identify procedures to straighten and align sag damage.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4 MAFS.912.G-CO.1.1, 2, 3, 4, 5	SC.912.P.12.4, 5	
15.06	Identify procedures to straighten and align side sway damage.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4 MAFS.912.G-CO.1.1, 2, 3, 4, 5	SC.912.P.12.4, 5	
15.07	Identify procedures to straighten and align twist damage.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4	SC.912.P.12.4, 5	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
	MAFS.912.G-CO.1.1, 2, 3, 4, 5		
15.08 Identify procedures to straighten and align kickup damage.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4 MAFS.912.G-CO.1.1, 2, 3, 4, 5	SC.912.P.12.4, 5	
15.09 Identify procedures to straighten and align broadside damage.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4 MAFS.912.G-CO.1.1, 2, 3, 4, 5	SC.912.P.12.4, 5	
15.10 Identify procedures to straighten and align diamond frame damage.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4 MAFS.912.G-CO.1.1, 2, 3, 4, 5	SC.912.P.12.4, 5	
15.11 Identify procedures to remove and replace damaged frame horns, side rails, cross members and front or rear frame sections and weld cracks in frame members.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4	SC.912.P.12.4, 5	
15.12 Repair, reinforce or replace weakened frame members in accordance with vehicle manufacturers' recommendations.			

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 6**
Course Number: **8709060**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for inspecting spray equipment and selection and application of finishes.

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: National Standards

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
04.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:			
04.16	Inspect air makeup and exhaust systems (including intake filters, exhaust filters, fans and other mechanical components of the system) to insure proper filtering and ventilation.		SC.912.P.10.2	
08.0	Evaluate and prepare surfaces for refinishing--The student will be able to:			
08.12	Inspect and identify type of substrate, and surface condition; develop a plan for refinishing.			
08.13	Chemically, mechanically and safely remove paint finishes.		SC.912.P.12.12	
08.14	Dry and wet sand areas to be refinished.			
08.15	Artistically featheredge broken areas to be refinished.			
08.16	Determine when sealing is needed or desirable and apply suitable sealer to the area being refinished.			
08.17	Creatively scuff sand to remove nibs or overspray from a sealer.			
08.18	Apply adhesion promoter over areas to be painted and blend into adjacent areas.		SC.912.P.12.12	
08.19	Apply stone chip resistant coating.		SC.912.P.12.12	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
08.20	Restore corrosion resistant coatings, caulking and seam sealers to repaired areas.			
12.0	Select and apply appropriate polishing compounds and detail techniques--The student will be able to:			
12.03	Select the proper spray mask, inspect the spray mask to insure proper fit and operation, and inspect the condition of the mask filters and other components.			
12.04	Interpret the type and color of paint already on a vehicle and identify alternates.			
12.05	Measure, shake, stir, thin or reduce, and strain paint.	MAFS.912.G-MG.1.3 MAFS.912.N-Q.1.1, 2, 3	SC.912.P.8.1, 2	
12.06	Verify color match before applying and adjust if needed.			
12.07	Creatively apply urethane enamel for spot, panel and overall refinishing.			
12.08	Creatively apply urethane clear coat for spot, panel and overall repairs.			
12.09	Apply decals, transfers, tapes, wood-grains, pinstripes (painted and taped), etc.			
12.10	Properly dispose of hazardous waste.		SC.912.L.17.14	
12.11	Identify the types of plastic parts to be finished and determine the proper refinishing procedure.		SC.912.P.12.11	
12.12	Apply a finish coat to plastic parts.			
12.13	Clean, condition and refinish vinyl (e.g. upholstery, dashes and tops).			
12.14	Apply a tri-coat paint system using visual and artistic techniques.			

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 7**
Course Number: **8709070**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for maintaining spray equipment and the causes of finish defects.

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: National Standards

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
16.0	Maintain and operate spray equipment--The student will be able to:			
16.01	Explain, adjust and use a variety of spray guns including siphon feed, pressure feed, gravity feed and HVLP.	LAFS.910.SL.2.4,5, 6 LAFS.1112.SL.2.4, 5, 6 LAFS.910.L.3.6 LAFS.1112.L.3.6	SC.912.P.12.10	
16.02	Check and adjust air pressure at the spray gun.		SC.912.P.12.10	
16.03	Adjust spray gun fluid and pattern control valves.		SC.912.P.12.10	
16.04	Appropriately use creative and artistic spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.		SC.912.P.12.3	
16.05	Inspect, clean and determine the condition and adequacy of spray guns and related equipment (air hoses, regulators, air- lines, air sources and spray environment).			
16.06	Maintain and properly use the spray booth.			
17.0	Finish defects, causes and cures--The student will be able to:			
17.01	Check for rust spots; determine the cause(s) and correct the condition.		SC.912.P.8.10	

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	National Standards
17.02 Identify and interpret paint cracking (crowsfeet or line-checking, micro-checking, etc); correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4		
17.03 Identify poor adhesion; determine the cause(s) and correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.6	
17.04 Identify blistering appearance in the paint surface; determine the cause(s) and correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.6	
17.05 Identify water spotting on paint surface, correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.6	
17.06 Identify finish damage caused by bird droppings, tree sap, and other natural causes; interpret and correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.10	
17.07 Identify finish damage caused by airborne contaminants (acids, soot, and other industrial-related causes); correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.10	
17.08 Identify die-back conditions (dulling of the paint film showing haziness and/or film distortion showing shrinking); correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.10	
17.09 Identify chalking (oxidation); correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.10	
17.10 Identify body filler bleed-through; correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4	SC.912.P.8.10	
17.11 Identify pin-holing; correct the condition.	LAFS.910.SL.1.2; 2.4 LAFS.1112.SL.1.2;2.4 LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1; 2.4		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 8**
Course Number: **8709080**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for adjustment of outer body panels and welding operations.

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: National Standards

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
05.0	Prepare vehicles for repair and refinishing--The student will be able to:		SC.912.N.1.1	
05.10	Diagnose and analyze damage to determine appropriate methods for overall repair.		SC.912.P.10.13,14, 15	
05.11	Locate, remove and replace to specifications, those vehicle electrical/electronic devices that might be damaged during repair.		SC.912.P.12.3	
05.12	Explain proper air bag operation and passive restraint handling.			
06.0	Creatively repair, replace and adjust outer body panels--The student will be able to:			
06.09	Remove, replace and align a welded (non-structural) steel panel or panel assembly.			
06.10	Straighten roughed out contours of damaged panels to a surface condition for body filling or metal finishing.		SC.912.P.12.11	
06.11	Weld cracked or torn steel body panels; reweld broken welds.			
06.12	Apply protective coatings and sealants to structural panels.		SC.912.P.12.11	
06.13	Heat shrink stretched panel areas back to contour.			
06.14	Cold shrink stretched panel areas back to contour.			
06.15	Repair or replace door skins and intrusion beams.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
07.0	Perform welding operations that apply creativity and interpretation--The student will be able to:		SC.912.P.10.14	
07.02	Identify metal types prior to welding.		SC.912.P.12.10	
07.03	Setup, operate and maintain metal inert gas (MIG) welding equipment.			
07.04	Creatively perform various welds with MIG equipment including plug, butt and lap.		SC.912.P.12.12	
07.05	Setup and maintain oxyacetylene welding equipment.		SC.912.P.12.12	
07.06	Explain various welding, cutting and heating techniques with oxyacetylene equipment.		SC.912.P.12.11	
07.07	Describe plasma cutting.	LAFS.910.SL.2.4, 5 LAFS.1112.SL.2.4, 5 LAFS.910.L.3.6 LAFS.1112.L.3.6		
07.08	Remove, replace and align damaged, structural body panels and components that may interfere with or be damaged during repairing.		SC.912.P.12.12	
07.09	Identify procedures to Weld aluminum.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4	SC.912.P.12.10, 11	
07.10	Explain electric compression spot welding.	LAFS.910.SL.2.4, 5 LAFS.1112.SL.2.4, 5 LAFS.910.L.3.6 LAFS.1112.L.3.6	SC.912.P.12.11	
07.11	Set up and perform plasma cutting operations.		SC.912.N.1.1	

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Collision Repair and Refinishing 9**
Course Number: **8709090**
Course Credit: **1**

Course Description:
This course is designed to provide instruction in the different procedures for applying body fillers and performing miscellaneous repairs.

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: National Standards

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
18.0	Prepare metal parts and panels for creative finishing--The student will be able to:			
18.01	Identify specification(s) of metals used in automobiles.	LAFS.910.RI.1.2 LAFS.1112.RI.1.2	SC.912.P.8.1, 2	
18.02	Identify heat effects on metals.	LAFS.910.RI.1.2 LAFS.1112.RI.1.2	SC.912.P.8.1, 2	
18.03	Identify the importance of maintaining the structural integrity of a vehicle body.	LAFS.910.RI.1.2 LAFS.1112.RI.1.2	SC.912.P.12.11	
18.04	Remove the paint from the damaged area of a body panel.			
18.05	Pick and file the damaged area of a body panel to eliminate surface irregularities.			
18.06	Disc sand the repaired body panel to produce final smoothness.			
19.0	Prepare and apply body fillers--The student will be able to:			
19.01	Mix plastic filler.	MAFS.912.G-MG.1.3 MAFS.912.N-Q.1.1, 2, 3	SC.912.P.12.11	
19.02	Creatively apply plastic body filler and cheese grate during curing.			
19.03	Block sand cured plastic body fillers to creatively and artistically contour and then finish sand.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
20.0	Perform miscellaneous repairs--The student will be able to:			
20.01	Align headlamps.	MAFS.912.G-PE.2.5		
20.02	Apply rust repair methods including grinding, sandblasting and metal preparation.			
20.03	Remove and replace headliners, carpets, seats and other interior components and trim.			
20.04	Inspect, repair or replace weather stripping.			
20.05	Identify procedures to perform two- and four- wheel alignments.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
20.06	Diagnose and repair water leaks, dust leaks and wind noises.			
20.07	Identify procedures to remove and replace all stationary glass (including windshield, back lights, etc.) using manufacturers' recommended installation materials and procedures including electrically heated glass.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
20.08	Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanism and related controls.			
20.09	Repair/replace all power driven accessories and related controls.		SC.912.P.10.13,14, 15	
20.10	Inspect, repair or replace and adjust removable manually operated or electrically operated roof panels, hinges, latches, guides, handles, retainers and controls of sun roof.		SC.912.P.10.13,14, 15	
20.11	Diagnose and repair damaged circuits, wires and electrical components.		SC.912.P.10.13, 14,15	
20.12	Remove, replace and cap off air conditioner components.			
20.13	Evacuate, recycle and recharge air conditioning systems.		SC.912.P.10.2	
20.14	Identify procedures to remove and replace engines and mounts.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
20.15	Identify procedures to remove and replace transmissions and mounts.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	National Standards
		LAFS.1112.L.2.3; 3.4		
	20.16 Identify procedures to remove and replace suspension parts.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
	20.17 Identify procedures to remove and replace brake parts.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
	20.18 Identify procedures to bleed brakes.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4	SC.912.P.10.2	
	20.19 Identify procedures to remove and replace fuel system components.	LAFS.910.RI.1.1; 2.4 LAFS.1112.RI.1.1;2.4 LAFS.910.L.2.3; 3.4 LAFS.1112.L.2.3; 3.4		
	20.20 Demonstrate an understanding of ABS braking systems.		SC.912.P.10.1 SC.912.P.12.10	
	20.21 Inspect, adjust or repair steering, suspension and power-train components that affect four-wheel alignment.		SC.912.P.12.3	
21.0	Repair fiber glass and plastic components--The student will be able to:			
	21.01 Differentiate between fiberglass and sheet molded compound (SMC) to be repaired and the appropriate creative repair procedures (including plastic welding, chemical bonding and the use of structural adhesives).		SC.912.P.12.12	
	21.02 Creatively repair deep gouges and cracks in fiberglass panels and sheet molded compound (SMC).		SC.912.P.12.12	
	21.03 Repair holes in fiberglass panels and SMC.			
	21.04 Repair fiberglass body panels and straighten/align panel supports.			
	21.05 Remove damaged areas from fiberglass panels and SMC and repair with partial panel installation.			
	21.06 Prepare the surfaces of and repair damage to, thermoplastic parts.		SC.912.P.12.11, 12	
	21.07 Prepare the surfaces of and repair damage to thermosetting-plastic parts.		SC.912.P.12.11, 12	

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

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Automotive Detailing and Reconditioning**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Automotive Collision Repair and Refinishing (8709000)

Secondary – Career Preparatory	
Program Number	8710000
CIP Number	0647060302
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AUTO BODY @7 7G AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	53-7061 – Cleaners of Vehicles and Equipment
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to communication skills, leadership skills, human relations and employability skills, safe and efficient work practices.

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.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	8710010	Automotive Detailing 1	1 credit	53-7061	2	VO
B	8710020	Automotive Detailing 2	1 credit	53-7061	2	VO
C	8710030	Automotive Detailing 3	1 credit	53-7061	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
8710010	**	**	**	**	**	**	**	**	**	**	**
8710020	**	**	**	**	**	**	**	**	**	**	**
8710030	**	**	**	**	**	**	**	**	**	**	**

** *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
8710010	**	**	**	**	**	**	**
8710020	**	**	**	**	**	**	**
8710030	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and

language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Automotive Detailing and Reconditioning.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Automotive Detailing and Reconditioning.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Automotive Detailing and Reconditioning.
04.0 Demonstrate shop and occupational safety skills.
05.0 Demonstrate proficiency in washing a vehicle.
06.0 Perform vehicle interior cleaning.
07.0 Demonstrate proficiency in reconditioning vehicle paint surfaces.
08.0 Demonstrate proficiency in caring for vinyl tops.
09.0 Degrease and clean engine compartment.
10.0 Perform minor upholstery and vinyl repairs.
11.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Detailing and Reconditioning.
12.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Detailing and Reconditioning.
13.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Detailing and Reconditioning.
14.0 Demonstrate proficiency in applying vinyl pinstripes.
15.0 Demonstrate proficiency in applying window tint.

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Detailing 1**
Course Number: **8710010**
Course Credit: **1**

Course Description:
The Automotive Detailing 1 course prepares students for entry into the automotive detailing and reconditioning industry. Students explore career opportunities and requirements of a professional auto detailer. Students study occupational safety, washing, and interior cleaning.

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 Automotive Detailing and Reconditioning.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Automotive Detailing and Reconditioning.		
	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 Automotive Detailing and Reconditioning.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate shop and occupational safety skills--The student will be able to:		
04.01 Apply shop safety rules and procedures.		
04.02 Comply with safety rules regarding chemicals.		
04.03 Comply with shop safety rules regarding hand tools and power equipment.		
04.04 Apply fire safety rules and procedures.		
04.05 Comply with EPA standards regarding use of and disposal of chemicals.		
05.0 Demonstrate proficiency in washing a vehicle--The student will be able to:		
05.01 Identify the proper supplies needed to wash a vehicle.		
05.02 Identify the correct sequence of washing a vehicle.		
05.03 Dry the vehicle.		
05.04 Inspect the finished vehicle.		
06.0 Perform vehicle interior cleaning--The student will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
06.01 Identify the proper supplies and chemicals needed to clean and protect a vehicle interior.		
06.02 Vacuum a vehicle interior.		
06.03 Shampoo and/or clean vehicle upholstery.		
06.04 Apply fabric guard chemicals.		
06.05 Apply vinyl dressing and preservative chemicals.		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Detailing 2**
Course Number: **8710020**
Course Credit: **1**

Course Description:
The Automotive Detailing 2 course is designed to build on the skills and knowledge students learned in Automotive Detailing 1 for entry into the automotive detailing and reconditioning industry. Students explore career opportunities and requirements of a professional auto detailer. Students study vehicle paint surfaces, vinyl tops, engine compartments, and upholstery and vinyl repairs.

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 Automotive Detailing and Reconditioning.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Automotive Detailing and Reconditioning.		
	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 Automotive Detailing and Reconditioning.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
07.0 Demonstrate proficiency in reconditioning vehicle paint surfaces--The student will be able to:		
07.01 Identify the proper supplies and chemicals needed to recondition vehicle paint surfaces.		
07.02 Operate a power buffer.		
07.03 Apply rubbing/buffing compound.		
07.04 Remove heavy paint oxidation.		
07.05 Apply polishing compounds.		
07.06 Apply waxes, sealants, and polymers.		
07.07 Apply touch-up paint.		
07.08 Contamination Removal/Claying		
08.0 Demonstrate proficiency in caring for vinyl tops--The student will be able to:		
08.01 Identify the proper supplies and chemicals needed to care for vehicle vinyl tops.		
08.02 Apply vinyl top cleaners.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
08.03 Apply vinyl top dressings.		
09.0 Degrease and clean vehicle engine compartment--The student will be able to:		
09.01 Identify the proper supplies and chemicals needed to clean and recondition vehicle engine compartment.		
09.02 Operate a high-pressure washer.		
09.03 Degrease engine and engine compartment.		
09.04 Select and apply correct color engine paint.		
09.05 Apply clear engine paint.		
09.06 Inspect belts and hoses.		
10.0 Perform minor upholstery and vinyl repairs--The student will be able to:		
10.01 Identify the supplies necessary to perform minor upholstery repair.		
10.02 Repair fabric upholstery.		
10.03 Repair vinyl seat upholstery.		
10.04 Repair vinyl dashboards.		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Detailing 3**
Course Number: **8710030**
Course Credit: **1**

Course Description:
The Automotive Detailing 3 course is designed to build on the skills and knowledge students learned in Automotive Detailing 1 & 2 for entry into the automotive detailing and reconditioning industry. Students explore career opportunities and requirements of a professional auto detailer. Students study applying vinyl pinstripes, and window tints.

Florida Standards			Correlation to CTE Program Standard #
11.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Detailing and Reconditioning.		
	11.01 Key Ideas and Details		
	11.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	11.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	11.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	11.02 Craft and Structure		
	11.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	11.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	11.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
11.03	Integration of Knowledge and Ideas		
	11.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
	11.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
	11.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
11.04	Range of Reading and Level of Text Complexity		
	11.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	11.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
12.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Detailing and Reconditioning.		
12.01	Text Types and Purposes		
	12.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	12.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
12.02	Production and Distribution of Writing		
	12.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	

Florida Standards			Correlation to CTE Program Standard #
	12.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
	12.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
12.03	Research to Build and Present Knowledge		
	12.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
	12.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
	12.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
12.04	Range of Writing		
	12.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
13.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Detailing and Reconditioning.		
13.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1		
13.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1		
13.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1		

Florida Standards	Correlation to CTE Program Standard #
13.04 Model with mathematics. MAFS.K12.MP.4.1	
13.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
13.06 Attend to precision. MAFS.K12.MP.6.1	
13.07 Look for and make use of structure. MAFS.K12.MP.7.1	
13.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
14.0 Demonstrate proficiency in applying vinyl pinstripes--The student will be able to:		
14.01 Identify the supplies and materials necessary to pinstripe a vehicle.		
14.02 Sketch a vehicle pinstripe layout.		
14.03 Apply pinstripes to a vehicle.		
14.04 Sketch a multi-color graphic design using vinyl material.		
15.0 Demonstrate proficiency in applying window tint--The student will be able to:		
15.01 Identify the supplies and materials necessary to apply window tint to a vehicle.		
15.02 Comply with local and state regulations regarding application of window tint on motor vehicles.		
15.03 Apply window tint on flat glass surfaces.		
15.04 Apply window tint to curved glass surfaces.		

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

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Aircraft Airframe Mechanics**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Aviation Maintenance General (9540600)

Secondary – Career Preparatory	
Program Number	8715100
CIP Number	0647060700
Grade Level	9-12, 30,31
Standard Length	4 credits (General Only)
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this program is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. This program prepares students for employment as an Aviation General Maintenance Technician Helper, and an Aviation Maintenance Technician with FAA Airframe Rating.

This program focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

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

Program Structure

This program is a planned sequence of instruction consisting of one occupational completion points.

The following table illustrates the **Secondary** program structure:

Aviation Maintenance General - 4 secondary credits (480 hours FAA required minimum). These courses may be used as part of "Powerplant" or "Airframe". The outcomes and student performance standards are the same as "General". The courses can be used only once for secondary students enrolled in either "Powerplant" or "Airframe".

The FAA required subject matter may be sequenced in courses 1 through 4 as necessary to meet program specific General requirements. The student will be provided with a transcript of the FAA completed requirements when he or she leaves/moves as proof of completion/competency. The total FAA approved General program may not extend beyond the number courses for the high school program.

Aviation Maintenance General Only

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
	8715110	Aviation Maintenance General 1	1 credit		3	VO
	8715120	Aviation Maintenance General 2	1 credit		3	VO
	8715130	Aviation Maintenance General 3	1 credit		3	VO
A	8715140	Aviation Maintenance General 4	1 credit	49-3011	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.

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
8715110	**	**	**	**	**	**	**	**	**	**	**
8715120	**	**	**	**	**	**	**	**	**	**	**

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
8715130	**	**	**	**	**	**	**	**	**	**	**
8715140	**	**	**	**	**	**	**	**	**	**	**

** *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
8715110	**	**	**	**	**	**	**
8715120	**	**	**	**	**	**	**
8715130	**	**	**	**	**	**	**
8715140	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

National Standards

Programs identified as having Industry or National Standards to the corresponding standards and/or benchmarks for the Aircraft Airframe Mechanics program can be found using the following link:

http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part147-appC.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 Aircraft Airframe Mechanics.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aircraft Airframe Mechanics.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aircraft Airframe Mechanics.
04.0 Perform ground operations and servicing duties.
05.0 Demonstrate mathematical skills.
06.0 Maintain forms and records.
07.0 Apply principles of basic physics.
08.0 Demonstrate the use of maintenance publications.
09.0 Interpret mechanic privileges and limitations.
10.0 Demonstrate appropriate communication skills.
11.0 Perform basic aircraft drawing skills.
12.0 Maintain aircraft fluid lines and fittings.
13.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aircraft Airframe Mechanics.
14.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aircraft Airframe Mechanics.
15.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aircraft Airframe Mechanics.
16.0 Perform basic electricity skills.
17.0 Demonstrate aircraft weight and balance skills.
18.0 Perform aircraft materials and processes skills.
19.0 Perform cleaning and corrosion-control operations.
20.0 Demonstrate employability skills as an Aviation General Maintenance Technician Helper.

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 1**
Course Number: **8715110**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 1 course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study general hangar and shop safety, environmental concerns, mathematics, physics, basic aerodynamics, federal aviation regulations, publications and records.

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 Aircraft Airframe Mechanics.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Aircraft Airframe Mechanics.		
	02.01	Text Types and Purposes	
	02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
	02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
	02.02	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 Aircraft Airframe Mechanics.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
04.0 Perform ground operations and servicing duties--The student will be able to:			
04.01 Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards.			App. B, G, 20. Level 2
04.02 Identify and select fuels.			App. B, G, 21. Level 2
04.03 Comply with prescribed shop and personal safety procedures.			
05.0 Demonstrate mathematical skills--The student will be able to:			
05.01 Extract roots and raise numbers to a given power.			App. B, H, 24. Level 3
05.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.			App. B, H, 25. Level 3
05.03 Solve ratio, proportion, and percentage problems.			App. B, H, 26. Level 3
05.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.			App. B, H, 27. Level 3
06.0 Maintain forms and records--The student will be able to:			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
06.01	Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.			App. B, I, 28. Level 3
06.02	Complete required maintenance forms, records, and inspection reports.			App. B, I, 29. Level 3
07.0	Apply principles of basic physics--The student will be able to:			
07.01	Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.			App. B, J, 30. Level 2
07.02	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.			
07.03	Draw conclusions or make inferences from data.			
07.04	Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.			
07.05	Understand pressure measurement in terms of PSI, inches of mercury, and KPA.			
08.0	Demonstrate the use of maintenance publications--The student will be able to:			
08.01	Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.			App. B, K, 31. Level 3
08.02	Read technical data.			App. B, K, 32. Level 3
09.0	Interpret mechanic privileges and limitations--The student will be able to:			
09.01	Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.			App. B, L, 33. Level 3
09.02	Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.			
09.03	Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.			
10.0	Demonstrate appropriate communication skills--The student will be able to:			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
10.01	Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.			
10.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.			
10.03	Read and follow written and oral instructions.			
10.04	Answer and ask questions coherently and concisely.			
10.05	Read critically by recognizing assumptions and implications and by evaluating ideas.			
10.06	Demonstrate appropriate telephone/communication skills.			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 2**
Course Number: **8715120**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 2 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study aircraft hardware and precision measuring instruments; blueprints and drawings; hand and power tools; and fluid lines and fittings.

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 Aircraft Airframe Mechanics.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Aircraft Airframe Mechanics.		
	02.01	Text Types and Purposes	
	02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
	02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
	02.02	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 Aircraft Airframe Mechanics.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
11.0 Perform basic aircraft drawing skills--The student will be able to:			
11.01 Use aircraft drawings, symbols, and system schematics.			App. B, B, 7. Level 2
11.02 Draw sketches of repairs and alterations.			App. B, B, 8. Level 3
11.03 Use blueprint information.			App. B, B, 9. Level 3
11.04 Use graphs and charts.			App. B, B, 10. Level 3
12.0 Maintain aircraft fluid lines and fittings--The student will be able to:			
12.01 Fabricate and install rigid and flexible fluid lines and fittings.			App. B, D, 13. Level 3
12.02 Utilize proper personal safety procedures for fluid lines and fittings.			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 3**
Course Number: **8715130**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 3 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1 & 2 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study basic electricity and DC electrical circuits; aircraft battery service and inspection; AC electrical circuits and solid-state circuits.

Florida Standards			Correlation to CTE Program Standard #
13.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aircraft Airframe Mechanics.		
	13.01 Key Ideas and Details		
	13.01.1	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	
	13.01.2	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	
	13.01.3	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	
	13.02 Craft and Structure		
	13.02.1	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	
	13.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	13.02.3	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 #
13.03	Integration of Knowledge and Ideas		
	13.03.1	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	
	13.03.2	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	
	13.03.3	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	
13.04	Range of Reading and Level of Text Complexity		
	13.04.1	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.	
	13.04.2	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	
14.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aircraft Airframe Mechanics.		
14.01	Text Types and Purposes		
	14.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	14.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
14.02	Production and Distribution of Writing		
	14.02.1	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 #
	14.02.2	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	
	14.02.3	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	
	14.03	Research to Build and Present Knowledge	
	14.03.1	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	
	14.03.2	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	
	14.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	14.04	Range of Writing	
	14.04.1	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aircraft Airframe Mechanics.		
	15.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	15.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	15.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
15.04 Model with mathematics. MAFS.K12.MP.4.1	
15.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
15.06 Attend to precision. MAFS.K12.MP.6.1	
15.07 Look for and make use of structure. MAFS.K12.MP.7.1	
15.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
16.0 Perform basic electricity skills--The student will be able to:			
16.01 Calculate and measure capacitance and inductance.			App. B, A, 1. Level 2
16.02 Calculate and measure electrical power.			App. B, A, 2. Level 2
16.03 Measure voltage, current, resistance, and continuity.			App. B, A, 3. Level 3
16.04 Determine the relationship of voltage, current, and resistance in electrical circuits.			App. B, A, 4. Level 3
16.05 Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.			App. B, A, 5. Level 3
16.06 Inspect and service batteries.			App. B, A, 6. Level 3
16.07 Utilize proper electrical safety procedures.			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 4**
Course Number: **8715140**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 4 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1, 2, & 3 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study structural materials and processes, non-destructive inspection, aircraft cleaning and corrosion control, weight and balance, and aircraft ground operations and servicing.

Florida Standards			Correlation to CTE Program Standard #
13.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aircraft Airframe Mechanics.		
	13.01 Key Ideas and Details		
	13.01.1	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	
	13.01.2	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	
	13.01.3	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	
	13.02 Craft and Structure		
	13.02.1	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	
	13.02.2	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 #
	13.02.3	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	
13.03	Integration of Knowledge and Ideas		
	13.03.1	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	
	13.03.2	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	
	13.03.3	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	
13.04	Range of Reading and Level of Text Complexity		
	13.04.1	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.	
	13.04.2	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	
14.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aircraft Airframe Mechanics.		
14.01	Text Types and Purposes		
	14.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	14.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
14.02	Production and Distribution of Writing		

Florida Standards			Correlation to CTE Program Standard #
	14.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	14.02.2	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	
	14.02.3	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	
14.03	Research to Build and Present Knowledge		
	14.03.1	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	
	14.03.2	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	
	14.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
14.04	Range of Writing		
	14.04.1	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aircraft Airframe Mechanics.		
	15.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	15.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
15.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
15.04 Model with mathematics. MAFS.K12.MP.4.1	
15.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
15.06 Attend to precision. MAFS.K12.MP.6.1	
15.07 Look for and make use of structure. MAFS.K12.MP.7.1	
15.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
17.0 Demonstrate aircraft weight and balance skills--The student will be able to:			
17.01 Weigh aircraft.			App. B, C, 11. Level 2
17.02 Perform complete weight-and-balance check and record data.			App. B, C, 12. Level 3
17.03 Properly configure aircraft for weighing and capable of setting up and using weighing equipment.			
18.0 Perform aircraft materials and processes skills--The student will be able to:			
18.01 Identify and select appropriate nondestructive testing methods.			App. B, E, 14. Level 1
18.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.			App. B, E, 15. Level 2
18.03 Perform basic heat-testing processes.			App. B, E, 16. Level 1
18.04 Identify and select aircraft hardware and materials.			App. B, E, 17. Level 3
18.05 Inspect and check welds.			App. B, E, 18. Level 3
18.06 Perform precision measurements.			App. B, E, 19. Level 3

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
	18.07 Perform safety-wiring techniques.			
19.0	Perform cleaning and corrosion-control operations--The student will be able to:			
	19.01 Identify and select cleaning materials.			App. B, G, 22. Level 3
	19.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. Understand metal strength limitations when removing corrosion.			App. B, G, 23. Level 3
20.0	Demonstrate employability skills as an Aviation General Maintenance Technician Helper--The student will be able to:			
	20.01 Conduct a job search.			
	20.02 Secure information about a job.			
	20.03 Identify documents that may be required when applying for a job position.			
	20.04 Complete a job-application form correctly.			
	20.05 Demonstrate job-interview skills.			
	20.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.			
	20.07 Identify work habits for getting and keeping a job.			
	20.08 Explain how to make job changes.			
	20.09 Explain the purpose of the Right-to-Know" law.			

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.

Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

Special Notes

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral, and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working

condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

Common hand tools, portable tools, precision tools, machine tools, torqueing tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician school shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

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: **Aircraft Powerplant Mechanics**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Aviation Maintenance General (9540600).

Secondary – Career Preparatory	
Program Number	8715200
CIP Number	0647060800
Grade Level	9-12, 30,31
Standard Length	4 credits (General Only)
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this program is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. This program prepares students for employment as an Aviation General Maintenance Technician Helper, and an Aviation Maintenance Technician with FAA Airframe Rating.

This program focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

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

Program Structure

This program is a planned sequence of instruction consisting of one occupational completion points.

The following table illustrates the **Secondary** program structure:

Aviation Maintenance General - 4 secondary credits (480 hours FAA required minimum). These courses may be used as part of "Powerplant" or "Airframe". The outcomes and student performance standards are the same as "General". The courses can be used only once for secondary students enrolled in either "Powerplant" or "Airframe".

The FAA required subject matter may be sequenced in courses 1 through 4 as necessary to meet program specific General requirements. The student will be provided with a transcript of the FAA completed requirements when he or she leaves/moves as proof of completion/competency. The total FAA approved General program may not extend beyond the number courses for the high school program.

Aviation Maintenance General Only

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
	8715110	Aviation Maintenance General 1	1 credit		3	VO
	8715120	Aviation Maintenance General 2	1 credit		3	VO
	8715130	Aviation Maintenance General 3	1 credit		3	VO
A	8715140	Aviation Maintenance General 4	1 credit	49-3011	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.

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
8715110	**	**	**	**	**	**	**	**	**	**	**
8715120	**	**	**	**	**	**	**	**	**	**	**

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
8715130	**	**	**	**	**	**	**	**	**	**	**
8715140	**	**	**	**	**	**	**	**	**	**	**

** *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
8715110	**	**	**	**	**	**	**
8715120	**	**	**	**	**	**	**
8715130	**	**	**	**	**	**	**
8715140	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

National Standards

Programs identified as having Industry or National Standards to the corresponding standards and/or benchmarks for the Aircraft Powerplant Mechanics program can be found using the following link:

http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part147-appC.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 Aircraft Powerplant Mechanics.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aircraft Powerplant Mechanics.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aircraft Powerplant Mechanics.
04.0 Perform ground operations and servicing duties.
05.0 Demonstrate mathematical skills.
06.0 Maintain forms and records.
07.0 Apply principles of basic physics.
08.0 Demonstrate the use of maintenance publications.
09.0 Interpret mechanic privileges and limitations.
10.0 Demonstrate appropriate communication skills.
11.0 Perform basic aircraft drawing skills.
12.0 Maintain aircraft fluid lines and fittings.
13.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aircraft Powerplant Mechanics.
14.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aircraft Powerplant Mechanics.
15.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aircraft Powerplant Mechanics.
16.0 Perform basic electricity skills.
17.0 Demonstrate aircraft weight and balance skills.
18.0 Perform aircraft materials and processes skills.
19.0 Perform cleaning and corrosion-control operations.
20.0 Demonstrate employability skills as an Aviation General Maintenance Technician Helper.

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 1**
Course Number: **8715110**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 1 course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study general hangar and shop safety, environmental concerns, mathematics, physics, basic aerodynamics, federal aviation regulations, publications and records.

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 Aircraft Powerplant Mechanics.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Aircraft Powerplant Mechanics.		
	02.01	Text Types and Purposes	
	02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
	02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
	02.02	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 Aircraft Powerplant Mechanics.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
04.0 Perform ground operations and servicing duties--The student will be able to:			
04.01 Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards.			App. B, G, 20. Level 2
04.02 Identify and select fuels.			App. B, G, 21. Level 2
04.03 Comply with prescribed shop and personal safety procedures.			
05.0 Demonstrate mathematical skills--The student will be able to:			
05.01 Extract roots and raise numbers to a given power.			App. B, H, 24. Level 3
05.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.			App. B, H, 25. Level 3
05.03 Solve ratio, proportion, and percentage problems.			App. B, H, 26. Level 3
05.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.			App. B, H, 27. Level 3
06.0 Maintain forms and records--The student will be able to:			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
06.01	Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.			App. B, I, 28. Level 3
06.02	Complete required maintenance forms, records, and inspection reports.			App. B, I, 29. Level 3
07.0	Apply principles of basic physics--The student will be able to:			
07.01	Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.			App. B, J, 30. Level 2
07.02	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.			
07.03	Draw conclusions or make inferences from data.			
07.04	Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.			
07.05	Understand pressure measurement in terms of PSI, inches of mercury, and KPA.			
08.0	Demonstrate the use of maintenance publications--The student will be able to:			
08.01	Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.			App. B, K, 31. Level 3
08.02	Read technical data.			App. B, K, 32. Level 3
09.0	Interpret mechanic privileges and limitations--The student will be able to:			
09.01	Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.			App. B, L, 33. Level 3
09.02	Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.			
09.03	Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.			
10.0	Demonstrate appropriate communication skills--The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
10.01 Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.			
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.			
10.03 Read and follow written and oral instructions.			
10.04 Answer and ask questions coherently and concisely.			
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.			
10.06 Demonstrate appropriate telephone/communication skills.			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 2**
Course Number: **8715120**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 2 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study aircraft hardware and precision measuring instruments; blueprints and drawings; hand and power tools; and fluid lines and fittings.

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 Aircraft Powerplant Mechanics.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Aircraft Powerplant Mechanics.		
	02.01	Text Types and Purposes	
	02.01.1	Write arguments focused on discipline-specific content. LAFS.910.WHST.1.1	
	02.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.910.WHST.1.2	
	02.02	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 Aircraft Powerplant Mechanics.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
11.0 Perform basic aircraft drawing skills--The student will be able to:			
11.01 Use aircraft drawings, symbols, and system schematics.			App. B, B, 7. Level 2
11.02 Draw sketches of repairs and alterations.			App. B, B, 8. Level 3
11.03 Use blueprint information.			App. B, B, 9. Level 3
11.04 Use graphs and charts.			App. B, B, 10. Level 3
12.0 Maintain aircraft fluid lines and fittings--The student will be able to:			
12.01 Fabricate and install rigid and flexible fluid lines and fittings.			App. B, D, 13. Level 3
12.02 Utilize proper personal safety procedures for fluid lines and fittings.			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 3**
Course Number: **8715130**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 3 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1 & 2 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study basic electricity and DC electrical circuits; aircraft battery service and inspection; AC electrical circuits and solid-state circuits.

Florida Standards			Correlation to CTE Program Standard #
13.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aircraft Powerplant Mechanics.		
	13.01 Key Ideas and Details		
	13.01.1	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	
	13.01.2	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	
	13.01.3	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	
	13.02 Craft and Structure		
	13.02.1	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	
	13.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	13.02.3	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 #
13.03	Integration of Knowledge and Ideas		
	13.03.1	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	
	13.03.2	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	
	13.03.3	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	
13.04	Range of Reading and Level of Text Complexity		
	13.04.1	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.	
	13.04.2	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	
14.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aircraft Powerplant Mechanics.		
14.01	Text Types and Purposes		
	14.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	14.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
14.02	Production and Distribution of Writing		
	14.02.1	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 #
	14.02.2	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	
	14.02.3	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	
	14.03	Research to Build and Present Knowledge	
	14.03.1	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	
	14.03.2	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	
	14.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	14.04	Range of Writing	
	14.04.1	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aircraft Powerplant Mechanics.		
	15.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	15.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	15.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
15.04 Model with mathematics. MAFS.K12.MP.4.1	
15.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
15.06 Attend to precision. MAFS.K12.MP.6.1	
15.07 Look for and make use of structure. MAFS.K12.MP.7.1	
15.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
16.0 Perform basic electricity skills--The student will be able to:			
16.01 Calculate and measure capacitance and inductance.			App. B, A, 1. Level 2
16.02 Calculate and measure electrical power.			App. B, A, 2. Level 2
16.03 Measure voltage, current, resistance, and continuity.			App. B, A, 3. Level 3
16.04 Determine the relationship of voltage, current, and resistance in electrical circuits.			App. B, A, 4. Level 3
16.05 Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.			App. B, A, 5. Level 3
16.06 Inspect and service batteries.			App. B, A, 6. Level 3
16.07 Utilize proper electrical safety procedures.			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 4**
Course Number: **8715140**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 4 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1, 2, & 3 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study structural materials and processes, non-destructive inspection, aircraft cleaning and corrosion control, weight and balance, and aircraft ground operations and servicing.

Florida Standards			Correlation to CTE Program Standard #
13.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aircraft Powerplant Mechanics.		
	13.01 Key Ideas and Details		
	13.01.1	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	
	13.01.2	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	
	13.01.3	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	
	13.02 Craft and Structure		
	13.02.1	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	
	13.02.2	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 #
	13.02.3	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	
13.03	Integration of Knowledge and Ideas		
	13.03.1	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	
	13.03.2	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	
	13.03.3	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	
13.04	Range of Reading and Level of Text Complexity		
	13.04.1	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.	
	13.04.2	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	
14.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aircraft Powerplant Mechanics.		
14.01	Text Types and Purposes		
	14.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	14.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
14.02	Production and Distribution of Writing		

Florida Standards			Correlation to CTE Program Standard #
	14.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	14.02.2	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	
	14.02.3	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	
14.03	Research to Build and Present Knowledge		
	14.03.1	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	
	14.03.2	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	
	14.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
14.04	Range of Writing		
	14.04.1	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aircraft Powerplant Mechanics.		
	15.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	15.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
15.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
15.04 Model with mathematics. MAFS.K12.MP.4.1	
15.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
15.06 Attend to precision. MAFS.K12.MP.6.1	
15.07 Look for and make use of structure. MAFS.K12.MP.7.1	
15.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
17.0 Demonstrate aircraft weight and balance skills--The student will be able to:			
17.01 Weigh aircraft.			App. B, C, 11. Level 2
17.02 Perform complete weight-and-balance check and record data.			App. B, C, 12. Level 3
17.03 Properly configure aircraft for weighing and capable of setting up and using weighing equipment.			
18.0 Perform aircraft materials and processes skills--The student will be able to:			
18.01 Identify and select appropriate nondestructive testing methods.			App. B, E, 14. Level 1
18.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.			App. B, E, 15. Level 2
18.03 Perform basic heat-testing processes.			App. B, E, 16. Level 1
18.04 Identify and select aircraft hardware and materials.			App. B, E, 17. Level 3
18.05 Inspect and check welds.			App. B, E, 18. Level 3
18.06 Perform precision measurements.			App. B, E, 19. Level 3

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
	18.07 Perform safety-wiring techniques.			
19.0	Perform cleaning and corrosion-control operations--The student will be able to:			
	19.01 Identify and select cleaning materials.			App. B, G, 22. Level 3
	19.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. Understand metal strength limitations when removing corrosion.			App. B, G, 23. Level 3
20.0	Demonstrate employability skills as an Aviation General Maintenance Technician Helper--The student will be able to:			
	20.01 Conduct a job search.			
	20.02 Secure information about a job.			
	20.03 Identify documents that may be required when applying for a job position.			
	20.04 Complete a job-application form correctly.			
	20.05 Demonstrate job-interview skills.			
	20.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.			
	20.07 Identify work habits for getting and keeping a job.			
	20.08 Explain how to make job changes.			
	20.09 Explain the purpose of the Right-to-Know" law.			

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.

Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

Special Notes

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral, and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working

condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

Common hand tools, portable tools, precision tools, machine tools, torqueing tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician school shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

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: **Medium and Heavy Duty Truck and Bus Technician**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	8742000
CIP Number	0647060501
Grade Level	9-12, 30, 31
Standard Length	12 credits
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to maintaining and repairing diesel engines and electrical systems; reconditioning diesel fuel injection systems; overhauling diesel engines; and performing diesel engine preventive maintenance.

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 nine occupational completion points.

It is highly recommended that courses 8742010, 8742020, 8742030, and 8742040 (Core) be taught in sequential order. Courses after the Core may be taken in any sequence.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	8742010	Diesel Engine Service 1	1 credit	49-3031	3	VO
	8742020	Diesel Engine Service 2	1 credit		3	VO
B	8742030	Diesel Engine Service 3	1 credit	49-3031	3	VO
C	8742040	Diesel Engine Service 4	1 credit	49-3031	3	VO
	8742050	Diesel Engine Service 5	1 credit		3	VO
D	8742060	Diesel Engine Service 6	1 credit	49-3031	3	VO
	8742070	Diesel Engine Service 7	1 credit		3	VO
E	8742080	Diesel Engine Service 8	1 credit	49-3031	3	VO
F	8742090	Diesel Engine Service 9	1 credit	49-3031	3	VO
G	8742091	Diesel Engine Service 10	1 credit	49-3031	3	VO
H	8742092	Diesel Engine Service 11	1 credit	49-3031	3	VO
I	8742093	Diesel Engine Service 12	1 credit	49-3031	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.

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
8742010	#	3/80 4%	#	4/69 6%	1/67 1%	4/70 6%	1/69 1%	4/82 5%	1/66 2%	7/74 9%	5/72 7%
8742020	1/87 1%	1/80 1%	1/83 1%	1/69 1%	2/67 3%	1/70 1%	1/69 1%	1/82 1%	1/66 2%	3/74 4%	3/72 4%

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
8742030	1/87 1%	2/80 3%	1/83 1%	1/69 1%	2/67 3%	1/70 1%	1/69 1%	1/82 1%	1/66 2%	4/74 5%	4/72 6%
8742040	1/87 1%	7/80 9%	1/83 1%	3/69 4%	4/67 6%	5/70 7%	1/69 1%	6/82 7%	2/66 3%	9/74 12%	11/72 15%
8742050	1/87 1%	5/80 7%	1/83 1%	5/69 7%	3/67 4%	3/70 4%	2/69 3%	6/82 7%	2/66 3%	9/74 12%	8/72 11%
8742060	1/87 1%	6/80 8%	1/83 1%	5/69 7%	5/67 7%	4/70 6%	3/69 4%	6/82 7%	2/66 3%	11/74 15%	9/72 13%
8742070	1/87 1%	2/80 3%	1/83 1%	3/69 4%	1/67 1%	3/70 4%	1/69 1%	3/82 4%	2/66 3%	6/74 8%	7/72 10%
8742080	1/87 1%	4/80 5%	1/83 1%	1/69 1%	3/67 4%	1/70 1%	1/69 1%	3/82 4%	1/66 2%	6/74 8%	6/72 8%
8742090	1/87 1%	4/80 5%	1/83 1%	2/69 3%	4/67 6%	3/70 4%	1/69 1%	5/82 6%	1/66 2%	7/74 9%	7/72 10%
8742091	1/87 1%	3/80 4%	1/83 1%	2/69 3%	2/67 3%	2/70 3%	1/69 1%	3/82 4%	1/66 23%	5/74 7%	5/72 7%
8742092	1/87 1%	5/80 6%	1/83 1%	2/69 3%	3/67 4%	2/70 3%	1/69 1%	4/82 5%	1/66 2%	8/74 11%	9/72 13%
8742093	1/87 1%	3/80 4%	1/83 1%	3/69 4%	3/67 4%	5/70 7%	2/69 3%	4/82 5%	2/66 3%	8/74 11%	8/72 11%

** *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
8742010	**	**	**	**	**	**	**
8742020	**	**	**	**	**	**	**
8742030	**	**	**	**	**	**	**
8742040	**	**	**	**	**	**	**
8742050	**	**	**	**	**	**	**
8742060	**	**	**	**	**	**	**
8742070	**	**	**	**	**	**	**
8742080	**	**	**	**	**	**	**
8742090	**	**	**	**	**	**	**
8742091	**	**	**	**	**	**	**
8742092	**	**	**	**	**	**	**
8742093	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

National Standards

Programs identified as having Industry or National Standards to the corresponding standards and/or benchmarks for the Medium and Heavy Duty Bus and Truck program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Medium and Heavy Duty Truck and Bus Technician.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.
04.0 Proficiently explain and apply required shop and personal safety tasks.
05.0 Identify the basic diesel components and functions.
06.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment.
07.0 Identify principles, assemblies, and systems of engine operation.
08.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
09.0 Demonstrate workplace employability skills related to personal standards and work habits/ethics.
10.0 Diagnose and repair General electrical systems.
11.0 Diagnose and repair Battery systems.
12.0 Diagnose and repair Starting systems.
13.0 Diagnose and repair Charging systems.
14.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.
15.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.
16.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.
17.0 Diagnose and repair Lighting systems.
18.0 Diagnose and repair Gauges and warning devices.
19.0 Diagnose and repair Related electrical systems.
20.0 Diagnose and repair Engine systems.
21.0 Diagnose and repair Fuel system
22.0 Diagnose and repair Air induction and exhaust system
23.0 Diagnose and repair Cooling system
24.0 Diagnose and repair Lubrication system
25.0 Diagnose and repair Instruments and controls
26.0 Diagnose and repair Safety equipment
27.0 Diagnose and repair Hardware
28.0 Diagnose and repair Heating, ventilation, and air conditioning (HVAC)
29.0 Diagnose and repair Battery and starting systems
30.0 Diagnose and repair Electrical/Electronic charging systems
31.0 Diagnose and repair Lighting systems.
32.0 Diagnose and repair Air brake systems.

33.0 Diagnose and repair Hydraulic brake systems.
34.0 Diagnose and repair Drive Train systems.
35.0 Diagnose and repair Suspension and steering systems.
36.0 Diagnose and repair Tires and wheels.
37.0 Diagnose and repair Frame and fifth wheel.
38.0 General engine diagnosis and repair.
39.0 Cylinder head and valve train diagnosis and repair.
40.0 Engine block diagnosis and repair.
41.0 Lubrication systems diagnosis and repair.
42.0 Cooling system diagnosis and repair.
43.0 Air induction and exhaust systems diagnosis and repair.
44.0 Fuel system diagnosis and repair.
    44.01 Fuel supply system.
    44.02 Electronic fuel management system.
45.0 Diagnose and repair engine brakes.
46.0 Diagnose and repair air supply and service systems.
47.0 Diagnose and repair mechanical/foundation air brake systems.
48.0 Diagnose and repair parking brakes.
49.0 Diagnose and repair hydraulic systems.
50.0 Diagnose and repair mechanical/foundation hydraulic brake systems.
51.0 Diagnose and repair power assist units.
52.0 Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC).
53.0 Diagnose and repair wheel bearings.
54.0 HVAC systems diagnosis, service, and repair.
55.0 A/C system and component diagnosis, service, and repair.
56.0 Diagnose and repair Compressor and clutch.
57.0 Diagnose and repair Evaporator, condenser, and related components.
58.0 Heating and engine cooling systems diagnosis, service, and repair.
59.0 Electrical system diagnosis, service, and repair.
60.0 Air/vacuum/mechanical diagnosis, service, and repair.
61.0 Refrigerant recovery, recycling, and handling.
62.0 Steering column diagnosis, service, and repair.
63.0 Steering units diagnosis, service, and repair.
64.0 Steering linkage diagnosis, service, and repair.
65.0 Suspension systems diagnosis and repair.
66.0 Wheel alignment diagnosis, adjustment, and repair.
67.0 Wheels and tires diagnosis, service, and repair.
68.0 Frame and coupling diagnosis, service, and repair.
69.0 Clutch diagnosis and repair.
70.0 Transmission diagnosis and repair.
71.0 Driveshaft and universal joint diagnosis and repair.
72.0 Drive axle diagnosis and repair.

73.0 General hydraulic system diagnosis and repair.
74.0 Diagnose and repair hydraulic pumps.
75.0 Diagnose and repair hydraulic filtration/reservoirs (tanks).
76.0 Diagnose and repair hydraulic hoses, fittings, and connections.
77.0 Diagnose and repair hydraulic control valves.
78.0 Diagnose and repair hydraulic actuators.

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 1**
Course Number: **8742010**
Course Credit: **1**

Course Description:
The Diesel Engine Service 1 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop and personal safety skills, basic diesel components, tools and equipment, occupational safety, engine operation, and workplace employment skills.

For every task in Diesel Engine Service 1, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

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 Medium and Heavy Duty Truck and Bus Technician.		
	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	

Florida Standards			Correlation to CTE Program Standard #
	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 Medium and Heavy Duty Truck and Bus Technician.		
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 Medium and Heavy Duty Truck and Bus Technician.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	

Florida Standards	Correlation to CTE Program Standard #
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
ASE = Required Supplemental Tasks

Note: This course is pending alignment in the following categories: FS-M/LA and Priority Number

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
04.0 Proficiently explain and apply required shop and personal safety tasks - -The student will be able to:		SC.912.E.6.6 SC.912.L.17.15	
04.01 Identify basic shop organization and management regulations.			
04.02 Identify and apply general and required shop safety rules and procedures.			ASE
04.03 Utilize safe procedures for handling of tools and equipment.			ASE
04.04 Identify and use proper placement of floor jacks and jack stands.			ASE
04.05 Identify and use proper procedures for safe lift operation.			ASE
04.06 Utilize proper ventilation procedures for working within the lab/shop area.			ASE
04.07 Identify marked safety areas.			ASE

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
04.08	Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.			ASE
04.09	Identify the location and use of eye wash stations.			ASE
04.10	Identify the location of the posted evacuation routes.			ASE
04.11	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.			ASE
04.12	Identify and wear appropriate clothing for lab/shop activities.			ASE
04.13	Secure hair and jewelry for lab/shop activities.			ASE
04.14	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.			ASE
04.15	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HDD) lamps, ignition systems, injection systems, etc.).			ASE
04.16	Locate and demonstrate knowledge of Safety Data Sheets (SDS).			ASE
04.17	Assist in activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.			
04.18	Identify and comply with personal and environmental safety practices associated with the handling, storage, and disposal of chemicals and hazardous materials.			
05.0	Identify the basic diesel components and functions--The student will be able to:			
05.01	Identify types of bearings and their uses.			
05.02	Identify seals, gaskets, and fasteners.			
05.03	Identify drive power train components and functions.			
05.04	Identify threaded fasteners by size, type, thread series, thread classes, material hardness, and compatibility			
06.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment --The student will be able to:			
06.01	Identify tools and their usage in automotive applications.			ASE

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
06.02	Identify standard and metric designation.			ASE
06.03	Demonstrate safe handling and use of appropriate tools.			ASE
06.04	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.			ASE
06.05	Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper, etc.).			ASE
07.0	Identify principles, assemblies, and systems of engine operation--The student will be able to:		SC.912.P.8.2, 8 SC.912.P.10.1,2,3,4 SC.912.P.12.3, 6, 12	
07.01	Explain the basic principles in the operation of the four-stroke-cycle diesel engine			
07.02	Identify engine assemblies and systems.			
07.03	Explain the operating principles of two-and-four-stroke-cycle engines.			
07.04	Identify the equipment of two-and-four-stroke-cycle engines.			
07.05	Identify governor types and their operating principles.			
08.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services--The student will be able to:			
08.01	Identify information needed and the service requested on a repair order.			ASE
08.02	Identify purpose and demonstrate proper use of fender covers, mats.			ASE
08.03	Demonstrate use of the three C's (Concern, Cause, and Correction).			ASE
08.04	Review vehicle service history.			ASE
08.05	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.			ASE
08.06	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.)			ASE
09.0	Demonstrate workplace employability skills related to personal standards and work habits/ethics--The student will be able to:			
09.01	Reports to work daily on time; able to take directions and motivated to accomplish the task at hand.			ASE

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
09.02	Dresses appropriately and uses language and manners suitable for the workplace.			ASE
09.03	Maintains appropriate personal hygiene.			ASE
09.04	Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.			ASE
09.05	Demonstrates honesty, integrity and reliability.			ASE
09.06	Complies with workplace policies/laws			ASE
09.07	Contributes to the success of the team, assists others and requests help when needed.			ASE
09.08	Works well with all customers and coworkers.			ASE
09.09	Negotiates solutions to interpersonal and workplace conflicts.			ASE
09.10	Contributes ideas and initiative.			ASE
09.11	Follows directions.			ASE
09.12	Communicates (written and verbal) effectively with customers and coworkers.			ASE
09.13	Reads and interprets workplace documents; writes clearly and concisely.			ASE
09.14	Analyzes and resolves problems that arise in completing assigned tasks.			ASE
09.15	Organizes and implements a productive plan of work.			ASE
09.16	Uses scientific, technical, engineering and mathematics principles and reasoning to accomplish assigned tasks.			ASE
09.17	Identifies and address the needs of all customers, providing helpful, courteous and knowledgeable service and advice as needed.			ASE

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 2**
Course Number: **8742020**
Course Credit: **1**

Course Description:
The Diesel Engine Service 2 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study general electrical systems, batteries, starting, charging, service, and repair.

For every task in Diesel Engine Service 2, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

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 Medium and Heavy Duty Truck and Bus Technician.		
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	

Florida Standards			Correlation to CTE Program Standard #
	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 Medium and Heavy Duty Truck and Bus Technician.		
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	

Florida Standards		Correlation to CTE Program Standard #
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.	
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. 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
EE – Electrical/Electronics

Note: This course is pending alignment in the following categories: FS-M/LA

EE Task List:
P-1 = 25
P-2 = 03
P-3 = 02
Total 30

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
10.0	Diagnose and repair general electrical systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14, 15, 16	
10.01	Read and interpret electrical/electronic circuits using wiring diagrams.			P-1
10.02	Check continuity in electrical/electronic circuits using appropriate test equipment.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
10.03	Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using appropriate test equipment.			P-1
10.04	Check current flow in electrical/electronic circuits and components using appropriate test equipment.			P-1
10.05	Check resistance in electrical/electronic circuits and components using appropriate test equipment.			P-1
10.06	Locate shorts, grounds, and opens in electrical/electronic circuits.			P-1
10.07	Diagnose parasitic (key-off) battery drain problems; perform tests; determine needed action.			P-1
10.08	Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed.			P-1
10.09	Inspect and test spike suppression devices; replace as needed.			P-3
10.10	Check frequency and pulse width signal in electrical/electronic circuits using appropriate test equipment.			P-3
11.0	Diagnose and repair battery systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14,15	
11.01	Identify battery type; perform appropriate battery load test; determ needed action.			P-1
11.02	Determine battery state of charge using an open circuit voltage te			P-1
11.03	Inspect, clean, and service battery; replace as needed.			P-1
11.04	Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed.			P-1
11.05	Charge battery using appropriate method for battery type.			P-1
11.06	Inspect, test, and clean battery cables and connectors; repair or replace as needed.			P-1
11.07	Jump start a vehicle using jumper cables and a booster battery or auxiliary power supply using proper safety procedures.			P-1
11.08	Perform battery capacitance test; determine needed action.			P-2
11.09	Identify and test low voltage disconnect (LVD) systems; determine needed repair.			P-2
12.0	Diagnose and repair starting systems--The student will be able to:		SC.912.P.10.14, 15, 16	
12.01	Perform starter circuit cranking voltage and voltage drop tests; determine needed action.			P-1
12.02	Inspect and test components (key switch, push button and/or			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
	magnetic switch) and wires and harnesses in the starter control circuit; replace as needed			
12.03	Inspect and test starter relays and solenoids/switches; replace as needed.			P-1
12.04	Remove and replace starter; inspect flywheel ring gear or flex plate.			P-1
13.0	Diagnose and repair charging systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14, 15	
13.01	Test instrument panel mounted volt meters and/or indicator lamps; determine needed action.			P-1
13.02	Identify causes of a no charge, low charge, or overcharge problems; determine needed action.			P-1
13.03	Inspect and replace alternator drive belts, pulleys, fans, tensioners, and mounting brackets; adjust drive belts and check alignment.			P-1
13.04	Perform charging system voltage and amperage output tests; perform AC ripple test; determine needed action.			P-1
13.05	Perform charging circuit voltage drop tests; determine needed action.			P-1
13.06	Remove and replace alternator.			P-1
13.07	Inspect, repair, or replace cables, wires, and connectors in the charging circuit.			P-1

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 3**
Course Number: **8742030**
Course Credit: **1**

Course Description:
The Diesel Engine Service 3 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study general electrical systems, lighting, gauges, warning devices, and related electrical system diagnostics, service, and repair.

For every task in Diesel Engine Service 3 the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Florida Standards			Correlation to CTE Program Standard #
14.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.		
	14.01 Key Ideas and Details		
	14.01.1	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	
	14.01.2	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	
	14.01.3	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	
	14.02 Craft and Structure		
	14.02.1	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	

Florida Standards			Correlation to CTE Program Standard #
	14.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	14.02.3	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	
14.03	Integration of Knowledge and Ideas		
	14.03.1	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	
	14.03.2	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	
	14.03.3	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	
14.04	Range of Reading and Level of Text Complexity		
	14.04.1	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.	
	14.04.2	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.		
15.01	Text Types and Purposes		
	15.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	15.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	

Florida Standards			Correlation to CTE Program Standard #
	15.02	Production and Distribution of Writing	
	15.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	15.02.2	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	
	15.02.3	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	
	15.03	Research to Build and Present Knowledge	
	15.03.1	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	
	15.03.2	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	
	15.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	15.04	Range of Writing	
	15.04.1	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	
16.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.		
	16.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	

Florida Standards	Correlation to CTE Program Standard #
16.02 Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
16.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
16.04 Model with mathematics. MAFS.K12.MP.4.1	
16.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
16.06 Attend to precision. MAFS.K12.MP.6.1	
16.07 Look for and make use of structure. MAFS.K12.MP.7.1	
16.08 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
EE – Electrical/Electronics

Note: This course is pending alignment in the following categories: FS-M/LA

EE Task List:
P-1 = 13
P-2 = 12
P-3 = 10
Total 35

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
17.0 Diagnose and repair lighting systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14	
17.01 Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.			P-1
17.02 Identify causes of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation.			P-1
17.03 Test, aim, and replace headlights.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
17.04	Test headlight and dimmer circuit switches, relays, wires, terminals, connectors, sockets, and control components/modules; repair or replace as needed.			P-1
17.05	Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, and control components/modules of parking, clearance, and taillight circuits; repair or replace as needed.			P-1
17.06	Inspect and test instrument panel light circuit switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires, and printed circuits/control modules; repair or replace as needed.			P-2
17.07	Inspect and test interior cab light circuit switches, bulbs/LEDs, sockets, low voltage disconnect (LVD), connectors, terminals, wires, and control components/modules; repair or replace as needed.			P-2
17.08	Inspect and test tractor-to-trailer multi-wire connector(s); repair or replace as needed.			P-1
17.09	Inspect, test, and adjust stoplight circuit switches, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.			P-1
17.10	Inspect and test turn signal and hazard circuit flasher(s), switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.			P-1
17.11	Inspect and test reverse lights and warning device circuit switches, bulbs/LEDs, sockets, horns, buzzers, connectors, terminals, wires and control components/modules; repair or replace as needed.			P-1
18.0	Diagnose and repair gauges and warning devices--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14,15 SC.912.P.12.2	
18.01	Interface with vehicle's on-board computer; perform diagnostic procedure, verify instrument cluster operations using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.			P-1
18.02	Identify causes of intermittent, high, low, or no gauge readings; determine needed action.			P-2
18.03	Identify causes of data bus-driven gauge malfunctions; determine needed action.			P-3
18.04	Inspect and test gauge circuit sensor/sending units, gauges, connectors, terminals, and wires; repair or replace as needed.			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
18.05	Inspect and test warning devices (lights and audible) circuit sensor/sending units, bulbs/LEDs, sockets, connectors, wires, and control components/modules; repair or replace as needed.			P-1
18.06	Inspect, test, replace, and calibrate (if applicable) electronic speedometer, odometer, and tachometer systems.			P-2
19.0	Diagnose and repair related electrical systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14,15	
19.01	Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.			P-1
19.02	Identify causes of constant, intermittent, or no horn operation; determine needed action.			P-1
19.03	Inspect and test horn circuit relays, horns, switches, connectors, wires, clock springs, and control components/modules; repair or replace as needed.			P-2
19.04	Identify causes of constant, intermittent, or no wiper operation; diagnose the cause of wiper speed control and/or park problems; determine needed action.			P-2
19.05	Inspect and test wiper motor, resistors, park switch, relays, switches, connectors, wires and control components/modules; repair or replace as needed.			P-2
19.06	Inspect wiper motor transmission linkage, arms, and blades; adjust or replace as needed.			P-2
19.07	Inspect and test windshield washer motor or pump/relay assembly, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.			P-3
19.08	Inspect and test side view mirror motors, heater circuit grids, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.			P-3
19.09	Inspect and test heater and A/C electrical components including: A/C clutches, motors, resistors, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.			P-3
19.10	Inspect and test auxiliary power outlet, integral fuse, connectors, terminals, wires, and control components/modules; repair or replace as needed.			P-3
19.11	Identify causes of slow, intermittent, or no power window operation; determine needed action.			P-3

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
19.12 Inspect and test motors, switches, relays, connectors, terminals, wires, and control components/modules of power window circuits; repair or replace as needed.			P-3
19.13 Inspect and test block heaters; determine needed repairs.			P-2
19.14 Inspect and test cruise control electrical components; repair or replace as needed.			P-3
19.15 Inspect and test switches, relays, controllers, actuator/solenoids, connectors, terminals, and wires of electric door lock circuits.			P-3
19.16 Check operation of keyless and remote lock/unlock devices; determine needed action.			P-3
19.17 Inspect and test engine cooling fan electrical control components/modules, wiring; repair or replace as needed.			P-2
19.18 Identify causes of data bus communication problems; determine needed action.			P-2

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 4**
Course Number: **8742040**
Course Credit: **1**

Course Description:
The Diesel Engine Service 4 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine system, cab and hood systems, electrical/electronic systems, frame and chassis systems diagnostics, service, and repair.

For every task in Diesel Engine Service 4, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The tasks included in the Diesel Engine Service 4 area are entry-level technician inspection tasks designed to introduce the student to correct procedures and practices of vehicle inspection in a teaching/learning environment. They are not intended to satisfy the Annual Federal Vehicle Inspection requirement as prescribed in the Federal Motor Carrier Safety Regulations, Part 396, Appendix G to Subchapter B, Minimum Periodic Inspection Standards.

Florida Standards			Correlation to CTE Program Standard #
14.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.		
	14.01 Key Ideas and Details		
	14.01.1	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	
	14.01.2	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	
	14.01.3	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	

Florida Standards			Correlation to CTE Program Standard #
14.02	Craft and Structure		
	14.02.1	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	
	14.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	14.02.3	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	
14.03	Integration of Knowledge and Ideas		
	14.03.1	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	
	14.03.2	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	
	14.03.3	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	
14.04	Range of Reading and Level of Text Complexity		
	14.04.1	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.	
	14.04.2	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.		

Florida Standards		Correlation to CTE Program Standard #
15.01	Text Types and Purposes	
15.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
15.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
15.02	Production and Distribution of Writing	
15.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
15.02.2	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	
15.02.3	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	
15.03	Research to Build and Present Knowledge	
15.03.1	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	
15.03.2	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	
15.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
15.04	Range of Writing	

Florida Standards			Correlation to CTE Program Standard #
	15.04.1	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	
16.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Medium and Heavy Duty Truck and Bus Technician.		
	16.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	16.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	16.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
	16.04	Model with mathematics. MAFS.K12.MP.4.1	
	16.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
	16.06	Attend to precision. MAFS.K12.MP.6.1	
	16.07	Look for and make use of structure. MAFS.K12.MP.7.1	
	16.08	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
PM = Preventative Maintenance

Note: This course is pending alignment in the following categories: FS-M/LA

PM Task List:
P-1 = 132
P-2 = 11
P-3 = 0
Total 143

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
20.0	Diagnose and repair Engine systems--The student will be able to:		SC.912.E.5.8; 6.6 SC.912.L.17.15 SC.912.N.1.1 SC.912.P.8.1; 10.1, 2, 3, 4, 15; 12.2, 3	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
20.01	Check engine starting/operation (including unusual noises, vibrations, exhaust smoke, etc.); record idle and governed rpm.			P-1
20.02	Inspect vibration damper.			P-1
20.03	Inspect belts, tensioners, and pulleys; check and adjust belt tension; check belt alignment.			P-1
20.04	Check engine oil level and condition; check dipstick seal.			P-1
20.05	Inspect engine mounts for looseness and deterioration.			P-1
20.06	Check engine for oil, coolant, air, fuel and exhaust leaks (Engine Off and Running).			P-1
20.07	Check engine compartment wiring harnesses, connectors, and seals for damage and proper routing.			P-1
20.08	Check electrical wiring, routing, and hold-down clamps, including Engine Control Module/Powertrain Control Module (ECM/PCM).			
21.0	Diagnose and repair Fuel system--The student will be able to:			
21.01	Check fuel tanks, mountings, lines, caps, and vents.			P-1
21.02	Drain water from fuel system.			P-1
21.03	Service water separator/fuel heater; replace fuel filter(s); prime and bleed fuel system.			P-1
21.04	Inspect throttle linkages and return springs.			
22.0	Diagnose and repair Air induction and exhaust system--The student will be able to:			
22.01	Check exhaust system mountings for looseness and damage.			P-1
22.02	Check engine exhaust system for leaks, proper routing, and damaged or missing components to include exhaust gas recirculation (EGR) system and after treatment devices, if equipped.			P-1
22.03	Check air induction system: piping, charge air cooler, hoses, clamps, and mountings; check for air restrictions and leaks.			P-1
22.04	Inspect turbocharger for leaks; check mountings and connections.			P-1
22.05	Check operation of engine compression/exhaust brake.			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
22.06	Service or replace air filter as needed; check and reset air filter restriction indicator.			P-1
22.07	Inspect and service crankcase ventilation system.			P-1
22.08	Inspect diesel exhaust fluid (DEF) system, to include tanks, lines, gauge pump, and filter.			P-1
22.09	Inspect selective catalyst reduction (SCR) system; including diesel exhaust fluid (DEF) for proper levels, leaks, mounting and connections.			P-2
23.0	Diagnose and repair Cooling system--The student will be able to:			
23.01	Check operation of fan clutch.			P-1
23.02	Inspect radiator (including air flow restriction, leaks, and damage) and mountings.			P-1
23.03	Inspect fan assembly and shroud.			P-1
23.04	Pressure test cooling system and radiator cap.			P-1
23.05	Inspect coolant hoses and clamps.			P-1
23.06	Inspect coolant recovery system.			P-1
23.07	Check coolant for contamination, additive package concentration, aeration, and protection level (freeze point).			P-1
23.08	Service coolant filter.			P-1
23.09	Inspect water pump.			P-1
24.0	Diagnose and repair Lubrication system--The student will be able to:			
24.01	Change engine oil and filters; visually check oil for coolant or fuel contamination; inspect and clean magnetic drain plugs.			P-1
24.02	Take an engine oil sample for analysis.			P-1
25.0	Diagnose and repair Instruments and control systems--The student will be able to:		SC.912.P.8.1 SC.912.P.10.2, 3 SC.912.P.12.3, 5	
25.01	Inspect key condition and operation of ignition switch.			P-1
25.02	Check warning indicators.			P-1
25.03	Check instruments; record oil pressure and system voltage.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
25.04	Check operation of electronic power take off (PTO) and engine idle speed controls (if applicable)			P-2
25.05	Check HVAC controls.			P-1
25.06	Check operation of all accessories.			P-1
25.07	Using electronic service tool(s) or on-board diagnostic system; retrieve engine monitoring information; check and record diagnostic codes and trip/operational data (including engine, transmission, ABS, and other systems).			P-1
25.08	Check mechanical, electronic, and emergency shutdown operation.			
25.09	Check mechanical and electronic engine speed controls.			
26.0	Diagnose and repair Safety equipment--The student will be able to:			
26.01	Check operation of electric/air horns and back-up warning devices.			P-1
26.02	Check condition of spare fuses, safety triangles, fire extinguisher, and all required decals.			P-1
26.03	Inspect seat belts and sleeper restraints.			P-1
26.04	Inspect wiper blades and arms.			P-1
27.0	Diagnose and repair Hardware--The student will be able to:			
27.01	Check operation of wiper and washer.			P-1
27.02	Inspect windshield glass for cracks or discoloration; check sun visor.			P-1
27.03	Check seat condition, operation, and mounting.			P-1
27.04	Check door glass and window operation.			P-1
27.05	Inspect steps and grab handles.			P-1
27.06	Inspect mirrors, mountings, brackets, and glass.			P-1
27.07	Record all observed physical damage.			P-2
27.08	Lubricate all cab and hood grease fittings.			P-2
27.09	Inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
27.10	Inspect cab mountings, hinges, latches, linkages and ride height; service as needed.			P-1
27.11	Inspect tilt cab hydraulic pump, lines, and cylinders for leakage; inspect safety devices; service as needed.			
28.0	Diagnose and repair Heating, ventilation, and air conditioning (HVAC)--The student will be able to:			
28.01	Inspect A/C condenser and lines for condition and visible leaks; check mountings.			P-2
28.02	Inspect A/C compressor and lines for condition and visible leaks; check mountings.			P-2
28.03	Check A/C system condition and operation; check A/C monitoring system, if applicable.			P-1
28.04	Check HVAC air inlet filters and ducts; service as needed.			P-1
29.0	Diagnose and repair Electrical/Electronic battery and starting systems--The student will be able to:		SC.912.N.1.1 SC.912.P.8.1 SC.912.P.10.14,15, 16	
29.01	Inspect battery box(es), cover(s), and mountings.			P-1
29.02	Inspect battery hold-downs, connections, cables, and cable routing; service as needed.			P-1
29.03	Check/record battery state-of-charge (open circuit voltage) and condition.			P-1
29.04	Perform battery test (load and/or capacitance).			P-1
29.05	Inspect starter, mounting, and connections.			P-1
29.06	Engage starter; check for unusual noises, starter drag, and starting difficulty.			P-1
30.0	Diagnose and repair Electrical/Electronic charging systems--The student will be able to:			
30.01	Inspect alternator, mountings, cable, wiring, and wiring routing; determine needed action.			P-1
30.02	Perform alternator output tests.			P-1
31.0	Diagnose and repair Electrical/Electronic lighting systems--The student will be able to:			
31.01	Check operation of interior lights; determine needed action.			P-1
31.02	Check all exterior lights, lenses, reflectors, and conspicuity tape; check headlight alignment; determine needed action.			P-1

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
31.03 Inspect and test tractor-to-trailer multi-wire connector(s), cable(s), and holder(s); determine needed action.			P-1
32.0 Diagnose and repair Air brake systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.2, 3 SC.912.P.12.2, 3, 5, 6	
32.01 Check operation of parking brake.			
32.02 Record air governor cut-in and cut-out setting (psi).			P-1
32.03 Check operation of air reservoir/tank drain valves.			P-1
32.04 Check air system for leaks (brakes released).			P-1
32.05 Check air system for leaks (brakes applied).			P-1
32.06 Test one-way and double-check valves.			P-1
32.07 Check low air pressure warning devices.			P-1
32.08 Check emergency (spring) brake control/modulator valve, if applicable.			P-1
32.09 Check tractor protection valve.			P-1
32.10 Test air pressure build-up time.			P-1
32.11 Inspect coupling air lines, holders, and gladhands.			P-1
32.12 Check brake chambers and air lines for secure mounting and damage.			P-1
32.13 Check operation of air drier.			P-1
32.14 Inspect and record brake shoe/pad condition, thickness, and contamination.			P-1
32.15 Inspect and record condition of brake drums/rotors.			P-1
32.16 Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing			P-1
32.17 Check operation and adjustment of brake automatic slack adjusters (ASA); check and record push rod stroke.			P-1
32.18 Lubricate all brake component grease fittings.			P-1
32.19 Check condition and operation of hand brake (trailer) control valve, if applicable.			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
32.20	Perform antilock brake system (ABS) operational system self-test.			P-1
32.21	Drain air tanks and check for contamination.			P-1
32.22	Check condition of pressure relief (safety) valves.			P-1
32.23	Check air governor cut-in pressure.			
32.24	Check operation of brake manual slack adjusters; adjust as needed.			
33.0	Diagnose and repair Hydraulic brake systems--The student will be able to:			
33.01	Check master cylinder fluid level and condition.			P-1
33.02	Inspect brake lines, fittings, flexible hoses, and valves for leaks and damage.			P-1
33.03	Check parking brake operation; inspect parking brake application and holding devices; adjust as needed.			P-1
33.04	Check operation of hydraulic system: pedal travel, pedal effort, pedal feel.			P-1
33.05	Inspect calipers for leakage, binding and damage.			P-1
33.06	Inspect brake assist system (booster), hoses and control valves; check reservoir fluid level and condition.			P-1
33.07	Inspect and record brake lining/pad condition, thickness, and contamination.			P-1
33.08	Inspect and record condition of brake rotors.			P-1
33.09	Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing.			P-1
33.10	Adjust drum brakes.			
34.0	Diagnose and repair Drive Train systems--The student will be able to:			
34.01	Check operation of clutch, clutch brake, and gearshift.			P-1
34.02	Check clutch linkage/cable for looseness or binding, if applicable.			P-1
34.03	Check hydraulic clutch slave and master cylinders, lines, fittings, and hoses, if applicable.			P-1
34.04	Check clutch adjustment; adjust as needed.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
34.05	Check transmission case, seals, filter, hoses, lines and cooler for cracks and leaks.			P-1
34.06	Inspect transmission breather.			P-1
34.07	Inspect transmission mounts.			P-1
34.08	Check transmission oil level, type, and condition.			P-1
34.09	Inspect U-joints, yokes, driveshafts, boots/seals, center bearings, and mounting hardware for looseness, damage, and proper phasing.			P-1
34.10	Inspect axle housing(s) for cracks and leaks.			P-1
34.11	Inspect axle breather(s).			P-1
34.12	Lubricate all drivetrain grease fittings.			P-1
34.13	Check drive axle(s) oil level, type, and condition.			P-1
34.14	Change drive axle(s) oil and filter/screen, if applicable; check and clean magnetic plugs.			P-2
34.15	Check transmission wiring, connectors, seals, and harnesses for damage and proper routing.			P-1
34.16	Change transmission oil and filter, if applicable; check and clean magnetic plugs.			P-2
34.17	Check interaxle differential lock operation.			P-1
34.18	Check transmission range shift operation.			P-1
34.19	Check two-speed axle unit operation and oil level.			
35.0	Diagnose and repair Suspension and steering systems--The student will be able to:			
35.01	Check steering wheel operation for free play and binding.			P-1
35.02	Check power steering pump, mounting, and hoses for leaks, condition, and routing; check fluid level.			P-1
35.03	Change power steering fluid and filter.			P-1
35.04	Inspect steering gear for leaks and secure mounting.			P-1
35.05	Inspect steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, and linkages.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
35.06	Check kingpins for wear.			P-1
35.07	Check wheel bearings for looseness and noise.			P-1
35.08	Check oil level and condition in all non-drive hubs; check for leaks.			P-1
35.09	Inspect springs, pins, hangers, shackles, spring U-bolts, and insulators.			P-1
35.10	Inspect shock absorbers for leaks and secure mounting.			P-1
35.11	Inspect air suspension springs, mounts, hoses, valves, linkage, and fittings for leaks and damage.			P-1
35.12	Check and record suspension ride height.			P-1
35.13	Lubricate all suspension and steering grease fittings.			P-1
35.14	Check axle locating components (radius, torque, and/or track rods).			P-1
35.15	Check tandem axle alignment and spacing.			
35.16	Remove and inspect wheel bearings; reassemble and adjust.			
35.17	Check toe adjustment.			
36.0	Diagnose and repair Tires and wheels--The student will be able to:			
36.01	Inspect tires for wear patterns and proper mounting.			P-1
36.02	Inspect tires for cuts, cracks, bulges, and sidewall damage.			P-1
36.03	Inspect valve caps and stems; determine needed action.			P-1
36.04	Measure and record tread depth; probe for imbedded debris.			P-1
36.05	Check and record air pressure; adjust air pressure in accordance with manufacturers' specifications.			P-1
36.06	Check wheel mounting hardware condition; determine needed action.			P-1
36.07	Inspect wheels for cracks, damage and proper hand hold alignment.			P-1
36.08	Check tire matching (diameter and tread) on single and dual tire applications.			P-1
36.09	Retorque lugs in accordance with manufacturer's specifications.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
37.0 Diagnose and repair Frame and fifth wheel--The student will be able to:			
37.01 Inspect fifth wheel mounting, bolts, air lines, and locks.			P-1
37.02 Test operation of fifth wheel locking device; adjust if necessary.			P-1
37.03 Check quarter fenders, mud flaps, and brackets.			P-1
37.04 Check pintle hook assembly and mounting; if applicable.			P-2
37.05 Lubricate all fifth wheel grease fittings and plate; if applicable			P-1
37.06 Inspect frame and frame members for cracks and damage.			P-1

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 5**
Course Number: **8742050**
Course Credit: **1**

Course Description:
The Diesel Engine Service 5 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine, cylinder head, valve train, engine block, service, and repair.

For every task in Diesel Engine Service 5, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
DE = Diesel Engine

Note: This course is pending alignment in the following categories: FS-M/LA

DE Task List:	
P-1	**08**
P-2	**15**
P-3	**12**
Total	**35**

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
38.0	General engine diagnosis and repair--The student will be able to:		SC.912.N.1.1; SC.912.P.8.1, 2; SC.912.P.10.1,2,3, 4; SC.912.P.12.2, 3, 12	
38.01	Inspect fuel, oil, Diesel Exhaust Fluid (DEF) and coolant levels, and condition; determine needed action.			P-1
38.02	Identify and diagnose the causes of engine fuel, oil, coolant, air, and other leaks; determine needed action.			P-1
38.03	Listen and interpret engine noises; determine needed action.			P-3
38.04	Observe engine exhaust smoke color and quantity; determine needed action.			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
38.05	Check and diagnose no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action.			P-1
38.06	Identify and diagnose causes of engine surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed action.			P-1
38.07	Identify and diagnose engine vibration problems; determine needed action.			P-2
38.08	Check, record, and clear electronic diagnostic (fault) codes; monitor electronic data; determine needed action.			P-1
38.09	Perform air intake system restriction and leakage tests; determine needed action.			
38.10	Perform intake manifold pressure (boost) test; determine needed action.			
38.11	Perform exhaust back pressure test; determine needed action.			
38.12	Perform cylinder compression test; determine needed action.			
39.0	Cylinder head and valve train diagnosis and repair--The student will be able to:		SC.912.N.1.1; SC.912.P.10.4	
39.01	Inspect cylinder head for cracks/damage; check mating surfaces for warpage; check condition of passages; inspect core/expansion and gallery plugs; determine needed action.			P-2
39.02	Disassemble head and inspect valves, guides, seats, springs, retainers, rotators, locks, and seals; determine needed action.			P-3
39.03	Measure valve head height relative to deck, valve face-to-seat contact; determine needed action.			P-3
39.04	Inspect injector sleeves and seals; measure injector tip or nozzle protrusion; perform needed action.			P-3
39.05	Inspect valve train components; determine needed action.			P-1
39.06	Reassemble cylinder head.			P-3
39.07	Inspect, measure, and replace/reinstall overhead camshaft; measure/adjust end play and backlash.			P-3
39.08	Inspect electronic wiring harness and brackets for wear, bending, cracks, and looseness; determine needed action.			P-1
39.09	Inspect and adjust valve bridges (crossheads); adjust valve clearances and injector settings.			P-2
39.10	Remove, clean, inspect for visible damage, and replace cylinder head(s) assembly.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
39.11	Clean and inspect threaded holes, studs, and bolts for serviceability; determine needed action.			
39.12	Inspect pushrods, rocker arms, rocker arm shafts, and blocked oil passages; perform needed action.			
39.13	Inspect cam followers; perform needed action.			
40.0	Engine block diagnosis and repair--The student will be able to:		SC.912.N.1.1; SC.912.P.12.2	
40.01	Perform crankcase pressure test; determine needed action			P-1
40.02	Remove, inspect, service, and install pans, covers, gaskets, seals, wear rings, and crankcase ventilation components.			P-2
40.03	Disassemble, clean, and inspect engine block for cracks/damage; measure mating surfaces for warpage; check condition of passages, core/expansion and gallery plugs; inspect threaded holes, studs, dowel pins, and bolts for serviceability; determine needed action.			P-2
40.04	Inspect cylinder sleeve counter bore and lower bore; check bore distortion; determine needed action.			P-2
40.05	Clean, inspect, and measure cylinder walls or liners for wear and damage; determine needed action.			P-2
40.06	Replace/reinstall cylinder liners and seals; check and adjust liner height (protrusion).			P-2
40.07	Inspect in-block camshaft bearings for wear and damage; determine needed action.			P-3
40.08	Inspect, measure, and replace/reinstall in-block camshaft; measure/adjust end play.			P-3
40.09	Clean and inspect crankshaft for surface cracks and journal damage; check condition of oil passages; check passage plugs; measure journal diameter; determine needed action.			P-2
40.10	Inspect main bearings for wear patterns and damage; replace as needed; check bearing clearances; check and correct crankshaft end play.			P-2
40.11	Inspect, install, and time gear train; measure gear backlash; determine needed action.			P-2
40.12	Inspect connecting rod and bearings for wear patterns; measure pistons, pins, retainers, and bushings; perform needed action.			P-3
40.13	Determine piston-to-cylinder wall clearance; check ring-to-groove fit and end gap; install rings on pistons.			P-3

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
40.14	Assemble pistons and connecting rods; install in block; install rod bearings and check clearances.			P-2
40.15	Check condition of piston cooling jets (nozzles); determine needed action.			P-2
40.16	Inspect and measure crankshaft vibration damper; determine needed action.			P-3
40.17	Install and align flywheel housing; inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.			P-3
40.18	Inspect flywheel/flexplate (including ring gear) and mounting surfaces for cracks and wear; measure runout; determine needed action.			P-2

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 6**
Course Number: **8742060**
Course Credit: **1**

Course Description:
The Diesel Engine Service 6 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study lubrication, cooling, air induction, exhaust, fuel, and engine brakes diagnostics, service, and repair.

For every task in Diesel Engine Service 6, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
DE = Diesel Engine

Note: This course is pending alignment in the following categories: FS-M/LA

DE Task List:	
P-1	**27**
P-2	**17**
P-3	**09**
Total	**53**

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
41.0 Lubrication systems diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.12.3	
41.01 Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit, test engine oil temperature and check operation of temperature sensor; determine needed action.			P-1
41.02 Check engine oil level, condition, and consumption; determine needed action.			P-1
41.03 Inspect and measure oil pump, drives, inlet pipes, and pick-up screens; check drive gear clearances; determine needed action.			P-3

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
41.04	Inspect oil pressure regulator valve(s), by-pass and pressure relief valve(s), oil thermostat, and filters; determine needed action.			P-3
41.05	Inspect, clean, and test oil cooler and components; determine needed action.			P-3
41.06	Inspect turbocharger lubrication system; determine needed action.			P-2
41.07	Determine proper lubricant and perform oil and filter change.			P-1
42.0	Cooling system diagnosis and repair--The student will be able to:		SC.912.E.6.6 SC.912.L.17.15 SC.912.N.1.1 SC.912.P.10.4 SC.912.P.12.2, 3	
42.01	Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action.			P-1
42.02	Test coolant temperature and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action.			P-1
42.03	Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment.			P-1
42.04	Inspect thermostat(s), by-passes, housing(s), and seals; replace as needed.			P-2
42.05	Recover coolant, flush, and refill with recommended coolant/additive package; bleed cooling system.			P-1
42.06	Inspect coolant conditioner/filter assembly for leaks; inspect valves, lines, and fittings; replace as needed.			P-1
42.07	Inspect water pump and hoses; replace as needed.			P-1
42.08	Inspect, clean, and pressure test radiator. Pressure test cap, tank(s), and recovery systems; determine needed action.			P-1
42.09	Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.			P-1
42.10	Inspect turbo charger cooling systems; determine needed action.			P-2
43.0	Air induction and exhaust systems diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.10.3,14, 15 SC.912.P.12.3	
43.01	Perform air intake system restriction and leakage test; determine needed action.			P-1

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
43.02 Perform intake manifold pressure (boost) test; determine needed action.			P-3
43.03 Check exhaust back pressure; determine needed action.			P-3
43.04 Inspect turbocharger(s), wastegate, and piping systems; determine needed action.			P-2
43.05 Inspect turbocharger(s) (variable ratio/geometry VGT), pneumatic, hydraulic, electronic controls, and actuators.			P-2
43.06 Check air induction system: piping, hoses, clamps, and mounting; service or replace air filter as needed.			P-1
43.07 Remove and reinstall turbocharger/wastegate assembly.			P-3
43.08 Inspect intake manifold, gaskets, and connections; replace as needed.			P-3
43.09 Inspect, clean, and test charge air cooler assemblies; replace as needed.			P-2
43.10 Inspect exhaust manifold, piping, mufflers, and mounting hardware; repair or replace as needed.			P-2
43.11 Inspect exhaust after treatment devices; determine necessary action.			P-2
43.12 Inspect and test preheater/inlet air heater, or glow plug system and controls; perform needed action.			P-2
43.13 Inspect exhaust gas recirculation (EGR) system including EGR valve, cooler, piping, filter, electronic sensors, controls, and wiring; determine needed action.			P-2
44.0 Fuel system diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.N.3.5 SC.912.P.8.1, 2 SC.912.P.10.3,4,14, 15 SC.912.P.12.12	
44.01 Fuel supply system			
44.01.1 Check fuel level, and condition; determine needed action.			P-1
44.01.2 Perform fuel supply and return system tests; determine needed action.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
44.01.3	Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action.			P-1
44.01.4	Inspect, clean, and test fuel transfer (lift) pump, pump drives, screens, fuel/water separators/indicators, filters, heaters, coolers, ECM cooling plates, and mounting hardware; determine needed action.			P-1
44.01.5	Inspect and test pressure regulator systems (check valves, pressure regulator valves, and restrictive fittings); determine needed action.			P-1
44.01.6	Check fuel system for air; determine needed action; prime and bleed fuel system; check primer pump.			P-1
44.01.7	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time a distributor (rotary) type injection pump; determine needed action.			
44.01.8	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time an in-line type injection pump; determine needed action.			
44.01.9	Inspect and adjust throttle control linkage; determine needed action.			
44.01.10	Inspect air/fuel ratio control systems; determine needed action.			
44.01.11	Inspect, test, and adjust engine fuel shut-down devices and controls; determine needed action.			
44.02	Electronic fuel management system			
44.02.1	Inspect and test power and ground circuits and connections; measure and interpret voltage, voltage drop, amperage, and resistance readings using a digital multimeter (DMM); determine needed action.			P-1
44.02.2	Interface with vehicle's on-board computer; perform diagnostic procedures using electronic service tool(s) (to include PC based software and/or data scan tools); determine needed action.			P-1
44.02.3	Check and record electronic diagnostic codes and trip/operational data; monitor electronic data; clear codes; determine further diagnosis.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
44.02.4	Locate and use relevant service information (to include diagnostic procedures, flow charts, and wiring diagrams).			P-1
44.02.5	Inspect and replace electrical connector terminals, seals, and locks.			P-1
44.02.6	Inspect and test switches, sensors, controls, actuator components, and circuits; adjust or replace as needed.			P-1
44.02.7	Using electronic service tool(s) access and interpret customer programmable parameters.			P-1
44.02.8	Perform on-engine inspections, test and adjustments on electronic unit injectors (EUI); determine needed action			P-2
44.02.9	Remove and install electronic unit injectors (EUI) and related components; recalibrate ECM (if applicable).			P-2
44.02.10	Perform cylinder contribution test utilizing electronic service tool(s).			P-1
44.02.11	Perform on-engine inspections and tests on hydraulic electronic unit injectors (HEUI) and system electronic controls; determine needed action.			P-2
44.02.12	Perform on-engine inspections and tests on hydraulic electronic unit injector (HEUI) high pressure oil supply and control systems; determine needed action.			P-2
44.02.13	Perform on-engine inspections and tests on high pressure common rail (HPCR) type injection systems; determine needed action.			P-2
44.02.14	Inspect high pressure injection lines, hold downs, fittings and seals; determine needed action.			P-2
44.02.15	Perform engine timing sensor calibration (if applicable).			
44.02.16	Perform on-engine inspections and tests on distributor-type injection pump electronic controls; determine needed action.			
44.02.17	Perform on-engine inspections and tests on in-line type injection pump electronic controls; determine needed action.			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
45.0 Diagnose and repair engine brakes--The student will be able to:		SC.912.N.1.1 SC.912.P.8.1, 2 SC.912.P.10.4,14,15, 16 SC.912.P.12.12	
45.01 Inspect and adjust engine compression/exhaust brakes; determine needed action.			P-2
45.02 Inspect, test, and adjust engine compression/exhaust brake control circuits, switches, and solenoids; determine needed action.			P-3
45.03 Inspect engine compression/exhaust brake housing, valves, seals, lines, and fittings; repair or replace as needed.			P-3

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 7**
Course Number: **8742070**
Course Credit: **1**

Course Description:
The Diesel Engine Service 7 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of air brakes.

For every task in Diesel Engine Service 7, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
BR = Brakes

Note: This course is pending alignment in the following categories: FS-M/LA

BR Task List:	
P-1	**= 27**
P-2	**= 2**
P-3	**= 1**
Total	**30**

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
46.0	Diagnose and repair air supply and service systems--The student will be able to:		SC.912.N.1.1; SC.912.P.10.3,14,15; SC.912.P.12.3	
46.01	Identify and diagnose poor stopping, air leaks, premature wear, pulling, grabbing, dragging, or balance problems caused by supply and service system malfunctions; determine needed action.			P-1
46.02	Check air system build-up time; determine needed action.			P-1
46.03	Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
46.04	Inspect air compressor drive gear, belts and coupling; adjust or replace as needed.			P-3
46.05	Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed.			P-1
46.06	Inspect and test air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings; replace as needed.			P-1
46.07	Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed.			P-1
46.08	Inspect and test air tank relief (safety) valves, one-way (single) check valves, two-way (double) check-valves, manual and automatic drain valves; replace as needed.			P-1
46.09	Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; repair or replace as needed.			P-1
46.10	Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation; replace as needed.			P-1
46.11	Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed.			P-1
46.12	Inspect and test hand brake (trailer) control valve, lines, fittings, and mountings; repair or replace as needed.			P-1
46.13	Inspect and test brake relay valve; replace as needed.			P-1
46.14	Inspect and test quick release valves; replace as needed.			P-1
46.15	Inspect and test tractor protection valve; replace as needed.			P-1
46.16	Inspect and test emergency (spring) brake control/modulator valve(s); replace as needed.			P-1
46.17	Inspect and test low pressure warning devices, wiring, and connectors; repair or replace as needed.			P-1
46.18	Inspect and test air pressure gauges, lines, and fittings; replace as needed.			P-2
46.19	Inspect and test front and rear axle limiting (proportioning) valves; replace as needed.			
47.0	Diagnose and repair mechanical/foundation air brake systems--The student will be able to:		SC.912.N.1.1; SC.912.P.10.3,14,15; SC.912.P.12.3	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
47.01	Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, or dragging problems caused by the foundation brake, slack adjuster, and brake chamber problems; determine needed action.			P-1
47.02	Inspect and test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets; repair or replace as needed.			P-1
47.03	Identify type, inspect and service slack adjusters; perform needed action.			P-1
47.04	Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; replace as needed.			P-1
47.05	Inspect, clean, and adjust air disc brake caliper assemblies; determine needed repairs.			P-2
47.06	Inspect and measure brake shoes or pads; perform needed action.			P-1
47.07	Inspect and measure brake drums or rotors; perform needed action.			P-1
48.0	Diagnose and repair parking brakes--The student will be able to**:**		SC.912.N.1.1; SC.912.P.10.1, 2, 6	
48.01	Inspect and test parking (spring) brake chamber diaphragm and seals; replace parking (spring) brake chamber; dispose of removed chambers in accordance with local regulations.			P-1
48.02	Inspect and test parking (spring) brake check valves, lines, hoses, and fittings; replace as needed.			P-1
48.03	Inspect and test parking (spring) brake application and release valve; replace as needed.			P-1
48.04	Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturers' recommendations.			P-1
48.05	Identify and test anti compounding brake function.			P-1

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 8**
Course Number: **8742080**
Course Credit: **1**

Course Description:
The Diesel Engine Service 8 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of hydraulic brakes.

For every task in Diesel Engine Service 8, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
BR = Brakes

Note: This course is pending alignment in the following categories: FS-M/LA

BR Task List:
P-1 = 12
P-2 = 7
P-3 = 6
Total 25

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	Priority Number
49.0 Diagnose and repair hydraulic systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14, 15 SC.912.P.12.3	
49.01 Identify and diagnose poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system; determine needed action.			P-2
49.02 Inspect and test master cylinder for internal/external leaks and damage; replace as needed.			P-1
49.03 Inspect hydraulic system brake lines for leaks and damage, flexible hoses, and fittings for leaks and damage; replace as needed.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
49.04	Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; replace as needed.			P-3
49.05	Inspect and test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors; repair or replace as needed.			P-2
49.06	Inspect disc brake caliper assemblies; replace as needed.			P-1
49.07	Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type.			P-1
49.08	Check and adjust brake pedal pushrod length.			
49.09	Inspect and clean wheel cylinders; replace as needed.			
49.10	Test and adjust brake stop light switch, bulbs, wiring, and connectors; repair or replace as needed.			
50.0	Diagnose and repair mechanical/foundation hydraulic brake systems--The student will be able to:		SC.912.N.1.1 SC.912.P.10.4 SC.912.P.12.3	
50.01	Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components; determine needed action.			P-2
50.02	Inspect and measure rotors; perform needed action.			P-1
50.03	Inspect and measure disc brake pads; inspect mounting hardware; perform needed action.			P-1
50.04	Check parking brake operation; inspect parking brake application and holding devices; adjust and replace as needed.			P-2
50.05	Inspect and measure drum brake shoes and linings; inspect mounting hardware, adjuster mechanisms, and backing plates; perform needed action.			
51.0	Diagnose and repair power assist units--The student will be able to:		SC.912.N.1.1 SC.912.P.10.1, 2 SC.912.P.12.3	
51.01	Identify and diagnose stopping problems caused by the brake assist (booster) system; determine needed action.			P-3
51.02	Inspect, test, repair, or replace hydraulic brake assist (booster), hoses, and control valves; determine proper fluid type.			P-3
51.03	Check emergency (back-up, reserve) brake assist system.			P-3
52.0	Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC)--The student will be able to:		SC.912.N.1.1 SC.912.P.10.14, 15 SC.912.P.12.2, 3	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
52.01	Observe antilock brake system (ABS) warning light operation (includes trailer and dash mounted ABS warning light); determine needed action.			P-1
52.02	Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or electronic service tool(s); determine needed action.			P-1
52.03	Identify poor stopping and wheel lock-up caused by failure of the antilock brake system (ABS); determine needed action.			P-1
52.04	Test and check operation of antilock brake system (ABS) air, hydraulic, electrical, and mechanical components; perform needed action.			P-1
52.05	Test antilock brake system (ABS) wheel speed sensors and circuits; adjust or replace as needed.			P-1
52.06	Bleed the ABS hydraulic circuits according to manufacturers' procedures.			P-2
52.07	Observe automatic traction control (ATC) warning light operation; determine needed action.			P-3
52.08	Diagnose automatic traction control (ATC) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer); determine needed action.			P-3
52.09	Verify power line carrier (PLC) operations.			P-2
52.10	Diagnose, service, and adjust antilock brake system (ABS) wheel speed sensors and circuits following manufacturers' recommended procedures (including voltage output, resistance, shorts to voltage/ground, and frequency data).			
53.0	Diagnose and repair wheel bearings--The student will be able to:			
53.01	Clean, inspect, lubricate and replace wheel bearings and races/cups; replace seals and wear rings; inspect spindle/tube; inspect and replace retaining hardware; adjust wheel bearings. Verify end play with dial indicator method.			P-1
53.02	Identify, inspect or replace unitized/preset hub bearing assemblies.			P-2

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 9**
Course Number: **8742090**
Course Credit: **1**

Course Description:
The Diesel Engine Service 9 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of HVAC, and A/C systems.

For every task in Diesel Engine Service 9, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
HV = Heating and Air Conditioning

Note: This course is pending alignment in the following categories: FS-M/LA

HV Task List:	
P-1 =	**31**
P-2 =	**17**
P-3 =	**10**
Total	**58**

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
54.0	HVAC systems diagnosis, service, and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.8.1 SC.912.P.10.4	
54.01	Verify the need for service or repair of HVAC systems based on unusual operating noises; determine needed action.			P-1
54.02	Verify the need for service or repair of HVAC systems based on unusual visual, smell, and touch conditions; determine needed action.			P-1
54.03	Identify system type and components (cycling clutch orifice tube - CCOT, expansion valve) and conduct performance test(s) on HVAC systems; determine needed action.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
54.04	Retrieve diagnostic codes; determine needed action.			P-3
55.0	A/C system and component diagnosis, service, and repair--The student will be able to:		SC.912.E.6.6 SC.912.L.17.15 SC.912.N.1.1 SC.912.P.8.1 SC.912.P.10.3,4,14, 15 SC.912.P.12.3	
55.01	Identify causes of temperature control problems in the A/C system; determine needed action.			P-1
55.02	Identify refrigerant and lubricant types; check for contamination; determine needed action.			P-1
55.03	Identify A/C system problems indicated by pressure gauge and temperature readings; determine needed action.			P-1
55.04	Identify A/C system problems indicated by visual, audible, smell, and touch procedures; determine needed action.			P-1
55.05	Perform A/C system leak test; determine needed action.			P-1
55.06	Recover, evacuate, and recharge A/C system using appropriate equipment.			P-1
55.07	Identify contamination in the A/C system components; determine needed action.			P-3
55.08	Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.			P-2
55.09	Charge A/C system with refrigerant.			
55.10	Identify lubricant type needed for system application.			
56.0	Diagnose and repair Compressor and clutch--The student will be able to:			
56.01	Identify and diagnose A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action.			P-1
56.02	Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices.			P-2
56.03	Inspect, and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension and check alignment.			P-1
56.04	Inspect, test, adjust, service, or replace A/C compressor clutch components or assembly.			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
56.05	Inspect and correct A/C compressor lubricant level (if applicable).			P-2
56.06	Inspect, test, or replace A/C compressor.			P-1
56.07	Inspect, repair, or replace A/C compressor mountings and hardware.			P-2
57.0	Diagnose and repair Evaporator, condenser, and related components--The student will be able to:			
57.01	Correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses.			P-1
57.02	Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action.			P-1
57.03	Inspect and test A/C system condenser. Check for proper airflow and mountings; determine needed action.			P-1
57.04	Inspect and replace receiver/drier or accumulator/drier.			P-1
57.05	Inspect and test cab/sleeper refrigerant solenoid, expansion valve(s); check placement of thermal bulb (capillary tube); determine needed action.			P-3
57.06	Remove and replace orifice tube.			P-1
57.07	Inspect and test cab/sleeper evaporator core; determine needed action.			P-3
57.08	Inspect, clean, and repair evaporator housing and water drain; inspect and service/replace evaporator air filter.			P-1
57.09	Identify and inspect A/C system service ports (gauge connections); determine needed action.			P-1
57.10	Identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device; determine needed action.			P-2
57.11	Inspect and test A/C system condenser and mountings; determine needed action.			
58.0	Heating and engine cooling systems diagnosis, service, and repair--The student will be able to:			
58.01	Identify causes of outlet air temperature control problems in the HVAC system; determine needed action.			P-1
58.02	Diagnose window fogging problems; determine needed action.			P-2
58.03	Perform engine cooling system tests for leaks, protection level, contamination, coolant level, coolant type, temperature, and conditioner concentration; determine needed action.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
58.04	Inspect engine cooling and heating system hoses, lines, and clamps; determine needed action.			P-1
58.05	Inspect and test radiator, pressure cap, and coolant recovery system (surge tank); determine needed action.			P-1
58.06	Inspect water pump; determine needed action.			P-1
58.07	Inspect and test thermostats, by-passes, housings, and seals; determine needed repairs.			P-2
58.08	Recover, flush and refill with recommended coolant/additive package; bleed cooling system.			P-1
58.09	Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.			P-2
58.10	Inspect and test heating system coolant control valve(s) and manual shut-off valves; determine needed action.			P-2
58.11	Inspect and flush heater core; determine needed action.			P-3
59.0	Electrical system diagnosis, service, and repair--The student will be able to:		SC.912.E.5.4 SC.912.E.6.6 SC.912.L.17.15 SC.912.N.1.1 SC.912.P.8.1, 2 SC.912.P.10.3,14,15, 16 SC.912.P.12.3	
59.01	Identify causes of HVAC electrical control system problems; determine needed action.			
59.02	Inspect and test A/C heater blower motors, resistors, switches, relays, modules, wiring, and protection devices; determine needed action.			P-1
59.03	Inspect and test A/C compressor clutch relays, modules, wiring, sensors, switches, diodes, and protection devices; determine needed action.			P-2
59.04	Inspect and test A/C related electronic engine control systems; determine needed action.			P-2
59.05	Inspect and test engine cooling/condenser fan motors, relays, modules, switches, sensors, wiring, and protection devices; determine needed action.			P-2
59.06	Inspect and test electric actuator motors, relays/modules, switches, sensors, wiring, and protection devices; determine needed action.			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
59.07	Inspect and test HVAC system electrical/electronic control panel assemblies; determine needed action.			P-2
59.08	Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.			P-2
60.0	Air/vacuum/mechanical diagnostics, service, and repair--The student will be able to:			P-2
60.01	Identify causes of HVAC air and mechanical control problems; determine needed action.			P-1
60.02	Inspect and test HVAC system air and mechanical control panel assemblies; determine needed action.			P-3
60.03	Inspect, test, and adjust HVAC system air and mechanical control cables and linkages; determine needed action.			P-3
60.04	Inspect and test HVAC system actuators and hoses; determine needed action.			P-3
60.05	Inspect, test, and adjust HVAC system ducts, doors, and outlets; determine needed action.			P-3
60.06	Inspect and test HVAC system vacuum reservoir(s), check valve(s), and restrictors; determine needed action.			P-3
61.0	Refrigerant recovery, recycling, and handling--The student will be able to:			
NOTE: Tasks 1 through 5 should be accomplished in accordance with appropriate EPA regulations and SAE "J" standards.				
61.01	Maintain and verify correct operation of certified equipment.			P-1
61.02	Identify and recover A/C system refrigerant.			P-1
61.03	Recycle or properly dispose of refrigerant.			P-1
61.04	Handle, label, and store refrigerant.			P-1
61.05	Test recycled refrigerant for non-condensable gases.			P-1

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 10**
Course Number: **8742091**
Course Credit: **1**

Course Description:
The Diesel Engine Service 10 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of steering, suspension, wheel alignment, wheels, tires, and frame systems.

For every task in Diesel Engine Service 10, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
SS = Steering and Suspension

Note: This course is pending alignment in the following categories: FS-M/LA

SS Task List:	
P-1 =	**23**
P-2 =	**14**
P-3 =	**8**
Total	**45**

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
62.0	Steering column diagnosis, service, and repair--The student will be able to:		SC.912.N.1.1; SC.912.P.10.3; SC.912.P.12.2, 3	
62.01	Identify and diagnose fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action.			P-1
62.02	Inspect and service steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
62.03	Check cab mounting and adjust ride height.			P-2
62.04	Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components); install and center the steering wheel. Inspect, test, replace and calibrate steering angle sensor.			P-1
62.05	Disable and enable supplemental restraint system (SRS) in accordance with manufacturers' procedures.			P-1
63.0	Steering units diagnosis, service, and repair--The student will be able to:			
63.01	Identify and diagnose power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action.			P-1
63.02	Determine recommended type of power steering fluid; check level and condition; determine needed action.			P-1
63.03	Flush and refill power steering system; purge air from system.			P-2
63.04	Perform power steering system pressure, temperature, and flow tests; determine needed action.			P-3
63.05	Inspect, service, or replace power steering reservoir including filter, seals, and gaskets.			P-2
63.06	Inspect power steering pump drive gear and coupling; replace as needed.			P-3
63.07	Inspect, adjust, or replace power steering pump, mountings, and brackets.			P-3
63.08	Inspect and replace power steering system cooler, lines, hoses, clamps/mountings, hose routings, and fittings.			P-2
63.09	Inspect, adjust, repair, or replace integral type power steering gear(s) (single and/or dual) and mountings.			P-2
63.10	Inspect, and reinstall/replace pulleys, tensioners, and drive belts; adjust drive belts and check alignment.			
63.11	Inspect, adjust, or replace linkage-assist type power steering cylinder or gear (dual system).			
63.12	Adjust manual and automatic steering gear poppet/relief valves.			
64.0	Steering linkage diagnosis, service, and repair--The student will be able to:			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
64.01	Inspect and align pitman arm; replace as needed.			P-1
64.02	Check and adjust steering (wheel) stops; verify relief pressures.			P-1
64.03	Inspect and lubricate steering components.			P-1
64.04	Inspect drag link (relay rod) and tie rod ends; adjust or replace as needed.			
64.05	Inspect steering arm and levers, and linkage pivot joints; replace as needed.			
64.06	Inspect clamps and retainers on cross tube/relay rod/centerline/tie rod; position or replace as needed.			
65.0	Suspension systems diagnosis, service, and repair--The student will be able to:		SC.912.N.1.1; SC.912.P.10.1; SC.912.P.12.2, 3	
65.01	Inspect front axles and attaching hardware; determine needed action.			P-1
65.02	Inspect and service kingpins, steering knuckle bushings, locks, bearings, seals, and covers; determine needed action.			P-1
65.03	Inspect shock absorbers, bushings, brackets, and mounts; replace as needed.			P-1
65.04	Inspect leaf springs, center bolts, clips, pins and bushings, shackles, U-bolts, insulators, brackets, and mounts; determine needed action.			P-1
65.05	Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, torque arms, related bushings, mounts, shims, and cams; determine needed action.			P-1
65.06	Inspect tandem suspension equalizer components; determine needed action.			P-3
65.07	Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; adjust, repair or replace as needed.			P-1
65.08	Inspect air springs, mounting plates, springs, suspension arms, and bushings; replace as needed.			P-1
65.09	Measure and adjust vehicle ride height; determine needed action.			P-1
65.10	Identify rough ride problems; determine needed action.			P-3
65.11	Inspect walking beams, center (cross) tube, bushings, mounts, load pads, and saddles/caps; replace as needed.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
66.0	Wheel alignment diagnosis, adjustment, and repair--The student will be able to:		SC.912.N.1.1; SC.912.P.12.2, 3	
66.01	Identify and diagnose vehicle wandering, pulling, shimmy, hard steering and off-center steering wheel problems; adjust or repair as needed.			P-1
66.02	Check camber; determine needed action.			P-2
66.03	Check caster; adjust as needed.			P-2
66.04	Check and adjust toe settings.			P-1
66.05	Check rear axle(s) alignment (thrust line/centerline) and tracking; adjust or repair as needed.			P-2
66.06	Diagnose turning/Ackerman angle (toe-out-on-turns) problems; determine needed action.			P-3
66.07	Check front axle alignment (centerline); adjust or repair as needed.			P-2
67.0	Wheels and tires diagnosis, service, and repair --The student will be able to:		SC.912.N.1.1; SC.912.P.12.2, 3	
67.01	Identify and diagnose tire wear patterns; check tread depth and pressure; determine needed action.			P-1
67.02	Identify and diagnose wheel/tire vibration, shimmy, pounding, hop (tramp) problems; determine needed action.			P-2
67.03	Remove and install steering and drive axle wheel/tier assemblies; torque mounting hardware to specifications with a torque wrench.			P-1
67.04	Inspect tire for proper application, (size, load range, position, and tread design); determine needed action.			P-2
67.05	Inspect wheel/rims for proper application, hand hold alignment, load range, and design; determine needed action.			P-2
67.06	Check operation of tire pressure monitoring system (TPMS); determine needed action if applicable.			P-3
68.0	Frame and coupling diagnosis, service, and repair --The student will be able to:		SC.912.N.1.1	
68.01	Inspect, service, and/or adjust fifth wheel, pivot pins, bushings, locking mechanisms, and mounting hardware.			P-1
68.02	Inspect and service sliding fifth wheel, tracks, stops, locking systems, air cylinders, springs, lines, hoses, and controls.			P-2
68.03	Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage; determine needed repairs.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
68.04	Inspect, install, or repair frame hangers, brackets, and cross members in accordance with manufacturers' recommended procedures.			P-3
68.05	Inspect, repair or replace pintle hooks and draw bars, if applicable.			P-2

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 11**
Course Number: **8742092**
Course Credit: **1**

Course Description:
The Diesel Engine Service 11 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of clutch, transmission, driveshaft, universal joint, and drive axle systems.

For every task in Diesel Engine Service 11, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
DT = Drive Train

Note: This course is pending alignment in the following categories: FS-M/LA

DT Task List:	
	P-1 = 27
	P-2 = 18
	P-3 = 12
Total	**57**

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
69.0	Clutch diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.10.1, 3 SC.912.P.12.1, 2, 3	
69.01	Identify causes of clutch noise, binding, slippage, pulsation, vibration, grabbing, dragging, and chatter problems; determine needed action.			P-1
69.02	Inspect and adjust clutch linkage, cables, levers, brackets, bushings, pivots, springs, and clutch safety switch (includes push and pull-type assemblies); check pedal height and travel; perform needed action.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
69.03	Inspect, adjust, repair, and replace hydraulic clutch slave and master cylinders, lines, and hoses; bleed system.			P-2
69.04	Inspect, adjust, lubricate or replace release (throw-out) bearing, sleeve, bushings, springs, housing, levers, release fork, fork pads, rollers, shafts, and seals.			P-1
69.05	Inspect, adjust, and replace single-disc clutch pressure plate and clutch disc.			P-1
69.06	Inspect, adjust, and replace two-plate clutch pressure plate, clutch discs, intermediate plate, and drive pins/lugs.			P-1
69.07	Inspect and/or replace clutch brake assembly; inspect input shaft and bearing retainer; perform needed action.			P-1
69.08	Inspect, adjust, and replace self-adjusting/continuous-adjusting clutch mechanisms.			P-1
69.09	Inspect and replace pilot bearing.			P-1
69.10	Remove and reinstall flywheel, inspect mounting area on crankshaft, rear main oil seal, and measure crankshaft end play; determine needed action.			P-1
69.11	Inspect flywheel, starter ring gear and measure flywheel face and pilot bore runout; determine needed action.			P-1
69.12	Inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.			P-2
70.0	Transmission diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.10.1,3,4,14,15 SC.912.P.12.2, 3, 6	
70.01	Identify causes of transmission noise, shifting concerns, lockup, jumping-out-of-gear, overheating, and vibration problems; determine needed action.			P-1
70.02	Inspect, test, repair, or replace air shift controls, lines, hoses, valves, regulators, filters, and cylinder assemblies.			P-2
70.03	Inspect and replace transmission mounts, insulators, and mounting bolts.			P-1
70.04	Inspect for leakage and replace transmission cover plates, gaskets, seals, and cap bolts; inspect seal surfaces and vents; repair as needed.			P-1
70.05	Check transmission fluid level and condition; determine needed service; add proper type of lubricant.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
70.06	Inspect, adjust, and replace transmission shift lever, cover, rails, forks, levers, bushings, sleeves, detents, interlocks, springs, and lock bolts/safety wires.			P-2
70.07	Remove and reinstall transmission.			P-1
70.08	Inspect input shaft, gear, spacers, bearings, retainers, and slingers; determine needed action.			P-3
70.09	Inspect transmission oil filters and coolers and related components; replace as needed.			P-2
70.10	Inspect speedometer components; determine needed action.			P-2
70.11	Inspect and adjust power take-off (P.T.O.) assemblies, controls, and shafts; determine needed action.			P-3
70.12	Inspect and test function of reverse light, neutral start, and warning device circuits; determine needed action.			P-1
70.13	Inspect and test transmission temperature gauge, wiring harnesses and sensor/sending unit; determine needed action.			P-2
70.14	Inspect and test operation of automated mechanical transmission and manual electronic shift controls, shift, range and splitter solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU) neutral/in gear and reverse switches, and wiring harnesses; determine needed action.			P-2
70.15	Inspect and test operation of automated mechanical transmission electronic shift selectors, air and electrical switches, displays and indicators, wiring harnesses, and air lines; determine needed action.			P-2
70.16	Use appropriate electronic service tool(s) and procedures to diagnose automated mechanical transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed action.			P-1
70.17	Inspect and test operation of automatic transmission electronic shift controls, shift solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU), neutral/in gear and reverse switches, and wiring harnesses.			P-2
70.18	Inspect and test operation of automatic transmission electronic shift selectors, switches, displays and indicators, wiring harnesses.			P-2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
70.19	Use appropriate electronic service tool(s) and procedures to diagnose automatic transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed repairs.			P-3
70.20	Diagnose transmission component failure cause, both before and during disassembly procedures; determine needed action.			
70.21	Inspect, adjust, service, repair, or replace transmission remote shift linkages, brackets, bushings, pivots, and levers.			
70.22	Inspect and adjust main shaft, gears, sliding clutches, washers, spacers, bushings, bearings, auxiliary drive assemblies, retainers, and keys; replace as needed.			
70.23	Inspect countershafts, gears, bearings, retainers, and keys; adjust bearing preload and time multiple countershaft gears; replace as needed.			
70.24	Inspect output shafts, gears, washers, spacers, bearings, retainers, and keys; replace as needed.			
70.25	Inspect and/or replace reverse idler shafts, gears, bushings, bearings, thrust washers, and retainers; check reverse idler gear end play (where applicable).			
70.26	Inspect synchronizer hub, sleeve, keys (inserts), springs, blocking rings, synchronizer plates, blocker pins, and sliding clutches; replace as needed.			
70.27	Inspect transmission cases including surfaces, bores, bushings, pins, studs, and magnets; replace as needed.			
70.28	Inspect transmission lubrication system pumps, troughs, collectors, and slingers; service or replace as needed.			
71.0	Driveshaft and universal joint diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.12.2, 3	
71.01	Identify causes of driveshaft and universal joint noise and vibration problems; determine needed action.			P-1
71.02	Inspect, service, or replace driveshaft, slip joints, yokes, drive flanges, and universal joints; driveshaft boots and seals, and retaining hardware; check phasing of all shafts.			P-1
71.03	Inspect driveshaft center support bearings and mounts; determine needed action.			P-1
71.04	Measure drive line angles; determine needed action.			P-1
72.0	Drive axle diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.10.3, 4, SC.912.P.12.2, 3	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
72.01	Identify causes of drive axle(s) drive unit noise and overheating problems; determine needed action.			P-2
72.02	Check and repair fluid leaks; inspect and replace drive axle housing cover plates, gaskets, sealants, vents, magnetic plugs, and seals.			P-1
72.03	Check drive axle fluid level and condition; determine needed service; add proper type of lubricant.			P-1
72.04	Remove and replace differential carrier assembly.			P-2
72.05	Inspect and replace differential case assembly including spider gears, cross shaft, side gears, thrust washers, case halves, and bearings.			P-3
72.06	Inspect and replace components of locking differential case assembly.			P-3
72.07	Inspect differential carrier housing and caps, side bearing bores, and pilot (spigot, pocket) bearing bore; determine needed action.			P-3
72.08	Measure ring gear runout; determine needed action.			P-2
72.09	Inspect and replace ring and drive pinion gears, spacers, sleeves, bearing cages, and bearings.			P-3
72.10	Measure and adjust drive pinion bearing preload.			P-3
72.11	Measure and adjust drive pinion depth.			P-3
72.12	Measure and adjust side bearing preload and ring gear backlash.			P-2
72.13	Check and interpret ring gear and pinion tooth contact pattern; determine needed action.			P-2
72.14	Inspect, adjust, or replace ring gear thrust block/bolt.			P-3
72.15	Inspect power divider (inter-axle differential) assembly; determine needed action.			P-3
72.16	Inspect, adjust, repair, or replace air operated power divider (inter-axle differential) lockout assembly including diaphragms, seals, springs, yokes, pins, lines, hoses, fittings, and controls.			P-2
72.17	Inspect, repair, or replace drive axle lubrication system: pump, troughs, collectors, slingers, tubes, and filters.			P-3
72.18	Inspect and replace drive axle shafts.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
72.19	Remove and replace wheel assembly; check rear wheel seal and axle flange gasket for leaks; perform needed action.			P-1
72.20	Identify causes of drive axle wheel bearing noise and check for damage; perform needed action.			P-1
72.21	Inspect and test drive axle temperature gauge, wiring harnesses, and sending unit/sensor; determine needed action.			P-2
72.22	Clean, inspect, lubricate and replace wheel bearings; replace seals and wear rings; inspect and replace retaining hardware; adjust drive axle wheel bearings. Verify end play with dial indicator method			P-1
72.23	Inspect, adjust, repair, or replace planetary gear-type 2-speed axle assembly including: case, idler pinion, pins, thrust washers, sliding clutch gear, shift fork, pivot, seals, cover, and springs.			
72.24	Inspect, repair, or replace 2-speed axle shift control system, speedometer adapters, motors, axle shift units, wires, air lines, and connectors.			

Florida Department of Education
Student Performance Standards

Course Title: **Diesel Engine Service 12**
Course Number: **8742093**
Course Credit: **1**

Course Description:
The Diesel Engine Service 12 course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of hydraulic, pumps, filtration/reservoir, hoses, fittings, connectors, control valves, and actuator systems.

For every task in Diesel Engine Service 12, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
HY = Hydraulics

Note: This course is pending alignment in the following categories: FS-M/LA

HY Task List:
P-1 = 27
P-2 = 5
P-3 = 0
Total 32

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
73.0	General hydraulic system diagnosis and repair--The student will be able to:		SC.912.N.1.1 SC.912.P.10.2, 4 SC.912.P.12.3, 12	
73.01	Identify system type (closed and open) and verify proper operation.			P-1
73.02	Read and interpret system diagrams and schematics.			P-1
73.03	Perform system temperature, pressure, flow, and cycle time tests; determine needed action.			P-1
73.04	Verify placement of equipment /component safety labels and placards; determine needed action.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
74.0	Diagnose and repair hydraulic pumps--The student will be able to:		SC.912.N.1.1 SC.912.P.10.1, 3	
74.01	Identify system fluid type.			P-1
74.02	Identify causes of pump failure, unusual pump noises, temperature flow, and leakage problems; determine needed action.			P-1
74.03	Determine pump type, rotation, and drive system.			P-1
74.04	Remove and install pump; prime and/or bleed system.			P-2
74.05	Inspect pump inlet for restrictions and leaks; determine needed action.			P-2
74.06	Inspect pump outlet for restrictions and leaks; determine needed action.			P-2
75.0	Diagnose and repair hydraulic filtration/reservoirs (tanks)--The student will be able to:		SC.912.E.6.6 SC.912.L.17.15 SC.912.N.1.1	
75.01	Identify type of filtration system; verify filter application and flow direction.			P-1
75.02	Service filters and breathers.			P-1
75.03	Identify causes of system contamination; determine needed action.			P-2
75.04	Take a hydraulic oil sample for analysis.			P-1
75.05	Check reservoir fluid level and condition; determine needed action.			P-1
75.06	Inspect and repair or replace reservoir, sight glass, vents, caps, mounts, valves, screens, supply and return lines.			P-1
76.0	Diagnose and repair hydraulic hoses, fittings, and connections--The student will be able to:		SC.912.N.1.1	
76.01	Diagnose causes of component leakage, damage, and restriction; determine needed action.			P-2
76.02	Inspect hoses and connections (length, size, routing, bend radii, and protection); repair or replace as needed.			P-1
76.03	Assemble hoses, tubes, connectors, and fittings in accordance with manufacturers' specifications; use proper procedures to avoid contamination.			P-1
76.04	Inspect and replace fitting seals and sealants.			P-1

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	Priority Number
77.0	Diagnose and repair hydraulic control valves--The student will be able to:		SC.912.P.10.14, 15, 16	
77.01	Pressure test system safety relief valve; determine needed action.			P-1
77.02	Perform control valve operating pressure and flow tests; determine needed action.			P-1
77.03	Inspect, test, and adjust valve controls (electrical/electronic, mechanical, and pneumatic).			P-1
77.04	Identify causes of control valve leakage problems (internal/external); determine needed action.			P-1
77.05	Inspect pilot control valve linkages, cables, and PTO controls; adjust, repair, or replace as needed.			P-1
78.0	Diagnose and repair hydraulic actuators--The student will be able to:		SC.912.N.1.1 SC.912.P.10.1, 2, 3	
Comply with manufacturers' and industry accepted safety practices associated with equipment lock out/tag out; pressure line release; implement/support (blocked or resting on ground); and articulated cylinder devices/machinery safety locks.				
78.01	Identify actuator type (single/double acting, multi-stage/telescopic, and motors).			P-1
78.02	Identify the cause of seal failure; determine needed repairs.			P-1
78.03	Identify the cause of incorrect actuator movement and leakage (internal and external); determine needed repairs.			P-1
78.04	Inspect actuator mounting, frame components, and hardware for looseness, cracks, and damage; determine needed action.			P-1
78.05	Remove, repair, and/or replace actuators in accordance with manufacturers' recommended procedures.			P-1
78.06	Inspect actuators for dents, cracks, damage, and leakage; determine needed action.			P-1
78.07	Purge and/or bleed system in accordance with manufacturers' recommended procedures.			P-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.

Special Notes

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Commercial Fishing**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	8751200
CIP Number	0649030300
Grade Level	9-12, 30, 31
Standard Length	5 credits
Teacher Certification	COMM FISH 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	53-5021 – Captains, Mates, and Pilots of Water Vessels
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, crew duties on seagoing boats, trailers, and small ships. Included are vessel operation and maintenance, vessel navigation, vessel handling, shrimp and net fishing, pot and line fishing, and galley operation/food preparation.

The purpose of this program is to prepare students for initial employment as an officer or fishing vessel captain (SOC 53-5021).

The plan of instruction prepares individuals for crew duties on seagoing boats, barges and ships. Included are boat operation, fishing operations, cleaning and preservation, loading and unloading and emergency procedures.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the fishing industry; planning, management, finance, technical and product 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.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
	8751210	Commercial Fishing 1	1 credit		2	VO
A	8751220	Commercial Fishing 2	1 credit	53-5021	2	VO
	8751230	Commercial Fishing 3	1 credit		2	VO
	8751240	Commercial Fishing 4	1 credit		2	VO
B	8751250	Commercial Fishing 5	1 credit	53-5021	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
8751210	**	**	**	**	**	**	**	**	**	**	**
8751220	**	**	**	**	**	**	**	**	**	**	**
8751230	**	**	**	**	**	**	**	**	**	**	**
8751240	**	**	**	**	**	**	**	**	**	**	**
8751250	**	**	**	**	**	**	**	**	**	**	**

** *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
8751210	**	**	**	**	**	**	**
8751220	**	**	**	**	**	**	**
8751230	**	**	**	**	**	**	**

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
8751240	**	**	**	**	**	**	**
8751250	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Commercial Fishing.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Commercial Fishing.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Commercial Fishing.
04.0 Unlock and get a vessel underway.
05.0 Dock a vessel.
06.0 Operate a vessel at sea.
07.0 Maneuver around offshore structures.
08.0 Anchor vessel.
09.0 Manage and perform cargo-handling duties.
10.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Commercial Fishing.
11.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Commercial Fishing.
12.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Commercial Fishing.
13.0 Perform shrimp boat deckhand duties.
14.0 Perform net fisher duties.
15.0 Perform pot fisher duties.
16.0 Perform line fisher duties.
17.0 Bring vessel into port.
18.0 Perform crew operational and maintenance duties aboard a vessel in port.
19.0 Prepare meals aboard vessel.
20.0 Plan and perform emergency procedures.
21.0 Demonstrate appropriate communication skills.
22.0 Demonstrate appropriate math skills.
23.0 Demonstrate appropriate understanding of basic science.
24.0 Demonstrate employability skills.
25.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
Student Performance Standards

Course Title: **Commercial Fishing 1**
Course Number: **8751210**
Course Credit: **1**

Course Description:
The Commercial Fishing 1 course prepares students for entry into the commercial fishing industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study vessel underway procedures, docking, and vessel operation.

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 Commercial Fishing.		
01.01	Key Ideas and Details		
01.01.1		Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
01.01.2		Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
01.01.3		Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
01.02	Craft and Structure		
01.02.1		Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
01.02.2		Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
01.02.3		Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Commercial Fishing.		
	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 Commercial Fishing.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Unlock and get vessel underway--The student will be able to:		
04.01 Bleed air compressor of water.		
04.02 Check and maintain batteries.		
04.03 Measure fuel in day tank.		
04.04 Maintain proper level of coolant in expansion tank.		
04.05 Use proper testing procedure to determine if all navigation lights are functioning.		
04.06 Use a torque wrench to tighten engine mounts to predetermined level.		
04.07 Inspect water level indicators for cleanliness.		
04.08 Test marine radio equipment using proper technique.		
04.09 Inspect antenna for physical damage.		
04.10 Determine if hydraulic steering equipment is free of air and water.		
04.11 Inspect fire-fighting equipment for excessive wear, proper location, and prescribed type.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.12 Inspect buoyant apparatuses for excessive wear, proper location and prescribed type.		
04.13 Determine that rudder-stuffing box is functioning properly.		
04.14 Tighten propeller stuffing box.		
04.15 Inspect vessel for fuel leakage.		
04.16 Prepare list of equipment to be checked for oil leakage.		
04.17 Use a voltage meter to determine if proper voltage is being generated.		
04.18 Maneuver vessel from berth into navigable waterway.		
04.19 Pump out bilges.		
04.20 Secure loose deck equipment.		
04.21 Secure watertight doors, hatches, vents and skylights.		
05.0 Dock a vessel--The student will be able to:		
05.01 Assign crewmembers positions for mooring vessel.		
05.02 Cast off vessel's mooring lines while remaining on dock.		
05.03 Cast off vessel's mooring lines while remaining aboard vessel.		
05.04 Demonstrate how to tie various knots used in maritime operations.		
05.05 Maneuver vessel to dock.		
05.06 Release towing gear aboard towing vessel and barges.		
05.07 Demonstrate how to secure mooring lines to dock.		
05.08 Demonstrate how to secure mooring lines to vessel.		
05.09 Summarize the steps for securing the engine room.		
05.10 Secure propeller shaft.		
05.11 Inspect engine room equipment for proper maintenance and safety.		
05.12 Determine the correct nautical chart prior to departure.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
05.13 Prepare vessel to take on fuel and lube oil.		
05.14 Prepare to take on water aboard vessel.		
05.15 Demonstrate how to splice an eye into line.		
06.0 Operate vessel at sea--The student will be able to:		
06.01 Act as vessel's lookout.		
06.02 Determine if electrical connections and outlets are tight and dry.		
06.03 Use a volt meter to determine if electrical outlets have proper voltage.		
06.04 Change air filters on engines.		
06.05 Change oil and fuel filters on engines.		
06.06 Change oil in engines.		
06.07 Demonstrate knowledge of the rules of the road in operating a vessel.		
06.08 Determine time of arrival when current effect is known.		
06.09 Determine time of arrival when current effect is unknown.		
06.10 Display day or night signals for different towing situations.		
06.11 Inspect heaving lines, mooring lines, and fixed and running rigging for excessive wear.		
06.12 Clean engine room and its equipment.		
06.13 Determine Greenwich Mean Time (GMT) by using vessel's chronometer.		
06.14 Determine position by using Omega navigation system or equipment.		
06.15 Steer a course by using the magnetic compass.		
06.16 Operate radar equipment.		
06.17 Interpret basic meteorological data from different sources.		
06.18 Determine "distance off" by using angular measurements.		
06.19 Establish a vessel's dead reckoning (DR) track.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
06.20 Plot position by using GPS and GPS overprint charts.		
06.21 Chip and paint vessel.		

Florida Department of Education
Student Performance Standards

Course Title: **Commercial Fishing 2**
Course Number: **8751220**
Course Credit: **1**

Course Description:
The Commercial Fishing 2 course is designed to build on the skills and knowledge students learned in the Commercial Fishing 1 course for entry into the commercial fishing industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study maneuvering, anchoring, cargo handling duties.

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 Commercial Fishing.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Commercial Fishing.		
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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Commercial Fishing.		
	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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
07.0 Maneuver around offshore structures--The student will be able to:		
07.01 Assist personnel in boarding personnel basket.		
07.02 Maneuver vessel to discharge passengers.		
07.03 Maneuver vessel to discharge cargo.		
07.04 Demonstrate the proper method to secure hoses on board vessel.		
07.05 Demonstrate the proper methods to secure lashings, hawsers, or mooring lines on board vessel.		
08.0 Anchor vessel--The student will be able to:		
08.01 Anchor vessel.		
08.02 Maneuver vessel to anchorage area.		
08.03 Anchor vessel by using anchor winch.		
08.04 Anchor vessel by using anchor windlass.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
08.05 Stack (tier) anchor chain in chain locker.		
09.0 Manage and perform cargo handling duties--The student will be able to:		
09.01 Adjust vessel's mooring lines to allow for variations of tides and current.		
09.02 Determine if all cargo is aboard.		
09.03 Determine if all deck cargo is secured.		
09.04 Determine if vessel is loaded in compliance with stability laws.		
09.05 Discharge cargo by using bulk cargo system.		
09.06 Load cargo by using bulk cargo system.		
09.07 Prepare list of lost or damaged cargo.		

Florida Department of Education
Student Performance Standards

Course Title: **Commercial Fishing 3**
Course Number: **8751230**
Course Credit: **1**

Course Description:
The Commercial Fishing 3 course is designed to build on the skills and knowledge students learned in the Commercial Fishing 2 course for entry into the commercial fishing industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study deckhand, net fisher, pot fisher and line duties.

Florida Standards			Correlation to CTE Program Standard #
10.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Commercial Fishing.		
	10.01 Key Ideas and Details		
	10.01.1	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	
	10.01.2	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	
	10.01.3	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	
	10.02 Craft and Structure		
	10.02.1	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	
	10.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	10.02.3	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 #
10.03	Integration of Knowledge and Ideas		
	10.03.1	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	
	10.03.2	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	
	10.03.3	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	
10.04	Range of Reading and Level of Text Complexity		
	10.04.1	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.	
	10.04.2	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Commercial Fishing.		
11.01	Text Types and Purposes		
	11.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	11.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
11.02	Production and Distribution of Writing		
	11.02.1	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 #
	11.02.2	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	
	11.02.3	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	
	11.03	Research to Build and Present Knowledge	
	11.03.1	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	
	11.03.2	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	
	11.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	11.04	Range of Writing	
	11.04.1	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	
12.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Commercial Fishing.		
	12.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	12.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	12.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
12.04 Model with mathematics. MAFS.K12.MP.4.1	
12.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
12.06 Attend to precision. MAFS.K12.MP.6.1	
12.07 Look for and make use of structure. MAFS.K12.MP.7.1	
12.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
13.0 Perform shrimp boat deckhand duties--The student will be able to:		
13.01 Stand lookout, steering, and engine room watches.		
13.02 Attach nets, slings, hooks, and other lifting devices to cables, booms, and hoists.		
13.03 Load equipment and supplies aboard vessel by hand or using hoisting equipment.		
13.04 Signal other workers to move, hoist, and position loads.		
13.05 Attach accessories, such as floats, weights, and markers to nets and lines.		
13.06 Pull and guide nets and lines onto vessel.		
13.07 Remove shrimp from nets.		
13.08 Sort, clean and identify marine life and return undesirable and illegal catch to the sea.		
13.09 Operate brine tank and refrigeration equipment.		
13.10 Place catch in containers and store in hold and cover with salt and ice.		
13.11 Wash decks, conveyors, knives, and other equipment, using proper sanitary procedures.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
13.12	Lubricate, adjust, and make minor repairs to engines and equipment.		
14.0	Perform net fisher duties--The student will be able to:		
14.01	Demonstrate proper procedures to catch finfish, shellfish, and other marine life alone or as crew.		
14.02	Use and operate equipment such as dip, diver, gill, hoop, lampara, pound, trap, reef, trammel, and travel nets.		
14.03	Use and operate equipment such as purse seine, haul, drag, or beach seine.		
14.04	Insert and attach hoops, rods, poles, ropes, floats, weights, beam runners, other boards, and cables to form, reinforce, position, set tow and anchor net.		
14.05	Attach flags and lights to buoys to identify net location.		
14.06	Put net into water and anchor or tow net according to kind of net used, location of fishing area, and method of fishing.		
14.07	Haul net to boat or shore manually and using winch.		
14.08	Empty catch from net, using dip net, brail bucket, hydraulic pump, and conveyor, and by lifting net, using block and tackle, and dumping catch.		
14.09	Store catch in hold and containers, or transfer catch to base ship or bigger boat.		
14.10	Ride in skiff and hold end of net as base ship discharges net to surround school of fish or other seafood.		
14.11	Sort and clean fish.		
14.12	Repair fishing nets and gear.		
14.13	Act as lookout or observe instruments to sight schools of fish.		
15.0	Perform pot fisher duties--The student will be able to:		
15.01	Fish for marine life, including crab, eel, or lobster, using pots (cages with funnel-shaped net openings).		
15.02	Tie marker float to line, attach line to pot, fasten bait inside pot, and lower pot into water.		
15.03	Hook marker float with pole and pull up pot.		
15.04	Reach through hinged door of pot to remove catch or dump catch on deck.		
15.05	Measure catch with fixed gauge to insure compliance with legal size.		
15.06	Place legal catch in container and toss illegal catch overboard.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
15.07	Rubber band claws to prevent lobsters in container from killing each other.		
15.08	Rig and lower dredge (rake scoop with bag net attached), drag dredge behind boat to gather marine life from water bottom, and hoist it to deck by hand using block and tackle.		
16.0	Perform line fisher duties--The student will be able to:		
16.01	Catch fish and other marine life with hooks and lines, working alone or as a member of crew.		
16.02	Lay out line and attach hooks, bait, sinkers, and various anchors, floats, and swivels, depending on the targeted species sought.		
16.03	Put line into water, and hold, anchor, or troll (tow) line to catch fish.		
16.04	Haul line onto boat deck by hand, reel, or synch, and remove catch.		
16.05	Store catch in hold or boxes and pack catch in ice.		
16.06	Hit fish with club to stun it before removing it from hook.		
16.07	Use gaff to assist in lifting fish from water and placing them on the deck.		
16.08	Use proper and safe technique to slit fish, remove viscera, and wash cavity to clean fish for storage.		
16.09	Navigate vessel in fishing area safely and legally.		

Florida Department of Education
Student Performance Standards

Course Title: **Commercial Fishing 4**
Course Number: **8751240**
Course Credit: **1**

Course Description:
The Commercial Fishing 4 course is designed to build on the skills and knowledge students learned in the Commercial Fishing 3 course for entry into the commercial fishing industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study bringing vessels into port, and crew operations and maintenance.

Florida Standards			Correlation to CTE Program Standard #
10.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Commercial Fishing.		
	10.01 Key Ideas and Details		
	10.01.1	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	
	10.01.2	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	
	10.01.3	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	
	10.02 Craft and Structure		
	10.02.1	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	
	10.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	10.02.3	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 #
10.03	Integration of Knowledge and Ideas		
	10.03.1	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	
	10.03.2	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	
	10.03.3	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	
10.04	Range of Reading and Level of Text Complexity		
	10.04.1	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.	
	10.04.2	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Commercial Fishing.		
11.01	Text Types and Purposes		
	11.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	11.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
11.02	Production and Distribution of Writing		
	11.02.1	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 #
	11.02.2	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	
	11.02.3	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	
	11.03	Research to Build and Present Knowledge	
	11.03.1	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	
	11.03.2	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	
	11.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	11.04	Range of Writing	
	11.04.1	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	
12.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Commercial Fishing.		
	12.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	12.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	12.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
12.04 Model with mathematics. MAFS.K12.MP.4.1	
12.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
12.06 Attend to precision. MAFS.K12.MP.6.1	
12.07 Look for and make use of structure. MAFS.K12.MP.7.1	
12.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
17.0 Bring vessel into port--The student will be able to:		
17.01 Determine approximate position and hazardous conditions by using depth recorder.		
17.02 Determine position by using GPS satellite information.		
17.03 Determine vessel's course and position against dead reckoning plots.		
18.0 Perform crew operational and maintenance duties aboard vessel in port--The student will be able to:		
18.01 Prepare and perform necessary duties for dry-docking a vessel.		
18.02 Change lube oil filters on auxiliary engines.		
18.03 Change fuel filters on auxiliary engines.		
18.04 Clean electric motor.		
18.05 Prepare a list of hoses, valves, connections, gaskets, and tanks that have been determined to need repairs.		
18.06 Determine if const-a-voltage regulator is functioning properly.		
18.07 Determine if drive bolts on air compressors are excessively loose.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
18.08 Tighten panel box fittings to prevent vibration.		
18.09 Clean keel cool strainers.		
18.10 Clean oil coolers.		
18.11 Clean oil strainers in marine gears.		
18.12 Drain water out of fuel traps.		
18.13 Check tightness of fuel and oil line connections on engines and tighten if necessary.		
18.14 Inspect day tanks containing fuel for leaks.		
18.15 Lubricate deck and engine room equipment on a regular schedule.		
18.16 Determine vessel's manning requirements.		
18.17 Wash down vessel's superstructure and decks.		

Florida Department of Education
Student Performance Standards

Course Title: **Commercial Fishing 5**
Course Number: **8751250**
Course Credit: **1**

Course Description:
The Commercial Fishing 5 course is designed to build on the skills and knowledge students learned in the Commercial Fishing 4 course for entry into the commercial fishing industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study preparing meals, emergency procedures, math, science, and employability skills, and entrepreneurship.

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
19.0 Prepare meals aboard vessel--The student will be able to:		
19.01 Make yeast breads.		
19.02 Make pie crust.		
19.03 Make cream filling in pie.		
19.04 Make pancakes.		
19.05 Make corn bread.		
19.06 Make cakes.		
19.07 Make biscuits.		
19.08 Clean galley deck, woodwork, and cabinets.		
19.09 Wash dishes, glasses, flatware, trays, pots and pans.		
19.10 Cook vegetables by boiling, simmering and steaming.		
19.11 Cook meats, seafood, and fowl by frying.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
19.12 Cook meats, seafood, and fowl by stewing and braising.		
19.13 Cook meats, seafood, and fowl by broiling.		
19.14 Cook meats, seafood, and fowl by roasting or baking.		
19.15 Cook meats, seafood, and fowl by braising.		
19.16 Season and bread meats, seafood, and fowl for baking, roasting, broiling and frying.		
19.17 Cook eggs by frying and scrambling.		
19.18 Make gravies.		
19.19 Make coffee.		
19.20 Make salads.		
19.21 Prepare soup stock.		
19.22 Prepare sandwiches.		
19.23 Prepare dehydrated or concentrated foods.		
19.24 Make soup with stock, meats, vegetables, and seasonings, as required by recipe.		
19.25 Carve cooled meats.		
19.26 Cut, trim, and bone beef, lamb, pork, or fish into prescribed portions for steaks, chops, and fillets.		
19.27 Clean and care for equipment using proper sanitary procedures.		
19.28 Order food.		
19.29 Plan menu.		
19.30 Keep records for purchasing foods.		
19.31 Store food.		
19.32 Keep continuous inventory of food items.		
20.0 Plan and perform emergency procedures--The student will be able to:		
20.01 Act as lookout to keep person in sight who has been lost overboard.		
20.02 Administer first aid to prevent shock.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
20.03 Administer first aid to control bleeding.		
20.04 Administer CPR		
20.05 Launch lifeboat and life raft.		
20.06 Close emergency fuel shutoff valves.		
20.07 Extinguish class A, B, and C type fires.		
20.08 Maneuver life raft or lifeboat away from vessel.		
20.09 Maneuver vessel to return to area in which person was lost overboard.		
20.10 Issue life preservers for use by passengers and crew.		
20.11 Secure engine room to prevent spread of fire.		
20.12 Send out distress signals.		
20.13 Sound abandon-ship alarm.		
20.14 Train crew to perform emergency procedures.		
21.0 Demonstrate appropriate communication skills--The student will be able to:		
21.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.		
21.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.		
21.03 Read and follow written and oral instructions.		
21.04 Answer and ask questions coherently and concisely.		
21.05 Read critically by recognizing assumptions and implications and by evaluating ideas.		
21.06 Demonstrate appropriate telephone/communication skills.		
22.0 Demonstrate appropriate math skills--The student will be able to:		
22.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.		
22.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
22.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.		
22.04	Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.		
22.05	Demonstrate an understanding of federal, state and local taxes and their computation.		
23.0	Demonstrate appropriate understanding of basic science--The student will be able to:		
23.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.		
23.02	Draw conclusions or make inferences from data.		
23.03	Identify health-related problems that may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.		
23.04	Understand pressure measurement in terms of PSI, inches of mercury, and KPA.		
24.0	Demonstrate employability skills--The student will be able to:		
24.01	Conduct a job search using periodicals and the internet.		
24.02	Secure information about a job.		
24.03	Identify documents that may be required when applying for a job interview.		
24.04	Complete a job application form correctly.		
24.05	Demonstrate competence in job interview techniques.		
24.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.		
24.07	Identify acceptable work habits.		
24.08	Demonstrate knowledge of how to make appropriate job changes.		
24.09	Demonstrate acceptable employee health habits.		
24.10	Demonstrate knowledge of and the ability to locate on-line the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.		
25.0	Demonstrate an understanding of entrepreneurship--The student will be able to:		
25.01	Define entrepreneurship.		
25.02	Describe the importance of entrepreneurship to the American economy.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
25.03 List the advantages and disadvantages of business ownership.		
25.04 Identify the risks involved in ownership of a business.		
25.05 Identify the necessary personal characteristics of a successful entrepreneur.		
25.06 Identify the business skills needed to operate a small business efficiently and effectively.		

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)

SkillsUSA 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.

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: **Motorcycle Service Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Motorcycle Service Technologies (9540500)

Secondary – Career Preparatory	
Program Number	8766100
CIP Number	0647060601
Grade Level	9-12, 30, 31
Standard Length	10 credits
Teacher Certification	MOTORCYCLE @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3052 – Motorcycle Mechanics
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the motorcycle services technology industry, and demonstrates such elements of the industry as 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 occupational completion points.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	8766110	Motorcycle Service 1	1 credit	49-3052	2	VO
	8766120	Motorcycle Service 2	1 credit		2	VO
B	8766130	Motorcycle Service 3	1 credit	49-3052	2	VO
	8766140	Motorcycle Service 4	1 credit		2	VO
C	8766150	Motorcycle Service 5	1 credit	49-3052	2	VO
	8766160	Motorcycle Service 6	1 credit		2	VO
	8766170	Motorcycle Service 7	1 credit		2	VO
	8766180	Motorcycle Service 8	1 credit		2	VO
	8766190	Motorcycle Service 9	1 credit		2	VO
D	8766200	Motorcycle Service 10	1 credit	49-3052	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
8766110	**	**	**	**	**	**	**	**	**	**	**
8766120	**	**	**	**	**	**	**	**	**	**	**
8766130	**	**	**	**	**	**	**	**	**	**	**
8766140	**	**	**	**	**	**	**	**	**	**	**
8766150	**	**	**	**	**	**	**	**	**	**	**
8766160	**	**	**	**	**	**	**	**	**	**	**
8766170	**	**	**	**	**	**	**	**	**	**	**
8766180	**	**	**	**	**	**	**	**	**	**	**

** *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
8766110	**	**	**	**	**	**	**
8766120	**	**	**	**	**	**	**
8766130	**	**	**	**	**	**	**
8766140	**	**	**	**	**	**	**
8766150	**	**	**	**	**	**	**
8766160	**	**	**	**	**	**	**
8766170	**	**	**	**	**	**	**
8766180	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Motorcycle Service Technology.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Motorcycle Service Technology.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technology.
04.0 Recognize personal and industry safety requirements.
05.0 Verify the proper use and care of basic shop tools and equipment.
06.0 Outline the appropriate set-up procedures.
07.0 Show proficiency in performing routine preventative maintenance services.
08.0 Compare and contrast the differences in the measurement systems, fasteners and thread repair.
09.0 Illustrate industry-related math skills.
10.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Motorcycle Service Technology.
11.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Motorcycle Service Technology.
12.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technology.
13.0 Show proficiency in parts inventory identification and repair order processing.
14.0 Perform basic services and minor repairs.
15.0 Perform basic frame and suspension service.
16.0 Perform basic electrical system service.
17.0 Diagnose, service and repair cooling systems.
18.0 Diagnose, repair and recondition basic engine components.
19.0 Apply industry-related science to motorcycle service.
20.0 Diagnose, service and repair frames and suspension components.
21.0 Diagnose, service and repair wheels, tires, and brakes.
22.0 Diagnose, service and repair drive trains.
23.0 Diagnose, service and repair fuel and exhaust systems.
24.0 Troubleshoot and repair electrical-system components.
25.0 Tune up motorcycles.
26.0 Diagnose, repair, and recondition engines.
27.0 Demonstrate the proper use of industry tools and equipment.

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 1**
Course Number: **8766110**
Course Credit: **1**

Course Description:
The Motorcycle Service 1 course prepares students for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study safety requirements, tools and equipment, set-up procedures, and routine preventative maintenance.

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 Motorcycle Service Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Motorcycle Service 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Motorcycle Service 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	

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Recognize personal and industry safety requirements--The student will be able to:		
04.01 List the federal and state standards for health and safety, including OSHA and the "Right-to-Know" law.		
04.02 Outline the safety requirements for shop organization and management.		
04.03 Recognize the safety requirements for the use of industry tools and equipment.		
04.04 List the fire-safety precautions.		
04.05 Recognize electrical-safety precautions.		
05.0 Verify the proper use and care of basic shop tools and equipment--The student will be able to:		
05.01 Categorize general and specialized hand tools.		
05.02 Examine and use power tools.		
05.03 Classify and use fasteners.		
05.04 Document proper use of air tools.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
05.05	Utilize oxy-acetylene welding outfit for heating, welding, brazing and cutting.		
05.06	Use heating devices to perform service procedures.		
06.0	Outline the appropriate set-up procedures--The student will be able to:		
06.01	Inspect and interpret vehicle identification number information.		
06.02	Inspect tires; check and adjust air pressure.		
06.03	Check for proper fluid levels.		
06.04	Utilize electrical test equipment to isolate defective components and check lamp circuits.		
06.05	Inspect and fill battery.		
06.06	Clean engine.		
06.07	Install cables, hoses and electrical assemblies.		
06.08	Inspect cables, connectors, clamps and hold-downs; adjust as necessary.		
06.09	Read and interpret a wiring diagram.		
06.10	Troubleshoot and repair wiring harnesses.		
07.0	Show proficiency in performing routine preventative maintenance services--The student will be able to:		
07.01	Compare and contrast typical motorcycle lubricants and lubricant properties.		
07.02	Inspect and test head and tail lamp circuits; aim headlights and replace bulbs.		
07.03	Inspect battery terminals and the state-of-charge test; perform slow/fast battery charge.		
07.04	Inspect and clean battery cables, connectors, clamps and hold-downs; repair or replace as needed.		
07.05	Inspect and test fusible links, circuit breakers and fuses; replace as needed.		
07.06	Check radiator coolant level (if applicable), test and add coolant.		
07.07	Check fluid levels and change fluids and the tightness of the oil filters.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 2**
Course Number: **8766120**
Course Credit: **1**

Course Description:
The Motorcycle Service 2 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study measurement systems, fasteners, thread repair, and math.

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 Motorcycle Service Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Motorcycle Service 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Motorcycle Service 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	

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
08.0 Compare and contrast the differences in the measurement systems, fasteners and thread repair--The student will be able to:		
08.01 Describe and distinguish the different types of measurement systems.		
08.02 Compare and contrast the different types of fasteners.		
08.03 Explain the steps of inspecting, cleaning and replacement of broken fasteners.		
08.04 Describe the sequence of tightening and torqueing fasteners to specs.		
08.05 Compare and contrast the different stress fractures of fasteners		
09.0 Illustrate industry-related math skills--The student will be able to:		
09.01 Measure tolerance(s) using millimeters and inches.		
09.02 Perform metric to SAE (and SAE to metric) conversions.		
09.03 Perform correct measurements using different precise metering tools. T handle measuring tool.		
09.04 Perform correct measures using Vernier Calipers.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
09.05 Perform correct measures using Micrometers.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 3**
Course Number: **8766130**
Course Credit: **1**

Course Description:
The Motorcycle Service 3 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1 & 2 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study parts inventory, repair ordering, basic services and minor repairs, basic frame, and suspension.

Florida Standards			Correlation to CTE Program Standard #
10.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Motorcycle Service Technology.		
	10.01 Key Ideas and Details		
	10.01.1	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	
	10.01.2	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	
	10.01.3	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	
	10.02 Craft and Structure		
	10.02.1	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	
	10.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	10.02.3	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 #
10.03	Integration of Knowledge and Ideas		
	10.03.1	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	
	10.03.2	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	
	10.03.3	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	
10.04	Range of Reading and Level of Text Complexity		
	10.04.1	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.	
	10.04.2	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Motorcycle Service Technology.		
11.01	Text Types and Purposes		
	11.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	11.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
11.02	Production and Distribution of Writing		
	11.02.1	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 #
	11.02.2	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	
	11.02.3	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	
	11.03	Research to Build and Present Knowledge	
	11.03.1	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	
	11.03.2	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	
	11.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	11.04	Range of Writing	
	11.04.1	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	
12.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technology.		
	12.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	12.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	12.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
12.04 Model with mathematics. MAFS.K12.MP.4.1	
12.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
12.06 Attend to precision. MAFS.K12.MP.6.1	
12.07 Look for and make use of structure. MAFS.K12.MP.7.1	
12.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
13.0 Show proficiency in parts inventory identification and repair order processing--The student will be able to:		
13.01 Read and interpret information in parts and service manuals and other technical media.		
13.02 Read and understand graphs, charts, diagrams and tables commonly used in the industry.		
13.03 Write and process work orders.		
13.04 Prepare cost estimates for jobs using service and flat-rate standards.		
13.05 Perform basic parts inventory tracking with the latest computer updates.		
13.06 Interpret and verify complaint; determine needed repairs. If find more than first estimated ask customer if ok to do repairs.		
14.0 Perform basic services and minor repairs--The student will be able to:		
14.01 Identify, select and use appropriate replacement parts.		
14.02 Clean or replace after inspection of air filtration.		
14.03 Service and check batteries, if not charging then replace.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
14.04 Service lubrication systems.		
14.05 Name the components of air and liquid cooling systems by name and function.		
14.06 Remove, remount and balance tires.		
14.07 Diagnose, service and repair chain and belt final drive components.		
15.0 Perform basic frame and suspension service--The student will be able to:		
15.01 Categorize the different front- and rear-suspension systems and explain their operation.		
15.02 Compare the parts and functions of different frames and suspension systems.		
15.03 Explain how wheels, tires and suspension affect chassis performance and driveability.		
15.04 Replace and true a wheel assembly.		
15.05 Diagnose and service wheel bearings and seals.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 4**
Course Number: **8766140**
Course Credit: **1**

Course Description:
The Motorcycle Service 4 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2 & 3 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study electrical system services.

Florida Standards			Correlation to CTE Program Standard #
10.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Motorcycle Service Technology.		
	10.01 Key Ideas and Details		
	10.01.1	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	
	10.01.2	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	
	10.01.3	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	
	10.02 Craft and Structure		
	10.02.1	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	
	10.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	10.02.3	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 #
	10.03	Integration of Knowledge and Ideas	
	10.03.1	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	
	10.03.2	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	
	10.03.3	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	
	10.04	Range of Reading and Level of Text Complexity	
	10.04.1	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.	
	10.04.2	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Motorcycle Service Technology.		
	11.01	Text Types and Purposes	
	11.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	11.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
	11.02	Production and Distribution of Writing	
	11.02.1	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 #
	11.02.2	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	
	11.02.3	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	
	11.03	Research to Build and Present Knowledge	
	11.03.1	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	
	11.03.2	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	
	11.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	11.04	Range of Writing	
	11.04.1	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	
12.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technology.		
	12.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	12.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	12.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
12.04 Model with mathematics. MAFS.K12.MP.4.1	
12.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
12.06 Attend to precision. MAFS.K12.MP.6.1	
12.07 Look for and make use of structure. MAFS.K12.MP.7.1	
12.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
16.0 Perform basic electrical system service--The student will be able to:		
16.01 Assess and use basic electrical system test equipment.		
16.02 Use basic DC electrical theory to select appropriate test procedures.		
16.03 Inspect and test fusible links, circuit breakers and fuses; replace as needed.		
16.04 Check electrical circuits with a test light; determine needed repairs.		
16.05 Troubleshoot and repair battery-operated electronic ignition systems.		
16.06 Troubleshoot and repair magneto-ignition systems.		
16.07 Troubleshoot and repair capacitive-discharge-ignition (CDI) systems.		
16.08 Troubleshoot and repair half-wave and full-wave charging systems.		
16.09 Troubleshoot and repair three-phase charging systems.		
16.10 Troubleshoot and repair electrical starter systems.		
16.11 Troubleshoot and repair Direct-Current (DC) Generators.		
16.12 Troubleshoot and repair Warning systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 5**
Course Number: **8766150**
Course Credit: **1**

Course Description:
The Motorcycle Service 5 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3 & 4 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study diagnostics, service, and repair of cooling systems, and engine components.

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
17.0 Diagnose, service, and repair cooling systems--The student will be able to:		
17.01 Categorize the components of air and liquid cooling systems by name and function.		
17.02 Diagnose service and repair air-cooling systems.		
17.03 Diagnose service and repair liquid cooling systems.		
18.0 Diagnose, repair and recondition basic engine components--The student will be able to:		
18.01 Explain the engine operating theory.		
18.02 Recondition a two-stroke engine top-end.		
18.03 Recondition a single-cylinder four-stroke engine top-end.		
18.04 Recondition a multi-cylinder four-stroke engine top-end.		
18.05 Rebuild a four-stroke head.		
18.06 Recondition a single-cylinder four-stroke engine bottom-end.		
18.07 Recondition a multi-cylinder four-stroke engine bottom-end.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
18.08 Recondition a two-stroke engine bottom-end.		
18.09 Service a plain-bearing crankshaft.		
18.10 Diagnose and repair oil-delivery systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 6**
Course Number: **8766160**
Course Credit: **1**

Course Description:
The Motorcycle Service 6 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, & 5 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study the science of motorcycles, frames, and suspension systems.

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, NGSSS-Sci.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
19.0	Apply industry-related science to motorcycle service--The student will be able to:		
19.01	Explain how temperature extremes, chemical reactions and moisture content affect motorcycle systems.		
19.02	Draw conclusions or make inferences from data.		
20.0	Diagnose, service, and repair frames and suspension components--The student will be able to:		
20.01	Service and repair front suspension.		
20.02	Service and repair rear suspension.		
20.03	Inspect, remove, and replace frames.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 7**
Course Number: **8766170**
Course Credit: **1**

Course Description:
The Motorcycle Service 7 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, 5, & 6 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study wheels, tires, and brakes.

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
21.0 Diagnose, service, and repair wheels, tires and brakes--The student will be able to:		
21.01 Diagnose and repair mechanical disc and drum brake systems and components.		
21.02 Diagnose and repair hydraulic disc and drum brake systems and components.		
21.03 Diagnose and repair ABS braking systems and other advanced stopping systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 8**
Course Number: **8766180**
Course Credit: **1**

Course Description:
The Motorcycle Service 8 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, 5, 6, & 7 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study drive trains, fuel, and exhaust systems.

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, NGSSS-Sci.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
22.0	Diagnose, service, and repair drive trains--The student will be able to:		
22.01	Diagnose, service, and repair primary-drive systems.		
22.02	Diagnose, service, and repair clutch assemblies.		
22.03	Diagnose, service, and repair transmissions.		
22.04	Diagnose, service, and repair shaft drives.		
22.05	Diagnose and repair kickstart systems.		
23.0	Diagnose, service, and repair fuel and exhaust systems--The student will be able to:		
23.01	Identify components and operation of carburetion and fuel-injection systems.		
23.02	Diagnose service and repair slide-type carburetors.		
23.03	Diagnose service and repair constant-velocity-type (CV-type) carburetors.		
23.04	Diagnose service and repair fixed-venturi carburetors.		
23.05	Diagnose service and repair fuel-injection systems.		
23.06	Diagnose service and repair exhaust systems replace necessary components as needed.		
23.07	Diagnose service and repair other fuel-delivery-system components.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 9**
Course Number: **8766190**
Course Credit: **1**

Course Description:
The Motorcycle Service 9 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, 5, 6, 7, & 8 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study troubleshooting and repair of electrical system components.

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
24.0 Troubleshoot and repair electrical-system components--The student will be able to:		
24.01 Utilize electrical test equipment to isolate defective components.		
24.02 Read and interpret a wiring diagram.		
24.03 Troubleshoot and repair wiring harnesses.		
24.04 Troubleshoot and repair battery/points ignition systems.		
24.05 Troubleshoot and repair battery-operated electronic ignition systems.		
24.06 Troubleshoot and repair magneto-ignition systems.		
24.07 Troubleshoot and repair capacitive-discharge-ignition (CDI) systems.		
24.08 Troubleshoot and repair half-wave and full-wave charging systems.		
24.09 Troubleshoot and repair three-phase charging systems.		
24.10 Troubleshoot and repair electrical starter systems.		
24.11 Troubleshoot and repair direct current (DC) generators.		
24.12 Troubleshoot and repair warning systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 10**
Course Number: **8766200**
Course Credit: **1**

Course Description:
The Motorcycle Service 10 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, 5, 6, 7, 8, & 9 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study tune-up, engine reconditioning, and proper use of industry tools/equipment.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
25.0 Tune up motorcycles--The student will be able to:		
25.01 Diagnose driveability problems.		
25.02 Adjust the cam chain tension.		
25.03 Adjust the valve clearances.		
25.04 Replace the ignition points, condenser, and spark plugs.		
25.05 Check and set the ignition timing.		
25.06 Adjust the carburetor and service the fuel-delivery systems.		
25.07 Service the air-filtration systems.		
25.08 Service and diagnose batteries.		
25.09 Service the lubrication systems.		
26.0 Diagnose, repair, and recondition engines--The student will be able to:		
26.01 Explain the engine operating theory.		
26.02 Recondition a single-cylinder four-stroke engine top-end.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
26.03 Recondition a multi-cylinder four-stroke engine top-end.		
26.04 Recondition a two-stroke engine top-end.		
26.05 Rebuild a four-stroke head.		
26.06 Recondition a single-cylinder four-stroke engine bottom-end.		
26.07 Recondition a multi-cylinder four-stroke engine bottom-end.		
26.08 Recondition a two-stroke engine bottom-end.		
26.09 Rebuild a built-up crankshaft.		
26.10 Service a plain-bearing crankshaft.		
26.11 Diagnose and repair electric-starter drive systems.		
26.12 Diagnose and repair oil-delivery systems.		
27.0 Demonstrate the proper use of industry tools and equipment--The student will be able to:		
27.01 Utilize oxyacetylene welding outfit for heating, welding, brazing and cutting.		
27.02 Use heating devices to perform service procedures.		
27.03 Recondition cylinders.		

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

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

Course Title: **Transportation, Distribution and Logistics Cooperative Education-OJT**
Course Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Cooperative Education - OJT	
Course Number	9500420
CIP Number	06499999CP
Grade Level	9-12, 30, 31
Standard Length	Multiple credits
Teacher Certification	Any District Certification appropriate to the students' chosen career field
CTSO	SkillsUSA
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 Transportation, Distribution and Logistics cluster(s); 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 Transportation, Distribution and Logistics cluster(s).

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.

Transportation, Distribution and Logistics 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.

Florida Standards for English Language Development (ELD)

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

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

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: **Transportation, Distribution and Logistics Cooperative Education OJT**
Program Number: **9500420**

Standards and Benchmarks	
01.0	Perform designated job skills--The student will be able to:
01.01	Perform tasks as outlined in the training plan.
01.02	Demonstrate job performance skills.
01.03	Demonstrate safety procedures on the job.
01.04	Maintain appropriate records.
01.05	Attain an acceptable level of productivity.
01.06	Demonstrate appropriate dress and grooming habits.
02.0	Demonstrate work ethics--The student will be able to:
02.01	Follow directions.
02.02	Demonstrate good human relations skills on the job.
02.03	Demonstrate good work habits.
02.04	Demonstrate acceptable business ethics.

Additional Information

Special Notes

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/urlt/steps-manual.pdf.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

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

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

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: **Transportation, Distribution and Logistics Directed Study**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Course Number	9501000
CIP Number	0649999901
Grade Level	11-12, 30, 31
Standard Length	1 credit - Multiple credits
Teacher Certification	Any District Certification appropriate to the students' chosen career field
CTSO	SkillsUSA
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this course is to provide students with learning opportunities in a prescribed program of study within the Transportation, Distribution and Logistics cluster(s) that will enhance opportunities for employment in the career field chosen by the student.

Florida Standards for English Language Development (ELD)

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

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

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

Course Structure

The content is prescribed by the instructor based upon the individual student's assessed needs for directed study.

This course may be taken only by a student who has completed or is currently completing a specific secondary job preparatory program or occupational completion point for additional study in this career cluster. A student may earn multiple credits in this course.

The selected standards and benchmarks, which the student must master to earn credit, must be outlined in an instructional plan developed by the instructor.

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate expertise in a specific occupation contained within the career cluster.
02.0 Conduct investigative research on a selected topic related to the career cluster using approved research methodology, interpret findings, and prepare presentation to defend results.
03.0 Apply enhanced leadership and professional career skills.
04.0 Demonstrate higher order critical thinking and reasoning skills appropriate for the selected program of study.

Florida Department of Education
Student Performance Standards

Course Title: **Transportation, Distribution and Logistics Directed Study**
Course Number: **9501000**
Course Credit: **1**

CTE Standards and Benchmarks	
01.0	Demonstrate expertise in a specific occupation within the career cluster--The student will be able to:
01.01	The benchmarks will be selected from the appropriate curriculum frameworks and determined by the instructor based upon the individual students assessed needs.
02.0	Conduct investigative research on a selected topic related to the career cluster using approved research methodology, interpret findings, and prepare presentation to defend results--The student will be able to:
02.01	Select investigative study referencing prior research and knowledge.
02.02	Collect, organize and analyze data accurately and precisely.
02.03	Design procedures to test the research.
02.04	Report, display and defend the results of investigations to audiences that may include professionals and technical experts.
03.0	Apply enhanced leadership and professional career skills--The student will be able to:
03.01	Develop and present a professional presentation offering potential solutions to a current issue.
03.02	Enhance leadership and career skills through work-based learning including job placement, job shadowing, entrepreneurship, internship, or a virtual experience.
03.03	Participate in leadership development opportunities available through the appropriate student organization and/or other professional organizations.
03.04	Enhance written and oral communications through the development of presentations, public speaking, and live and/or virtual interviews.
04.0	Demonstrate higher order critical thinking and reasoning skills appropriate for the selected program of study--The student will be able to:
04.01	Use mathematical and/or scientific skills to solve problems encountered in the chosen occupation.
04.02	Read and interpret information relative to the chosen occupation.
04.03	Locate and evaluate key elements of oral and written information.
04.04	Analyze and apply data and/or measurements to solve problems and interpret documents.
04.05	Construct charts/tables/graphs using functions and data.

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)

SkillsUSA 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.

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: **Global Logistics and Supply Chain Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9503100
CIP Number	0652020300
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	BUS ED 1 LOG TECH 7G
CTSO	SkillsUSA, FL-TSA
SOC Codes (all applicable)	11-3071 – Transportation, Storage, and Distribution Managers 43-5071 – Shipping, Receiving, and Traffic Clerks 13-1081 – Logisticians 15-1151 – Computer User Support Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to: the global supply chain, the logistics environment, safety principles, quality control principles, work communication practices, teamwork-workplace behavior- and problem solving, supply chain computer systems, supply chain life cycle, product receiving and stocking, product order processing, product shipment, safe operation and use of equipment, inventory control, safe handling of hazardous materials, customs process/free trade, modes of transportation (air, sea, truck, and rail), dispatch operations, routing and tracking operations, and customer relations.

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

Program Structure

This program is a planned sequence of instruction consisting of four occupational completion points.

Students who successfully complete Digital Information Technology (8207310) may be used as an equivalent substitute for **Introduction to Information Technology Applications (Course Number - 9503120)**.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	9503110	Global Logistics and Supply Chain Technology	1 credit	11-3071	3	VO
B	9503120	Introduction to Information Technology Applications	1 credit	15-1151	3	VO
C	9503130	Global Logistics Operations	1 credit	43-5071	3	VO
D	9503140	Global Logistics Management	1 credit	13-1081	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.

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
9503110	**	**	**	**	**	**	**	**	**	**	**
9503120	**	**	**	**	**	**	**	**	**	**	**
9503130	**	**	**	**	**	**	**	**	**	**	**
9503140	**	**	**	**	**	**	**	**	**	**	**

** *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
9503110	**	**	**	**	**	**	**
9503120	**	**	**	**	**	**	**
9503130	**	**	**	**	**	**	**

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
9503140	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Global Logistics and Supply Chain Technology.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Global Logistics and Supply Chain Technology.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Global Logistics and Supply Chain Technology.
04.0 Demonstrate an understanding of global logistics and supply chain
05.0 Demonstrate an understanding of transportation systems
06.0 Demonstrate professional communication skills
07.0 Demonstrate customer service skills
08.0 Demonstrate knowledge and skill of information technology applications related to logistics and supply chain management.
09.0 Demonstrate knowledge and skill of common software applications.
10.0 Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication skills utilizing word processing applications.
11.0 Demonstrate knowledge and skill in using technology to enhance communication skills utilizing presentation applications.
12.0 Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication utilizing spreadsheet and database applications.
13.0 Demonstrate knowledge and skill in using technology to enhance communication skills utilizing electronic mail.
14.0 Demonstrate proficiency using computer networks, internet, and online databases to facilitate collaborative communication.
15.0 Develop an awareness of emerging technologies.
16.0 Investigate individual assessment and job/career exploration and individual career planning that reflect the transition from school to work, lifelong learning, and personal and professional goals.
17.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
18.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Global Logistics and Supply Chain Technology.
19.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Global Logistics and Supply Chain Technology.
20.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Global Logistics and Supply Chain Technology.
21.0 Demonstrate an understanding of warehouse operations
22.0 Demonstrate an understanding of storage and control operations
23.0 Demonstrate an understanding of protection skills
24.0 Demonstrate an understanding of economics
25.0 Demonstrate an understanding of career readiness
26.0 Demonstrate employability skills
27.0 Demonstrate competencies in a specific career
28.0 Demonstrate career acquisition

29.0 Demonstrate career retention
30.0 Demonstrate integrated learning and life skills
31.0 Demonstrate technology and information

Florida Department of Education
Student Performance Standards

Course Title: **Global Logistics and Supply Chain Technology**
Course Number: **9503110**
Course Credit: **1**

Course Description:
The Global Logistics and Supply Chain Technology course prepares students for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes beginning skills key to the success of working in the logistics and supply chain industry. Students study and gain a basic understanding of global logistics and supply chain technology, transportation systems, communication skills, and customer service 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 Global Logistics and Supply Chain Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Global Logistics and Supply Chain 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Global Logistics and Supply Chain 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	

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 and NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate an understanding of global logistics and supply chain--The student will be able to:		
04.01 Discuss the history, career fields, and benefits of the global supply chain industry.		
04.02 Describe principal elements of the logistics environment and logistics systems.		
04.03 Explore career pathways within global logistics and supply chain.		
04.04 Explain ways in which handling of product throughout supply chain logistics affects company's viability and profitability.		
04.05 Define basic principles of cost effectiveness throughout supply chain logistics.		
04.06 Define basic principles of just-in-time purchasing and inventory control.		
04.07 Identify major security requirements applicable to the logistics environment.		
04.08 Cite examples of environmental and financial impacts of logistics activities.		
04.09 Describe the alignment between the supply chain strategy and business strategy.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
04.10	Define basic principles of customs, free trade and international issues in Supply Chain Management.		
05.0	Demonstrate an understanding of transportation systems--The student will be able to:		
05.01	Identify various transportation modes.		
05.02	Describe and contrast the different modes of transportation and their advantages/disadvantages.		
05.03	List the main considerations in determining the best mode.		
05.04	Explain how to use the information on performance and costs for mode selection to enhance rapid decision making.		
05.05	Give examples of transportation documentation, dispatch, routing and tracking.		
05.06	Describe and assess global freight transportation systems.		
05.07	Describe the government's involvement in transportation and explain freight transportation laws, regulations, and policies.		
05.08	Determine which transportation method is most appropriate for various situations.		
06.0	Demonstrate professional communication skills--The student will be able to:		
06.01	Show effective methods for communications between shifts.		
06.02	Identify effective communications to both internal and external customers.		
06.03	Identify ways to elicit clear statements of customer requirements and specifications.		
06.04	Provide examples of effective written communications in logistics/supply chain workplace.		
06.05	Provide examples of effective oral communications in logistics/supply chain workplace.		
06.06	Demonstrate an understanding of teamwork and good professional workplace behavior to solve problems.		
06.07	Describe a high-performance team.		
06.08	List characteristics of an effective team member.		
06.09	Explain ways to set team goals.		
06.10	Identify use of team environment to solve problems and resolve conflicts.		
06.11	Describe typical requirements for good workplace conduct.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
06.12	Read and comprehend technical and non-technical reading assignments related to course content, including, books, magazines and electronic sources.		
06.13	Use listening, speaking, telecommunication and nonverbal skills and strategies to communicate effectively with supervisors, co-workers, and customers.		
06.14	Apply the writing process to the creation of appropriate documents following designated business formats. (e.g., note taking, research, MLA/APA)		
06.15	Demonstrate an awareness of project management concepts and tools. (e.g., timelines, deadlines, resource allocation, time management, delegation of tasks, collaboration)		
07.0	Demonstrate customer service skills--The student will be able to:		
07.01	Exhibit acceptable workplace dress or attire.		
07.02	Exhibit punctuality, initiative, courtesy, loyalty, and honesty.		
07.03	Use a personality inventory for personal improvement.		
07.04	Exhibit the ability to get along with others.		
07.05	Discuss the importance of human relations.		
07.06	Develop and demonstrate the unique human relations skills needed for successful entry and progress in the customer service occupations or marketing occupations selected as a career objective.		
07.07	Differentiate between an acceptable and an unacceptable code of business ethical conduct.		

Florida Department of Education
Student Performance Standards

Course Title: **Introduction to Information Technology Applications**
Course Number: **9503120**
Course Credit: **1**

Course Description:
The Introduction to Information Technology Applications course is designed to build on the skills and knowledge students learned in Global Logistics and Supply Chain Technology for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes knowledge and skills of information technology applications, common software applications, word processing, presentation, spreadsheet, and database applications. Additionally, content knowledge and skills related to electronic communication methods, understanding computer networking, awareness of emerging technologies, college and career readiness, and appropriate leadership techniques.

Florida Standards			Correlation to CTE Program Standard #
01.0	Methods and strategies for using Florida Standards for grades 09-10 reading in Technical Subjects for student success in Global Logistics and Supply Chain Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Global Logistics and Supply Chain 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Global Logistics and Supply Chain 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	

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 and NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
08.0 Demonstrate knowledge and skill of information technology applications related to logistics and supply chain management. – The student will be able to:		
08.01 Describe the impact of technology on society.		
08.02 Develop keyboarding skills to enter and manipulate text and data.		
08.03 Explain main uses of computer systems by front-line workers.		
08.04 Identify technologies used to capture and store logistics information.		
08.05 Explain the concepts and use of various information technologies in logistics.		
08.06 Research, describe, access, and evaluate Internet-based business models.		
08.07 Describe and use current and emerging computer technologies and software to perform business tasks.		
08.08 Identify and describe types of file systems and classify common file extensions based on software application programs.		
08.09 Use reference materials. (e.g. on-line help, tutorials, manuals, vendor bulletin boards)		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
08.10	Demonstrate basic computer file management skills and file naming conventions to accurately organize files into hierarchies by labeling file folders for easy accessibility.		
08.11	Describe and understand the general architecture of a microcomputer system.		
08.12	Discuss the process of troubleshooting problems with computer hardware, input and output devices.		
08.13	Differentiate between diagnosing and troubleshooting.		
08.14	Explain the need for and use of peripherals.		
08.15	Describe ethical issues and problems associated with computers and information systems, including federal laws against anti-piracy with computers and PC software security protection.		
08.16	Demonstrate proficiency with file management and structure. (e.g., folder creation file creation, backup copy, delete, open, save)		
08.17	Compare and contrast various computer operating systems.		
08.18	Select and apply an information technology application for procurement, acquisition, logistics, and supply chain management.		
09.0	Demonstrate knowledge and skill of common software applications. – The student will be able to:		
09.01	Compare and contrast the appropriate use of various software applications. (e.g., word processing, desktop publishing, graphics design, web browser, e-mail, presentation, database, scheduling, financial management, Java applet, music)		
09.02	Demonstrate the use of various software applications. (e.g., word processing, desktop publishing, graphics design, web browser, e-mail, presentation, database, scheduling, financial management, Java applet, music).		
09.03	Describe and identify language terminology. (e.g., HTML, Python, Java, flash, Basic, etc.)		
10.0	Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication skills utilizing word processing applications. – The student will be able to:		
10.01	Select and use word processing software and accompanying features to enhance written business communications.		
10.02	Share and maintain documents by applying different views and protection to a document and manage document versions.		
10.03	Share and save a document and apply a template. (e.g., pdf, html, blog, hyperlinks)		
10.04	Format content to a document by applying font, paragraph attributes, indent and tab settings to text and paragraphs.		
10.05	Apply spacing settings to text and paragraphs.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
10.06	Navigate and search through a document, create and manipulate tables.		
10.07	Apply page layout and reusable content by editing and manipulating page setup settings and applying themes.		
10.08	Create and manipulate page backgrounds, headers and footers.		
10.09	Use image design theory and software to create illustrations, shapes, and graphics and include a selection in a document.		
10.10	Insert and format pictures, shapes, and clipart.		
10.11	Apply and manipulate text boxes.		
10.12	Proofread documents by validating content through the use of spell and grammar check.		
10.13	Configure autocorrect settings, insert and modify comments in a document.		
10.14	Apply references and hyperlinks, create end and footnotes, and create a table of contents in a document.		
10.15	Perform various mail merge options, macros and tracking revisions		
11.0	Demonstrate knowledge and skill in using technology to enhance communication skills utilizing presentation applications. – The student will be able to:		
11.01	Manage and configure the presentation software environment, including: adjusting views, manipulating window, configuring toolbar and file options.		
11.02	Create slide presentations utilizing various project development elements, including: adding and removing slides, slide layouts, format slide design, insert or format placeholders.		
11.03	Locate, create and incorporate graphical and multimedia elements, including: shapes, graphics, images, bullets, hyperlinks, video, and audio into a slide presentation appropriate for the project.		
11.04	Explore and apply design and color theory to create dynamic and appealing visuals.		
11.05	Create and manipulate graphical and multimedia elements to improve or develop new contacts appropriate for the project, including: creation of images, color selections, tone, hue and contrast.		
11.06	Demonstrate various business-related elements that can be created, embedded and manipulated in a slide presentation, including: charts, graphs, tables, spreadsheets, flowcharts, and organizational charts.		
11.07	Apply slide transitions and create custom animations to slide presentations appropriate for the target audience.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
11.08	Demonstrate different delivery methods for slide presentations, including: packaging for CD delivery, video projection – on mouse click, rehearsed timings, printing options - outlines, handouts, slides and notes.		
12.0	Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication utilizing spreadsheet and database applications. – The student will be able to:		
12.01	Manage the worksheet environment by navigating through and printing a worksheet.		
12.02	Personalize the environment by manipulating the ribbon tabs, group settings, importing data/database, manipulating properties, files and folders.		
12.03	Create cell data, apply auto fill and hyperlinks.		
12.04	Format cells and worksheets by applying cell formats, merging and splitting cells, create row and column titles, hide and unhide column titles, rows and columns.		
12.05	Manipulate page set up options.		
12.06	Create and apply cell styles.		
12.07	Manage worksheets and workbooks by creating and formatting worksheets and manipulating views/themes.		
12.08	Apply formulas and functions by creating formulas, enforcing precedence and cell formula references.		
12.09	Apply conditional formula logic, name and cell ranges.		
12.10	Demonstrate data visually by creating and modifying charts and images. (e.g., pivot tables)		
12.11	Share worksheet data through email, changing file type and different versions. (e.g., mail merge)		
12.12	Analyze and organize data through filters, sorting and applying conditional formatting. (e.g., macros)		
12.13	Create different forms for inputting data into a database application.		
12.14	Interpret queries for specialized reports using a database application.		
12.15	Interpret data on line graphs, pie charts, diagrams, and tables commonly used in spreadsheet software applications that incorporate industry data.		
13.0	Demonstrate knowledge and skill in using technology to enhance communication skills utilizing electronic mail. – The student will be able to:		
13.01	Describe and perform e-mail capabilities and functions.		
13.02	Create and send messages, manage signature and automated messages.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
13.03	Save, send, schedule, and manage junk mail, e-mail and spam.		
13.04	Configure message sensitivity, security and delivery options.		
13.05	Use the Internet to perform e-mail activities, including: attaching external files, saving e-mail attachments, viewing mailbox details, establishing appointments, creating contact groups, and sending a meeting to a contact group to communicate in the workplace.		
13.06	Manage tasks and organize information. (e.g., forward e-mail)		
14.0	Demonstrate proficiency using computer networks, internet, and online databases to facilitate collaborative communication. – The student will be able to:		
14.01	Demonstrate how to connect to the Internet and use appropriate Internet protocol.		
14.02	Identify and describe web terminology, addresses and how browsers work.		
14.03	Demonstrate proficiency using basic features of GUI browsers, including: bookmarks, basic configurations, e-mail configurations, and address books.		
14.04	Describe appropriate browser security configurations.		
14.05	Describe information technology terminology, including Internet, intranet, ethics, copyright laws, and regulatory control.		
14.06	Demonstrate proficiency using search engines and search tools.		
14.07	Use various web tools, including: downloading files, transfer of files, telnet, PDF, plug-ins, and data compression.		
14.08	Identify and use Boolean search strategies.		
14.09	Understand and apply level one Universal Resource Locator (URL) and associated protocols (e.g., .com, .org, .edu, .gov, .net, etc.)		
14.10	Explain the need for web-based applications. (dangers of piracy, copyright, plagiarism)		
14.11	Describe appropriate use of social networking sites and applications, blogs and collaborative tools for file sharing and using listservers.		
14.12	Describe web applications, including sharing photos and video clips, messaging, chatting and collaborating.		
15.0	Develop an awareness of emerging technologies. – The student will be able to:		
15.01	Compare and contrast emerging technologies and describe how they impact business in the global marketplace. (e.g., wireless, wireless web, cell phones, portables/handhelds, smart appliances, home networks, peer-to-peer)		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
16.0	Investigate individual assessment and job/career exploration and individual career planning that reflect the transition from school to work, lifelong learning, and personal and professional goals. – The student will be able to:		
16.01	Analyze personal skills and aptitudes in comparison with various business related job and career options.		
16.02	Use career resources to develop an information base that reflects local and global business related occupations and opportunities for continuing education and workplace experience.		
16.03	Demonstrate job-seeking skills required for entry-level employment, including resume, cover letter, thank you letter, online/hard copy application, mock interview, and follow-up call.		
16.04	Design, initiate, refine and implement a plan to facilitate growth and skill development related to anticipated job requirements and career expectations.		
16.05	Demonstrate an awareness of specific job requirements and career paths (e.g., requirements, characteristics needed) in business environments.		
16.06	Demonstrate an awareness of the potential impact of local and global trends on career plans and life goals.		
16.07	Describe the importance of building community and mentor relationships in a variety of professional and workplace situations.		
16.08	Simulate work-based projects in an information technology environment.		
17.0	Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance. – The student will be able to:		
17.01	Demonstrate awareness of the following workplace essentials: Quality customer service; business ethics; confidentiality of information; copyright violations; accepted workplace rules, regulations, policies, procedures, processes, and workplace safety, and appropriate attire and grooming.		
17.02	Demonstrate ways of accepting constructive criticism on team projects within the workplace.		
17.03	Apply appropriate strategies to manage and resolve conflicts in work situations.		
17.04	Demonstrate human relations, personal and interpersonal skills appropriate for the workplace, including: responsibility, dependability, punctuality, integrity, positive attitude, initiative, respect for self and others, and professional dress.		

Florida Department of Education
Student Performance Standards

Course Title: **Global Logistics Operations**
Course Number: **9503130**
Course Credit: **1**

Course Description:
The Global Logistics Operations course is designed to build on the skills and knowledge students learned in Global Logistics and Supply Chain Technology and the Introduction to Information Technology Applications courses for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes an understanding of warehouse operations, storage and control operations, protection, and economics.

Florida Standards			Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Global Logistics and Supply Chain Technology.		
	18.01 Key Ideas and Details		
	18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	18.02 Craft and Structure		
	18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas		
	18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
	18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
	18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity		
	18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Global Logistics and Supply Chain Technology.		
19.01	Text Types and Purposes		
	19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.02	Production and Distribution of Writing		

Florida Standards			Correlation to CTE Program Standard #
	19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
	19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
	19.03	Research to Build and Present Knowledge	
	19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
	19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
	19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	19.04	Range of Writing	
	19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Global Logistics and Supply Chain Technology.		
	20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
20.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04 Model with mathematics. MAFS.K12.MP.4.1	
20.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
20.06 Attend to precision. MAFS.K12.MP.6.1	
20.07 Look for and make use of structure. MAFS.K12.MP.7.1	
20.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
21.0 Demonstrate an understanding of warehouse operations--The student will be able to:		
21.01 Identify and discuss the characteristics, purpose and importance of warehouse operations and supply chain management.		
21.02 Define material handling logistics as it applies to the warehousing function.		
21.03 Describe procedures for using computerized warehouse data.		
21.04 Define movement in a warehouse and explain the concept of movement and the vital role that efficient movement of materials plays in the total functionality of the warehouse.		
21.05 Define "logical" in terms of the term logistics.		
21.06 Define movement in a warehouse and identify the various locations within the warehouse where planned efficient movement of materials takes place.		
21.07 Explain channels of distribution.		
21.08 Discuss safety regulatory requirements and procedures.		
21.09 Explain the importance of storage in a warehouse.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
21.10	Define control as it applies to warehousing.		
21.11	Explain the relationship between physical structure and protection.		
21.12	Identify various types of equipment available to enhance the efficient movement of materials within a warehouse.		
21.13	Identify the various types of loading docks and cross docking.		
21.14	Define the term "peaks and valleys" as it applies to warehouse activity.		
21.15	Explain the importance of staging and JIT.		
21.16	Identify the primary types of hand-operated pieces of warehouse equipment.		
21.17	Identify the important characteristics of industrial trucks.		
21.18	Explain the concept of "balancing" as it applies to counterbalanced lift trucks.		
21.19	Define the term *narrow aisle* as it applies to fork trucks.		
21.20	Identify warehouse documents (e.g., pick tickets, special orders, inventory forms).		
21.21	Display and interpret inventory screens, receive, inspect, and stock inventory.		
21.22	Apply basic computer systems operations.		
22.0	Demonstrate an understanding of storage and control operations--The student will be able to:		
22.01	Explain the concepts involved in determining the best method for storage and the equipment needed to facilitate a cost effective and efficient warehouse.		
22.02	Identify the factors that are involved with the calculating and estimating of the storage area needed for retention of materials in a warehouse.		
22.03	Identify the possibilities and combinations of systems and equipment that can be used for storage areas in a warehouse.		
22.04	Define the following storage related terms: Size, Volume, Density, Pallet, and Case.		
22.05	Define the terms packaging, SKU, stacking frame, term "Logistics Execution Systems" (LES), signage and signposting, "real time" and barcoding.		
22.06	Explain how the volume of materials, space usage, and control affect the design of storage space in a warehouse design.		
22.07	Explain inventories and their importance.		
22.08	Identify and analyze various warehouse storage systems.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
22.09	Identify the two key issues in planning block stacking.		
22.10	Identify the basic configuration for pallet rack.		
22.11	Explain the concept of control in the broadest possible context and the importance of keeping track of materials and goods.		
22.12	Identify the various types of technologies developed over the years to keep track of goods within the warehouse.		
22.13	Identify various labeling and packaging schemes available for securing and tracking the movement of items through a warehouse.		
22.14	Define the components of an LES.		
22.15	Explain the importance of addresses in signage.		
22.16	Define information-filled labeling.		
22.17	Identify key magnetic devices used in automatic data capture.		
22.18	Define radio frequency identification (RFID).		
22.19	Explain the importance of automation in warehousing.		
22.20	Identify the value of emerging technologies related to warehouse operations.		
23.0	Demonstrate an understanding of protection skills--The student will be able to:		
23.01	Identify the role that protection plays in the total concept of "warehousing".		
23.02	Identify the various forms of unit load formation equipment that is used for protecting materials.		
23.03	Identify the types of load containment materials which include the machinery that dispenses them.		
23.04	Situations where they are most advantageously used.		
23.05	Explain the following: the need and means for protecting warehouse personnel and materials as they go about their duties.		
23.06	Identify the advantages and disadvantages of open-air or soft-wall warehousing for protection of warehoused items.		
23.07	Compliance issues.		
24.0	Demonstrate economics--The student will be able to:		
24.01	Demonstrate understanding of goals, resources and structure of an organization.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
24.02 Understand the concepts and contributions of entrepreneurship.		
24.03 Compare and contrast the advantages and disadvantages of the various forms of business ownership.		
24.04 Understand economic principles affecting business cycles and the workforce.		
24.05 Analyze possible solutions to specific business problems.		
24.06 Apply economic decisions related to personal financial affairs, the successful operation of organizations and within a global economy.		
24.07 Understand the role of a consumer, producer, saver and investor in the market system.		
24.08 Understand the concepts and laws pertaining to customs and free trade.		

Florida Department of Education
Student Performance Standards

Course Title: **Global Logistics Management**
Course Number: **9503140**
Course Credit: **1**

Course Description:
The Global Logistics Management course is designed to build on the skills and knowledge students learned in Global Logistics and Supply Chain Technology, Introduction to Information Technology Applications, and Global Logistics Operations courses for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes knowledge, skills, and understanding of college and career readiness, employability skills, career acquisition and retention, life skills, and technological literacy.

Florida Standards			Correlation to CTE Program Standard #
18.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Global Logistics and Supply Chain Technology.		
	18.01 Key Ideas and Details		
	18.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. LAFS.1112.RST.1.1	
	18.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.1112.RST.1.2	
	18.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.1112.RST.1.3	
	18.02 Craft and Structure		
	18.02.1	Determine the meaning of symbols key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. LAFS.1112.RST.2.4	
	18.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	18.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. LAFS.1112.RST.2.6	
18.03	Integration of Knowledge and Ideas		
	18.03.1	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. quantitative data, video, multimedia) in order to address a question or solve a problem. LAFS.1112.RST.3.7	
	18.03.2	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. LAFS.1112.RST.3.8	
	18.03.3	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. LAFS.1112.RST.3.9	
18.04	Range of Reading and Level of Text Complexity		
	18.04.1	By the end of grade 11, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	18.04.2	By the end of grade 12, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 11–CCR text complexity band independently and proficiently. LAFS.1112.RST.4.10	
19.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Global Logistics and Supply Chain Technology.		
19.01	Text Types and Purposes		
	19.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	19.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
19.02	Production and Distribution of Writing		

Florida Standards			Correlation to CTE Program Standard #
	19.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	19.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.1112.WHST.2.5	
	19.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. LAFS.1112.WHST.2.6	
	19.03	Research to Build and Present Knowledge	
	19.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.1112.WHST.3.7	
	19.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. LAFS.1112.WHST.3.8	
	19.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	19.04	Range of Writing	
	19.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.1112.WHST.4.10	
20.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Global Logistics and Supply Chain Technology.		
	20.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	20.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
20.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
20.04 Model with mathematics. MAFS.K12.MP.4.1	
20.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
20.06 Attend to precision. MAFS.K12.MP.6.1	
20.07 Look for and make use of structure. MAFS.K12.MP.7.1	
20.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

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
25.0 Demonstrate an understanding of career readiness--The student will be able to:		
25.01 Explain the importance of life-long learning.		
25.02 Evaluate/research occupational interests.		
25.03 Demonstrate attitudes/ethics needed for career success.		
25.04 Assess personal strengths, talents, values and interests to appropriate jobs and careers to maximize career potential.		
25.05 Use a variety of research tools (e.g., computer-assisted programs, newspapers, books, industry tours, job shadows, career fairs and the Internet) in the career exploration process.		
25.06 Evaluate postsecondary training opportunities related to career interests, including certification, licensing, apprenticeships, college and military options.		
25.07 Relate and identify career interests and transferable skills necessary for opportunities in the global workforce.		
25.08 Develop an individual career plan and portfolio.		
25.09 Analyze needs of business and industry on labor and economic trends.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
25.10	Describe the changing roles including non-traditional occupations in the workplace.		
26.0	Demonstrate employability skills--The student will be able to:		
26.01	Identify and utilize resources used in a job search (e.g., newspaper, Internet, networking).		
26.02	Discuss importance of drug tests and criminal background checks in identifying possible employment options.		
26.03	Identify steps in the job application process including arranging for references and proper documentation.		
26.04	Identify procedures and complete documents required when applying for a job (e.g., application, W-4, I-9).		
26.05	Prepare a resume (electronic and traditional), cover letter, letter of application, follow-up letter, acceptance/rejection letter, and letter of resignation.		
26.06	Demonstrate appropriate dress and grooming for employment.		
26.07	Demonstrate effective interviewing skills (e.g., behavioral).		
26.08	Describe methods for handling illegal interview and application questions.		
26.09	Discuss state and federal labor laws regulating the workplace (e.g., Child Labor Law, sexual harassment, EEOC, ADA, FMLA).		
26.10	Identify positive work attitudes and behaviors such as honesty, compassion, respect, responsibility, fairness, trustworthiness, and caring.		
26.11	Describe importance of producing quality work and meeting performance standards.		
26.12	Identify personal and business ethics (e.g., preventing theft, pilfering, and unauthorized discounting).		
26.13	Demonstrate orderly and systematic behavior by creating and maintaining a personal planner.		
26.14	Identify qualities typically required for promotion (e.g., productivity, dependability, responsibility).		
26.15	Identify how to prepare for job separation and re-employment.		
26.16	Create and maintain a career portfolio (e.g., resume, letters of recommendation, awards, evidence of participation in school/community/volunteer activities, employer evaluations).		
27.0	Demonstrate competencies in a specific career--The student will able to:		
27.01	Demonstrate job performance skills as outlined in the training plan		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
27.02	Exhibit effective workplace safety practices including use of protective devices		
27.03	Display an acceptable level of productivity and quality control		
27.04	Demonstrate effective written and oral communication and listening skills when interacting with customers, co-workers, and managers		
27.05	Demonstrate decision making and problem solving processes and techniques used in the workplace.		
27.06	Demonstrate acceptable work habits and conduct in the workplace as defined by company policy		
27.07	Demonstrate an understanding of the company's vision and mission statements.		
27.08	Demonstrate an understanding of the company's goals and objectives		
27.09	Demonstrate familiarity with the company's products and services		
27.10	Demonstrate the ability to identify authority, rights, and responsibilities of both employers and employees		
28.0	Demonstrate career acquisition--The student will be able to:		
28.01	Participate in work-based learning opportunities such as: mentoring, cooperative work, job shadows, apprenticeships and internships.		
28.02	Demonstrate effective oral and written communication skills necessary for employment.		
28.03	Demonstrate job search skills using a variety of resources.		
28.04	Apply the decision-making process to the various stages of the work life cycle.		
28.05	Identify and demonstrate employability skills including job search, selection, the interviewing process, proper dress and presentation.		
28.06	Compare and contrast compensation packages that include varying levels of wages and benefits.		
29.0	Demonstrate career retention--The student will be able to:		
29.01	Demonstrate positive personal qualities and self-management skills (i.e. time management, organization, punctuality and attendance).		
29.02	Describe how productivity, work ethic and quality affect job stability.		
29.03	Demonstrate communication team-building and leadership skills.		
29.04	Demonstrate personal health and workplace safety procedures.		
29.05	Identify biases, harassment and discriminatory behaviors impacting job success and advancement.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
29.06	Acknowledge and respond to constructive criticism and employment evaluation.		
29.07	Understand the importance of following company policy and procedures and the legal ramifications of labor laws impacting employment.		
29.08	Understand the role of compromise in conflict resolution.		
30.0	Demonstrate integrated learning and life skills--The student will be able to:		
30.01	Demonstrate the integration and application of academic and occupational skills in school, work and personal lives.		
30.02	Use communication, mathematical and technical skills to compare compute, and analyze complex information.		
30.03	Discuss how personal choices, experiences, technology, education/training and other factors correlate with earning a living.		
30.04	Discuss how income from employment is affected by factors such as supply and demand, geographic location, level of education, type of industry, union membership, productivity skill level and work ethic.		
30.05	Compare and contract strategies for personal finance and risk management.		
30.06	Demonstrate the ability to set, monitor and achieve clearly defined goals.		
31.0	Demonstrate technology and information--The students will be able to:		
31.01	Apply knowledge of technology to identify and solve problems.		
31.02	Identify and evaluate how information technology developments have changed the way people work.		
31.03	Select, apply and troubleshoot software and hardware as they apply to a variety of work applications.		
31.04	Describe how new developments in varied fields or technology affect the job market and the level of worker‘s responsibilities.		
31.05	Analyze the ethical issues surrounding access, privacy and confidentiality of information in emerging technologies.		
31.06	Explore current and future positions and career paths in field of technology.		
31.07	Identify job tasks that presently are and will be in the future performed in the specified occupation (training plan).		
31.08	Create a training plan indicating competencies mastered.		
31.09	Maintain a record of employment hours and wages for auditing and budgetary purposes (e.g., time cards, budget sheets).		
31.10	Maintain an up-to-date, signed training agreement.		

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

Students who successfully complete Digital Information Technology (8207310) may be used as an equivalent substitute for **Introduction to Information Technology Applications (Course Number - 9503120)**.

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

SkillsUSA and Florida Technology Student Association (FL-TSA) are the intercurricular career and technical student organizations for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

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: **Automotive Maintenance and Light Repair**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9504100
CIP Number	0647060417
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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. It is **strongly recommended** that the following scope, sequence, and course recommendations be followed.

NOTE: For institutions using this framework, the National Automotive Technicians Education Foundation (NATEF) highly recommends, at a minimum, the Maintenance and Light Repair (MLR) for program Certification/Accreditation. Florida Statute (F.S.) 1004.925 – Automotive service technology education programs; certification. – requires all automotive service technology education programs shall be industry certified in accordance with rules adopted by the State Board of Education.

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
	9504110	Automotive Maintenance and Light Repair 1	1 credit		3	VO
	9504120	Automotive Maintenance and Light Repair 2	1 credit		3	VO
	9504130	Automotive Maintenance and Light Repair 3	1 credit		3	VO
A	9504140	Automotive Maintenance and Light Repair 4	1 credit	49-3023	3	VO
	9504150	Automotive Maintenance and Light Repair 5	1 credit		3	VO
B	9504160	Automotive Maintenance and Light Repair 6	1 credit	49-3023	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.

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
9504110	2/87 2%	4/80 5%	4/83 5%	7/69 10%	4/67 6%	1/70 1%	3/69 4%	7/82 9%	2/66 3%	11/74 15%	6/72 8%
9504120	#	#	#	#	1/67 1%	#	#	#	#	1/74 1%	1/72 1%
9504130	2/87 2%	2/80 3%	1/83 1%	4/69 6%	1/67 1%	2/70 3%	2/69 3%	3/82 4%	2/66 3%	4/74 5%	4/72 6%

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
9504140	#	#	#	2/69 3%	#	#	#	1/82 1%	#	2/74 2%	#
9504150	1/87 1%	2/80 3%	1/83 1%	2/69 3%	2/67 3%	1/70 1%	2/69 3%	3/82 4%	1/66 2%	5/74 7%	6/72 8%
9504160	1/87 1%	2/80 3%	1/83 1%	4/69 6%	1/67 1%	#	1/69 1%	3/82 4%	1/66 2%	6/74 8%	5/72 7%

** *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
9504110	4/67 6%	#	2/54 4%	17/46 37%	17/45 38%	#	#
9504120	3/67 4%	3/75 4%	#	6/46 13%	6/45 13%	#	#
9504130	1/67 1%	1/75 1%	1/54 2%	#	#	11/45 24%	11/45 24%
9504140	#	#	#	#	#	8/45 18%	8/45 18%
9504150	2/67 3%	1/75 1%	1/54 2%	#	#	10/45 22%	10/45 22%
9504160	2/67 3%	1/75 1%	#	#	#	10/45 22%	10/45 22%

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

National Standards

Programs identified as having Industry or National Standards to the corresponding standards and/or benchmarks for the Automotive Maintenance and Light Repair program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Automotive Maintenance and Light Repair.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Automotive Maintenance and Light Repair.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Automotive Maintenance and Light Repair.
04.0 Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry.
05.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry.
06.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
07.0 Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, lubrication and cooling systems.
08.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, and accessory systems.
09.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Maintenance and Light Repair.
10.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Maintenance and Light Repair.
11.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Maintenance and Light Repair.
12.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspension systems, wheel alignment, and wheels and tires.
13.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems.
14.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, heating, ventilation, and engine cooling, operating and related control systems.
15.0 Explain and apply proficiently the diagnosis, service and repair of engine computerized controls, fuel, air induction, exhaust, and emission control systems.
16.0 Explain and apply proficiently the diagnosis, service, repair and overhaul of in-vehicle and off-vehicle automatic transmissions/transaxles.
17.0 Explain and apply proficiently the diagnosis, service and repair of manual drivetrain, clutches, transmissions/transaxles, drive and half-shafts, universal and constant velocity joints, differential case assemblies, drive axles, four-wheel and all-wheel drive systems.
18.0 Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems.
19.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.
20.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspension and steering systems, wheel alignment diagnosis and adjustment, and wheels and tires.
21.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems.
22.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, heating, ventilation, engine cooling, operating and related control systems, refrigerant recovery, and recycling and handling.

23.0 Explain and apply proficiently the diagnosis, service and repair of engines, computerized controls, ignition, fuel, air induction, exhaust, and emission control systems.

24.0 Explain and apply proficiently the diagnosis, service, maintenance, repair and overhaul of in-vehicle and off-vehicle automatic transmissions/transaxles.

25.0 Explain and apply proficiently the diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, ring and pinion gears, differential case assembly, and drive axles.

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Maintenance and Light Repair 1**
Course Number: **9504110**
Course Credit: **1**

It is strongly recommended that the following scope, sequence, and course recommendations be followed.

Recommended Prerequisite: **None**
Recommended Grade Level: **9th/10th**
Recommended Credits: **1**

Course Description:
The Automotive Maintenance and Light Repair 1 course prepare students for entry into Automotive Maintenance and Light Repair 2. Students explore career opportunities and requirements of a professional service technician. Content emphasizes beginning transportation service skills and workplace success skills. Students study safety, tools, equipment, shop operations, basic engine fundamentals, and basic technician skills.

For every task in Automotive Maintenance and Light Repair 1, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

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 Automotive Maintenance and Light Repair.		
	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.	
	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 Automotive Maintenance and Light Repair.		

Florida Standards		Correlation to CTE Program Standard #
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 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	

Florida Standards		Correlation to CTE Program Standard #
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 Automotive Maintenance and Light Repair.	
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. 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
ER = Engine Repair
ASE = Required Supplemental Tasks

ER Task List:	
P-1 =	**12**
P-2 =	**0**
P-3 =	**1**
Total	**13**

CTE Standards and Benchmarks		Priority Number	FS-M/LA	NGSSS-Sci
04.0	Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry--The student will be able to:			
04.01	Identify and apply general shop safety rules and procedures, EPA and OSHA standards.	ASE	LAFS.910.RI.1.1, 2; 3.8	
04.02	Demonstrate knowledge of appropriate automotive industry certifications.		LAFS.910.W.2.6; 3.7, 8 LAFS.910.L.1.2C	
04.03	Research, identify, and interpret the Federal 'Workers Right To Know Law'.		LAFS.910.W.2.6 LAFS.910.L.1.2C	
04.04	Identify and use appropriate emergency first aid procedures.		LAFS.910.RI.1.1, 2; 3.8	
04.05	Utilize and demonstrate safe procedures for handling of tools and equipment.	ASE	LAFS.910.W.3.9 LAFS.910.L.1.2C	
04.06	Identify and use proper placement of floor jacks and jack stands.	ASE	LAFS.910.RI.1.1	SC.912.P.12.3
04.07	Identify and use proper procedures for safe lift operation.	ASE	LAFS.910.RI.1.1	SC.912.P.12.3
04.08	Utilize proper ventilation procedures for working within the lab/shop area.	ASE	LAFS.910.RI.1.1	SC.912.E.6.6
04.09	Identify and use proper procedures for safe pit usage.		LAFS.910.RI.1.1	
04.10	Identify marked safety areas.	ASE	LAFS.910.RI.1.1	
04.11	Identify the location and the types of fire extinguishers and other fire safety equipment.	ASE	LAFS.910.RI.1.1	SC.912.P.8.1
04.12	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.	ASE	LAFS.910.RI.1.1	

CTE Standards and Benchmarks		Priority Number	FS-M/LA	NGSSS-Sci
04.13	Identify the location and use of eye wash stations.	ASE		
04.14	Identify the location of the posted evacuation routes.	ASE		
04.15	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE		
04.16	Identify and wear appropriate clothing for lab/shop activities.	ASE		
04.17	Secure hair and jewelry for lab/shop activities.	ASE		
04.18	Use proper handling procedures for automotive fluids.		LAFS.910.RI.1.1, 2; 3.8	SC.912.P.8.1, 2; 12.12
04.19	Identify and describe typical automotive lubricants and lubricant properties.		LAFS.910.RI.1.1, LAFS.910.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.910.L.1.2C LAFS.910.SL.1.2; 2.4	SC.912.P.8.1, 2; 12.12
04.20	Identify and describe the proper procedure to apply and remove automotive fasteners, including thread inserts.		LAFS.910.RI.1.1, LAFS.910.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.910.L.1.2C LAFS.910.SL.1.2; 2.4	
04.21	Identify and describe typical automotive seals and gaskets.		LAFS.910.RI.1.1	
04.22	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE	LAFS.910.RI.1.1	
04.23	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.		LAFS.910.RI.1.1	
04.24	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)	ASE	LAFS.910.RI.1.1	
04.25	Locate and demonstrate knowledge of Safety Data Sheets (SDS).	ASE	LAFS.910.RI.2.4	
05.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry--The student will be able to:			
05.01	Identify tools and equipment and their appropriate usage in automotive applications.	ASE		
05.02	Identify and use standard and metric measurement skills and designation.	ASE	MAFS.912.N-Q.1.1, 1.3	

CTE Standards and Benchmarks		Priority Number	FS-M/LA	NGSSS-Sci
05.03	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE		
05.04	Demonstrate proper use of precision-measuring tools (i.e. micrometer, digital/dial-indicator, digital/dial-caliper) and torque methods.	ASE	MAFS.912.N-Q.1.1, 3	
06.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services --The student will be able to:			
06.01	Identify information needed and the service requested on a repair order.	ASE	LAFS.910.W.1.2A, B, C, D, E, F; 2.4 LAFS.910.L.1.2C	
06.02	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.		LAFS.910.RI.1.1	
06.03	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.	ASE	LAFS.910.RI.1.1	
06.04	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE	LAFS.910.W.1.2A, B, C, D, E, F; 2.4 LAFS.910.L.1.2C	
06.05	Review vehicle service history.	ASE	LAFS.910.RI.1.2, .3	
06.06	Use computer and operate keyboard.			
06.07	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE	LAFS.910.W.1.2A, B, C, D, E, F; 2.4 LAFS.910.L.1.2C	
06.08	Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.		LAFS.910.W.1.2A, B, C, D, E, F; 2.4 LAFS.910.L.1.2C	
06.09	Determine the presence of a Tire Pressure Monitoring System (TPMS).			
06.10	Determine the presence of wheel locks.			
06.11	Determine the presence of an air suspension system.			
06.12	Check operation and status of instrument panel warning lights and gauges.			
06.13	Locate and use the Vehicle Identification Number (VIN).		LAFS.910.RI.1.1	
06.14	Locate and use vehicle information placards, decals, tags, as required.		LAFS.910.RI.1.1	
06.15	Locate and use paper and electronic manuals.		LAFS.910.L.3.4A, C; 3.6	
06.16	Locate and use technical service bulletins (TSBs).		LAFS.910.L.3.4A, C; 3.6	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
06.17 Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.		LAFS.910.RI.1.1; 2.4	
06.18 Use proper chemicals for cleaning and lubrication.			SC.912.P.8.1, 2, 8
06.19 Reset maintenance indicators.			
06.20 Verify status of instrument panel warning lights and gauges.			
06.21 Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).	ASE		
06.22 Inspect underhood area for leaks, damage, and unusual conditions.			
06.23 Determine fluid type requirements and identify fluid.		LAFS.910.RI.1.1; 2.4	SC.912.P.8.1, 2
06.24 Check engine oil level and condition; service as required.			
06.25 Check engine coolant level and condition; service as required.			
06.26 Check power steering fluid level and condition; service as required.			
06.27 Check brake fluid level and condition; service as required.			
06.28 Check hydraulic clutch fluid and condition; service as required.			
06.29 Check windshield washer fluid level and condition; service as required.			
06.30 Check automatic transmission fluid level and condition; service as required.			
06.31 Inspect undercar area for leaks, damage, and unusual conditions.			
06.32 Check differential/transfer case fluid level; note unusual conditions; service as required.		LAFS.910.W.1.2D, E LAFS.910.L.1.2C	
06.33 Check manual transmission fluid level; note unusual conditions; service as required.		LAFS.910.W.1.2D, E LAFS.910.L.1.2C	
06.34 Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear.			
06.35 Lubricate driveline, suspension and steering systems.			
06.36 Inspect cooling system pipes and hoses for wear, damage, and proper routing.			
06.37 Change engine oil and filter.			
06.38 Replace inline fuel filters as applicable.			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
06.39 Inspect and replace air filter.			
06.40 Inspect and replace cabin air filter.			
06.41 Inspect, replace and adjust drive belts; inspect tensioners and pulleys.			
06.42 Document observed damage, unusual conditions, and concerns.		LAFS.910.W.2.4 LAFS.910.L.1.2C; 3.6	
06.43 Visually inspect struts, springs, and related components.			
06.44 Visually inspect stabilizer bar, bushings, brackets, and links.			
06.45 Visually inspect springs, torsion bars, and related components.			
06.46 Visually inspect shock absorbers and related components.			
06.47 Visually inspect constant velocity (CV) axle shaft boots.			
06.48 Identify service considerations when equipped with a Tire Pressure Monitoring System (TPMS).			
06.49 Identify nitrogen-filled tires.		LAFS.910.RI.1.1	
06.50 Inspect tires; inspect spare and mounting system; check and adjust tire pressure.			
06.51 Rotate tires according to recommendations.			
06.52 Balance wheel and tire assembly.			
06.53 Dismount, inspect, and remount tire on wheel.			
06.54 Repair tire according to industry standards.			
06.55 Reinstall wheel; torque wheel fasteners to specification.		LAFS.910.RI.1.1 MAFS.912.N-Q.1.1, 3	
06.56 Check wheel bearings for play and other signs of wear.			
06.57 Perform a visual inspection of a brake drum system.			
06.58 Perform a visual inspection of a disc brake system.			
06.59 Check parking brake operation; check parking brake components for unusual conditions.			
06.60 Document damage, unusual conditions and concerns.		LAFS.910.W.2.4, LAFS.910.L.1.2C; 3.6	

CTE Standards and Benchmarks		Priority Number	FS-M/LA	NGSSS-Sci
06.61	Check wiper blades, inserts, and arms; replace wiper blades or inserts.			
06.62	Lubricate door latches and hinges.			
06.63	Inspect fuel cap and seal.			SC.912.E.6.6
06.64	Charge battery as needed.			SC.912.P.12.12
06.65	Inspect and clean battery hold-downs; repair or replace as needed.			
06.66	Inspect and clean battery and battery cable clamp connections.			
06.67	Perform battery, starting, and charging system tests using appropriate tester.			
06.68	Start vehicle using an auxiliary power supply.			
06.69	Maintain or restore electronic memory functions if required.			
06.70	Test and replace fuses; confirm proper circuit operation.			SC.912.P.10.15
06.71	Inspect and replace exterior and courtesy lamps.			
07.0	Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, lubrication and cooling systems--The student will be able to:			
General				
07.01	Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.910.RI.1.3; 2.4; 3.7	
07.02	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.910.W.2.6 LAFS.910.L.1.2C	
07.03	Verify operation of the instrument panel engine warning indicator.	P-1		
07.04	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	P-1		
07.05	Install engine covers using gaskets, seals and sealers as required.	P-1		
07.06	Remove and replace timing belt; verify correct camshaft timing.	P-1		
07.07	Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.	P-1		

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
07.08 Identify hybrid vehicle internal combustion engine service precautions.	P-3		
Cylinder Head and Valve Train			
07.09 Adjust valves (mechanical or hydraulic lifters).	P-1		
Lubrication and Cooling Systems			
07.10 Perform cooling system pressure and dye test to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and gallery plugs; determine necessary action.	P-1		SC.912.P.8.8; 10.5
07.11 Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1		
07.12 Remove, inspect, and replace thermostat and gasket/seal.	P-1		
07.13 Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	P-1		SC.912.P.8.8
07.14 Perform engine oil and filter change.	P-1		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Maintenance and Light Repair 2**
Course Number: **9504120**
Course Credit: **1**

It is <u>strongly recommended</u> that the following scope, sequence, and course recommendations be followed.

Recommended Prerequisite: **Automotive Maintenance and Light Repair 1**
Recommended Grade Level: **10th**
Recommended Credits: **1**

Course Description:
The Automotive Maintenance and Light Repair 2 course prepare students for entry into Automotive Maintenance and Light Repair 3. Students study automotive general electrical systems, starting and charging systems, batteries, lighting, and electrical accessories. Content emphasizes beginning transportation service skills and workplace success skills.

For every task in Automotive Maintenance and Light Repair 2, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

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 Automotive Maintenance and Light Repair.		
	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.	
	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 Automotive Maintenance and Light Repair.		

Florida Standards		Correlation to CTE Program Standard #
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 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	

Florida Standards		Correlation to CTE Program Standard #
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 Automotive Maintenance and Light Repair.	
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. 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
EE = Electrical/Electronic Systems

EE Task List:	
P-1 =	**26**
P-2 =	**8**
P-3 =	**3**
Total	**37**

CTE Standards and Benchmarks		**Priority Number**	**FS-M/LA**	**NGSSS-Sci**
08.0	Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, and accessory systems--The student will be able to:			
General				
08.01	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.910.RI.1.3; 2.4; 3.7	
08.02	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.910.W.2.6 LAFS.910.L.1.2C	
08.03	Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).	P-1	MAFS.912.A-CED.1.1, 2, 4	SC.912.P.10.15
08.04	Use wiring diagrams to trace electrical/electronic circuits.	P-1		
08.05	Demonstrate the proper use of a digital multimeter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.	P-1	MAFS.912.A-CED.1.1, 2, 4	SC.912.P.10.15
08.06	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.	P-2		SC.912.P.10.15
08.07	Check operation of electrical circuits with a test light.	P-2		
08.08	Check operation of electrical circuits using fused jumper wires.	P-2		
08.09	Measure key-off battery drain (parasitic draw).	P-1		SC.912.P.10.15
08.10	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1		SC.912.P.10.15
08.11	Perform solder repair of electrical wiring.	P-1		
08.12	Replace electrical connectors and terminal ends.	P-1		

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
Battery Service			
08.13 Perform battery state-of-charge test; determine necessary action.	P-1		
08.14 Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.	P-1		
08.15 Maintain or restore electronic memory functions.	P-1		
08.16 Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.	P-1		
08.17 Perform slow/fast battery charge according to manufacturer's recommendations.	P-1		
08.18 Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.	P-1		
08.19 Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	P-3		
08.20 Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.	P-1		
08.21 Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3		
Starting System			
08.22 Perform starter current draw tests; determine necessary action.	P-1	MAFS.912.A-CED.1.1, 2, 4	SC.912.P.10.15
08.23 Perform starter circuit voltage drop tests; determine necessary action.	P-1	MAFS.912.A-CED.1.1, 2, 4	SC.912.P.10.15
08.24 Inspect and test starter relays and solenoids; determine necessary action.	P-2		SC.912.P.10.16, 17
08.25 Remove and install starter in a vehicle.	P-1		
08.26 Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2		SC.912.P.10.15
Charging System			
08.27 Perform charging system output test; determine necessary action.	P-1	MAFS.912.A-CED.1.1, 2, 4	SC.912.P.10.15
08.28 Inspect, adjust, or replace generator (alternator) drive belts, check pulleys, and tensioners for wear; check pulley and belt alignment.	P-1		
08.29 Remove, inspect, and re-install generator (alternator).	P-2		
08.30 Perform charging circuit voltage drop test; determine necessary action.	P-1	MAFS.912.A-CED.1.1, 2, 4	SC.912.P.10.15

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
Lighting System			
08.31 Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving light); replace as needed.	P-1		
08.32 Aim headlights.	P-2		
08.33 Identify system voltage and safety precautions associated with high intensity discharge headlights.	P-2		
Accessories			
08.34 Disable and enable airbag system for vehicle service; verify indicator lamp operation.	P-1		
08.35 Remove and reinstall door panel.	P-1		
08.36 Describe the operation of keyless entry/remote-start systems.	P-3	LAFS.910.W.1.2A ,B, C, D, E, F LAFS.910.L.1.2C	
08.37 Verify operation of instrument panel gauges and warning /indicator lights; reset maintenance indicators.	P-1		
08.38 Verify windshield wiper and washer operation, replace wiper blades.	P-1		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Maintenance and Light Repair 3**
Course Number: **9504130**
Course Credit: **1**

It is <u>strongly recommended</u> that the following scope, sequence, and course recommendations be followed.

Recommended Prerequisite: **Automotive Maintenance and Light Repair 1 & 2**
Recommended Grade Level: **11th**
Recommended Credits: **1**

Course Description:
The Automotive Maintenance and Light Repair 3 course prepare students for entry into Automotive Maintenance and Light Repair 4. Students study and service suspension and steering systems, and brake systems. Content emphasizes beginning transportation service skills and workplace success skills.

For every task in Automotive Maintenance and Light Repair 3, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

Florida Standards			Correlation to CTE Program Standard #
09.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Maintenance and Light Repair.		
	09.01 Key Ideas and Details		
	09.01.1	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	
	09.01.2	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	
	09.01.3	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	

Florida Standards			Correlation to CTE Program Standard #
09.02	Craft and Structure		
	09.02.1	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	
	09.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	09.02.3	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	
09.03	Integration of Knowledge and Ideas		
	09.03.1	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	
	09.03.2	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	
	09.03.3	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	
09.04	Range of Reading and Level of Text Complexity		
	09.04.1	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.	
	09.04.2	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	
10.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Maintenance and Light Repair.		

Florida Standards		Correlation to CTE Program Standard #
10.01	Text Types and Purposes	
10.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
10.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
10.02	Production and Distribution of Writing	
10.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
10.02.2	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	
10.02.3	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	
10.03	Research to Build and Present Knowledge	
10.03.1	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	
10.03.2	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	
10.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
10.04	Range of Writing	

Florida Standards		Correlation to CTE Program Standard #
10.04.1	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Maintenance and Light Repair.	
11.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
11.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
11.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
11.04	Model with mathematics. MAFS.K12.MP.4.1	
11.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
11.06	Attend to precision. MAFS.K12.MP.6.1	
11.07	Look for and make use of structure. MAFS.K12.MP.7.1	
11.08	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
SS = Suspension and Steering
BR = Brakes

SS Task List:	
P-1 =	**26**
P-2 =	**6**
P-3 =	**2**
Total	**34**

BR Task List:	
P-1 =	**26**
P-2 =	**6**
P-3 =	**4**
Total	**36**

CTE Standards and Benchmarks	**Priority Number**	**FS-M/LA**	**NGSSS-Sci**
12.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires –The student will be able to:			
General			
12.01 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.1112.RI.1.3;2.4 ; 3.7	
12.02 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.1112.RI.2.4	
12.03 Disable and enable supplemental restraint system (SRS).	P-1		
Suspension and Steering Service			
12.04 Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.	P-1		
12.05 Determine proper power steering fluid type; inspect fluid level and condition.	P-1		SC.912.P.8.2
12.06 Flush, fill, and bleed power steering system.	P-2		
12.07 Inspect for power steering fluid leakage; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
12.08 Remove, inspect, replace, and adjust power steering pump drive belt.	P-1		
12.09 Inspect and replace power steering hoses and fittings.	P-2		
12.10 Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	P-1		
12.11 Inspect tie rod ends (sockets), tie rod sleeves, and clamps.	P-1		

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
12.12 Inspect upper and lower control arms, bushings, and shafts.	P-1		
12.13 Inspect and replace rebound and jounce bumpers.	P-1		
12.14 Inspect track bar, strut rods/radius arms and related mounts and bushings.	P-1		
12.15 Inspect upper and/or lower ball joints (with or without wear indicators).	P-1		
12.16 Inspect suspension system coil springs and spring insulators (silencers).	P-1		
12.17 Inspect suspension system torsion bars and mounts.	P-1		
12.18 Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links.	P-1		
12.19 Inspect strut cartridge or assembly.	P-1		
12.20 Inspect front strut coil spring bearing and mount.	P-1		
12.21 Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms.	P-1		
12.22 Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts and mounts.	P-1		
12.23 Inspect, remove, and replace shock absorbers; inspect mounts and bushings.	P-1		
12.24 Inspect electric power-assisted steering.	P-3		
12.25 Identify hybrid vehicle power steering system electrical circuits and safety precautions.	P-2	LAFS.1112.RI.1.1	
12.26 Describe the function of the power steering pressure switch.	P-3	LAFS.1112.W.1.2A, B, C, D, E, F; 2.6 LAFS.1112.L.1.2B	
12.27 Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.			
Wheel Alignment			
12.28 Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	P-1	MAFS.912.G-C0.1.1	
12.29 Identify alignment related symptoms such as wander, drift and pull.			
12.30 Measure front and rear wheel camber; adjust as needed.		MAFS.912.G-C0.1.1	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
12.31 Measure caster; adjust as needed.		MAFS.912.G-C0.1.1	
12.32 Measure front wheel toe; adjust as needed.		MAFS.912.G-C0.1.1	
12.33 Center the steering wheel using mechanical methods.			
12.34 Measure rear wheel toe, adjust as needed.		MAFS.912.G-C0.1.1	
12.35 Measure thrust angle.		MAFS.912.G-C0.1.1	
12.36 Calibrate steering angle sensor.			
Wheels and Tires			
12.37 Inspect tire condition; identify tire wear patterns; check of correct tire size and application (load and speed rating) and adjust air pressure; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
12.38 Rotate tires according to manufacturer's recommendations.	P-1		
12.39 Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).	P-1		
12.40 Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	P-2		
12.41 Inspect tire and wheel assembly for air loss; perform necessary action.	P-1		
12.42 Repair tire using internal patch.	P-1		
12.43 Identify and test pressure monitor system (indirect and direct) for operation; verify operation of instrument panel lambs.	P-2	LAFS.1112.RI.1.1	
12.44 Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.	P-2		
13.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems--The student will be able to:			
General			
13.01 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.1112.RI.1.3; 2.4; 3.7	
13.02 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.1112.RI.2.4, 6	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
13.03 Describe procedures for performing a road test to check brake system operation; including an antilock brake system (ABS).	P-1	LAFS.1112.SL.2.4, 6	
13.04 Install wheel and torque lug nuts.	P-1	MAFS.912.N-Q.1.1	
Hydraulic System			
13.05 Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.N-Q.1.1	
13.06 Check master cylinder for internal/external leaks and proper operation.	P-1		
13.07 Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; check for loose fittings and supports; determine necessary action.	P-1		
13.08 Select, handle, store, and fill brake fluids to proper level.	P-1		SC.912.P.8.2
13.09 Identify components of brake warning light system.	P-3	LAFS.1112.RI.1.1	
13.10 Bleed and/or flush brake system.	P-1		
13.11 Test brake fluid for contamination.	P-1		SC.912.P.8.2
13.12 Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).			
Drum Brakes			
13.13 Remove, clean, inspect, and measure brake drum diameter; determine necessary action.	P-1	MAFS.912.N-Q.1.1	
13.14 Refinish brake drum and measure final drum diameter; compare with specifications.	P-1	LAFS.1112.RI.1.2 MAFS.912.N-Q.1.1	
13.15 Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	P-1		
13.16 Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.	P-2		
13.17 Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments.	P-2		
Disc Brakes			
13.18 Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
13.19 Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
13.20 Remove, inspect, and replace pads and retaining hardware; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
13.21 Lubricate and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	P-1		
13.22 Clean and inspect rotor; measure rotor thickness, thickness variation, and lateral run out; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.N-Q.1.1	
13.23 Remove and reinstall rotor.	P-1		
13.24 Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.	P-1	MAFS.912.N-Q.1.1	
13.25 Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.	P-1	MAFS.912.N-Q.1.1	
13.26 Retract and re-adjust caliper piston on an integrated parking brake system.	P-3		
13.27 Check brake pad wear indicator; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
13.28 Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations.	P-1	LAFS.1112.W.2.4, 6	SC.912.P.10.1
Power-Assist Units			
13.29 Check brake pedal travel with, and without engine running to verify proper power booster operation.	P-2		
13.30 Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.	P-1		
Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.)			
13.31 Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.	P-1		
13.32 Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	P-2		
13.33 Check parking brake operation and parking brake indicator light system; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
13.34 Check operation of brake stop light system.	P-1		SC.912.P.10.15
13.35 Replace wheel bearing and race.	P-2		
13.36 Inspect and replace wheel studs.	P-1		

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
Electronic Brakes, and Traction and Stability Control Systems			
13.37 Identify traction control/vehicle stability control system components.	P-3		
13.38 Describe the operation of a regenerative braking system.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Maintenance and Light Repair 4**
Course Number: **9504140**
Course Credit: **1**

It is <u>strongly recommended</u> that the following scope, sequence, and course recommendations be followed.

Recommended Prerequisite: **Automotive Maintenance and Light Repair 1, 2, & 3**
Recommended Grade Level: **12th**
Recommended Credits: **1**

Course Description:
The Automotive Maintenance and Light Repair IV prepare students for entry into the automotive workforce or into post- secondary training. Student's study and service automotive HVAC systems, engine performance systems, automatic and manual transmission/transaxle systems, as well as practice workplace soft skills.

For every task in Automotive Maintenance and Light Repair 4, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

Florida Standards			Correlation to CTE Program Standard #
09.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Automotive Maintenance and Light Repair.		
	09.01 Key Ideas and Details		
	09.01.1	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	
	09.01.2	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	
	09.01.3	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	

Florida Standards			Correlation to CTE Program Standard #
09.02	Craft and Structure		
	09.02.1	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	
	09.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	09.02.3	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	
09.03	Integration of Knowledge and Ideas		
	09.03.1	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	
	09.03.2	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	
	09.03.3	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	
09.04	Range of Reading and Level of Text Complexity		
	09.04.1	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.	
	09.04.2	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	
10.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Automotive Maintenance and Light Repair.		

Florida Standards		Correlation to CTE Program Standard #
10.01	Text Types and Purposes	
10.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
10.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
10.02	Production and Distribution of Writing	
10.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
10.02.2	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	
10.02.3	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	
10.03	Research to Build and Present Knowledge	
10.03.1	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	
10.03.2	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	
10.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
10.04	Range of Writing	

Florida Standards		Correlation to CTE Program Standard #
10.04.1	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Automotive Maintenance and Light Repair.	
11.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
11.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
11.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
11.04	Model with mathematics. MAFS.K12.MP.4.1	
11.05	Use appropriate tools strategically. MAFS.K12.MP.5.1	
11.06	Attend to precision. MAFS.K12.MP.6.1	
11.07	Look for and make use of structure. MAFS.K12.MP.7.1	
11.08	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
HA = Heating and Air Conditioning
EP = Engine Performance
AT = Automatic Transmission/Transaxle
MD = Manual Drive Train and Axles

HA Task List:	
P-1 =	**5**
P-2 =	**2**
P-3 =	**0**
Total	**7**

EP Task List:	
P-1 =	**12**
P-2 =	**2**
P-3 =	**1**
Total	**15**

AT Task List:	
P-1 =	**4**
P-2 =	**4**
P-3 =	**2**
Total	**10**

MD Task List:	
P-1 =	**6**
P-2 =	**6**
P-3 =	**2**
Total	**14**

CTE Standards and Benchmarks	**Priority Number**	**FS-M/LA**	**NGSSS-Sci**
14.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, heating, ventilation, and engine cooling, operating and related control systems--The student will be able to:			
General			
14.01 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.1112.RI.1.3;2.4 3.7	
14.02 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.1112.RI.2.4	
Refrigeration Systems Components			
14.03 Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
14.04 Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.	P-2	LAFS.1112.RI.1.1;2.4 LAFS.1112.L.1.2B, LAFS.1112.W.2.4	
14.05 Inspect A/C condenser for airflow restrictions; perform necessary action.	P-1		
Heating, Ventilation, and Engine Cooling Systems			
14.06 Inspect engine cooling and heater system hoses; perform necessary action.	P-1		
Operating Systems and Related Controls			
14.07 Inspect A/C-heater ducts, doors, hoses, cabin filters and outlets; perform necessary action.	P-1		

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
14.08 Identify the source of A/C system odors.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
15.0 Explain and apply proficiently the diagnosis, service and repair of engine computerized controls, fuel, air induction, exhaust, and emission control systems --The student will be able to:			
General			
15.01 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.1112.RI.1.3;2.4 3.7	
15.02 Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
15.03 Perform cylinder power balance test; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
15.04 Perform cylinder cranking and running compression tests; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
15.05 Perform cylinder leakage test; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
15.06 Verify engine operating temperature; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.12.11
15.07 Remove and replace spark plugs; inspect secondary ignition components for wear and damage.	P-1		
Computerized Controls			
15.08 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1	LAFS.1112.RI.1.2 LAFS.1112.W.2.4	
15.09 Describe the importance of operating all OBDII monitors for repair verification.	P-1	LAFS.1112.RI.2.4	
Fuel, Air Induction, and Exhaust Systems			
15.10 Replace fuel filters.	P-1		
15.11 Inspect, service or replace air filters, filter housing and intake duct work.	P-1		
15.12 Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action.	P-1		
15.13 Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed.	P-1		
15.14 Check and refill diesel exhaust fluid (DEF).	P-3		SC.912.P.8.2

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
Emissions Control Systems			
15.15 Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
16.0 Explain and apply proficiently the diagnosis, service, repair and overhaul of in-vehicle and off-vehicle automatic transmissions/transaxles--The student will be able to:			
General			
16.01 Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.1112.RI.1.3;2.4 3.7	SC.912.P.8.2
16.02 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.1112.RI.2.4	
16.03 Check fluid level in a transmission or a transaxle equipped with a dipstick.	P-1		
16.04 Check fluid level in a transmission or a transaxle not equipped with a dipstick.	P-1		
16.05 Check transmission fluid condition; check for leaks.	P-2		SC.912.P.8.2
In-Vehicle Transmission/Transaxle			
16.06 Inspect, adjust, and replace manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.	P-2		
16.07 Inspect for leakage at external seals, gaskets, and bushings.	P-2		
16.08 Inspect, replace, and align powertrain mounts.	P-2		
16.09 Drain and replace fluids and filter(s).	P-1		
Off-Vehicle Transmission and Transaxle			
16.10 Describe the operational characteristics of a continuously variable transmission (CVT).	P-3	LAFS.1112.W.2.4 LAFS.1112.L.1.2B	
16.11 Describe the operational characteristics of a hybrid vehicle drive train.	P-3	LAFS.1112.W.2.4 LAFS.1112.L.1.2B	
17.0 Explain and apply proficiently the diagnosis, service and repair of manual drivetrain, clutches, transmissions/transaxles, drive and half-shafts, universal and constant velocity joints, differential case assemblies, drive axles, four-wheel and all-wheel drive systems - -The student will be able to:			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
General			
17.01 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1	LAFS.1112.RI.1.3;2.4 3.7	
17.02 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.1112.RI.2.4	
17.03 Drain and refill manual transmission/transaxle and final drive unit.	P-1		
17.04 Check fluid condition; check for leaks.	P-2		SC.912.P.8.2
Clutch			
17.05 Check and adjust clutch master cylinder fluid level.	P-1		
17.06 Check for system leaks.	P-1		
Transmission/Transaxle			
17.07 Describe the operational characteristics of an electronically controlled manual transmission/transaxle.	P-3	LAFS.1112.W.2.4 LAFS.1112.L.1.2B	
Drive Shaft, Half Shafts, Universal and Constant-Velocity (CV) Joints			
17.08 Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.	P-2		
17.09 Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.	P-2		
Differential Case Assembly/Drive Axles			
17.10 Clean and inspect differential housing; check for leaks; inspect housing vent.	P-2		
17.11 Check and adjust differential housing fluid level/condition.	P-1		SC.912.P.8.2
17.12 Drain and refill differential housing.	P-1		
17.13 Inspect and replace drive axle wheel studs.	P-2		
Four-Wheel Drive/All-Wheel Drive			
17.14 Inspect front-wheel bearings and locking hubs.	P-3		
17.15 Check for leaks at drive assembly seals; check vents; check lube level.	P-2		

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Maintenance and Light Repair 5**
Course Number: **9504150**
Course Credit: **1**

It is <u>strongly recommended</u> that the following scope, sequence, and course recommendations be followed.

Recommended Prerequisite: **Automotive Maintenance and Light Repair 1, 2 & 3**
***Students enrolled in Automotive Maintenance and Light Repair 5 should also be enrolled in or have successfully completed Automotive Maintenance and Light Repair 3. Automotive Maintenance and Light Repair 5 expands on tasks highlighted in Automotive Maintenance and Light Repair 1, 2, & 3.**

Recommended Grade Level: **11th/12th**
Recommended Credits: **1**

Course Description:
The Automotive Maintenance and Light Repair 5 prepare students for entry into the automotive workforce or into post- secondary training. Student's study and service automotive engine repair, electrical/electronic systems, suspension and steering systems, brakes as well as practice workplace soft skills.

For every task in Automotive Maintenance and Light Repair 5 the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
ER = Engine Repair
EE = Electrical/Electronics
SS = Suspension and Steering
BR = Brakes

ER Task List:	
P-1 =	8
P-2 =	6
P-3 =	2
Total	16

EE Task List:	
P-1 =	4
P-2 =	9
P-3 =	2
Total	15

SS Task List:	
P-1 =	7
P-2 =	14
P-3 =	3
Total	24

BR Task List:	
P-1 =	7
P-2 =	3
P-3 =	5
Total	15

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
18.0 Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems-- The student will be able to:			
General: Engine Diagnosis; Removal and Reinstallation (R & R)			
18.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1	LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.1B	
18.02 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.1112.RI.2.4, 6	
18.03 Identify and interpret engine concern; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.04 Locate and interpret vehicle and major component identification numbers.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.05 Diagnose engine noises and vibrations; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.06 Diagnose the cause of excessive oil consumption, coolant consumption, unusual engine exhaust color and odor; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.07 Perform engine vacuum tests; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.08 Perform cylinder power balance tests; determine necessary action.			
18.09 Perform cylinder cranking and running compression tests; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
18.10 Perform cylinder leakage tests; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.11 Remove and reinstall engine in an OBDII or newer vehicle; reconnect all attaching components and restore the vehicle to running condition.	P-3		
18.12 Inspect, remove and replace engine mounts.	P-2		
Cylinder Head and Valve Train Diagnosis and Repair			
18.13 Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.	P-1	LAFS.1112.RI.1.1, LAFS.1112.L.3.4A, B, C, D; 3.6	
18.14 Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.	P-1		
18.15 Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.16 Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing.	P-1		
18.17 Establish camshaft position sensor indexing.	P-1		
Engine Block Assembly Diagnosis and Repair			
18.18 Remove, inspect, or replace crankshaft vibration damper (harmonic balancer).	P-2		
18.19 Remove and replace piston pin.			
Lubrication and Cooling Systems Diagnosis and Repair			
18.20 Perform oil pressure tests; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.21 Inspect and replace engine cooling and heater system hoses.			
18.22 Inspect, remove and replace water pump.	P-2		
18.23 Remove and replace radiator.	P-2		
18.24 Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.	P-1		

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
18.25 Inspect auxiliary coolers; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
18.26 Inspect, test, and replace oil temperature and pressure switches and sensors.	P-2		SC.912.P.10.1, 4
18.27 Identify causes of engine overheating.	P-1	LAFS.1112.RI.1.1	
19.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems--The student will be able to:			
General: Electrical System Diagnosis			
19.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.		LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.1B	
19.02 Identify and interpret electrical/electronic system concern; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.03 Locate and interpret vehicle and major component identification numbers.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.04 Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 15
19.05 Repair wiring harness.	P-3		
19.06 Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.		LAFS.1112.RI.1.1 LAFS.1112.RL.2.4	
Battery Diagnosis and Service			
19.07 Perform battery conductance test; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
Starting System Diagnosis and Repair			
19.08 Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2		SC.912.P.10.13, 14, 15
Charging System Diagnosis and Repair			
19.09 Diagnose (troubleshoot) charging system for the cause of undercharge, no-charge, and overcharge conditions.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
Lighting Systems Diagnosis and Repair			
19.10 Diagnose (troubleshoot) the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
19.11 Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair			
19.12 Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.13 Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.14 Diagnose (troubleshoot) the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.A-CED.1.4	
Horn and Wiper/Washer Diagnosis and Repair			
19.15 Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.16 Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.17 Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
19.18 Diagnose (troubleshoot) windshield washer problems; perform necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
Accessories Diagnosis and Repair			
19.19 Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
19.20 Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.21 Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.22 Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.A-CED.1.4	SC.912.P.10.13, 14, 15
19.23 Diagnose (troubleshoot) supplemental restraint system (SRS) concerns; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
19.24 Check for module communication (including CAN/BUS systems) using a scan tool.	P-2		
20.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspension and steering systems, wheel alignment diagnosis and adjustment, and wheels and tires –The student will be able to:			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
General: Suspension and Steering Systems			
20.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.		LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.1B	
20.02 Locate and interpret vehicle and major component identification numbers.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
Suspension Systems Diagnosis and Repair			
20.03 Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.04 Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.05 Inspect, remove and install strut rods and bushings.	P-3	LAFS.1112.W.2.4, 6	
20.06 Inspect, remove and install steering knuckle assemblies.	P-3	LAFS.1112.W.2.4, 6	
Related Suspension and Steering Service			
20.07 Remove, inspect, and service or replace front and rear wheel bearings.	P-1	LAFS.1112.W.2.4, 6	
Wheel Alignment Diagnosis, Adjustment, and Repair			
20.08 Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concern; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.09 Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber and toe as required; center steering wheel.	P-1	MAFS.912.G-CO.1.1	
20.10 Check toe-out-on-turns (turning radius); determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.11 Check SAI (steering axis inclination) and included angle; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.12 Check rear wheel thrust angle; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.G-CO.1.1	
20.13 Check for front wheel setback; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.14 Check front and/or rear cradle (sub-frame) alignment; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
20.15 Reset steering angle sensor.	P-2		
Steering Systems Diagnosis and Repair			
20.16 Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).	P-1		
20.17 Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.18 Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.19 Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; perform necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.20 Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.21 Adjust non-rack and pinion worm bearing preload and sector lash.			
20.22 Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.	P-2		
20.23 Remove and reinstall power steering pump.	P-2		
20.24 Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	P-2		
Wheels and Tires Diagnosis and Repair			
20.25 Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.26 Measure wheel, tire, axle flange, and hub run out; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.27 Diagnose tire pull problems; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
20.28 Reinstall wheel; torque lug nuts.		MAFS.912.N-Q.1.1	
21.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems--The student will be able to:			
General: Brake Systems Diagnosis			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
21.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.		LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.2B	
21.02 Identify and interpret brake system concern; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.03 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
Hydraulic System Diagnosis and Repair			
21.04 Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).	P-1		
21.05 Remove, bench bleed, and reinstall master cylinder.	P-1		
21.06 Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.07 Replace brake lines, hoses, fittings, and supports.	P-2		
21.08 Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	P-2	MAFS.912.G-CO.1.1	
21.09 Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.		LAFS.1112.RI.1.3;2.4	
21.10 Inspect, test, and/or replace components of brake warning light system.	P-3	LAFS.1112.RI.1.3;2.4	
Drum Brake Diagnosis and Repair			
21.11 Diagnose poor drum brake stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.12 Install wheel, torque lug nuts, and make final checks and adjustments associated with drum brakes.		MAFS.912.N-Q.1.1	
Disc Brake Diagnosis and Repair			
21.13 Diagnose disk brake poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.14 Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.			
21.15 Install wheel, torque lug nuts, and make final checks and adjustments associated with disc brakes.		MAFS.912.N-Q.1.1	
Power-Assist Units Diagnosis and Repair			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
21.16 Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.17 Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.18 Measure and adjust master cylinder pushrod length.	P-3		
Miscellaneous (Wheel Bearings, Parking Brakes, Electrical) Diagnosis and Repair			
21.19 Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.20 Remove and reinstall sealed wheel bearing assembly.	P-2		
Electronic Brake, Traction and Stability Control Systems Diagnosis and Repair			
21.21 Identify and inspect electronic brake control system components; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
21.22 Remove and install electronic brake control system electrical/electronic and hydraulic components.			

Florida Department of Education
Student Performance Standards

Course Title: **Automotive Maintenance and Light Repair 6**
Course Number: **9504160**
Course Credit: **1**

It is <u>strongly recommended</u> that the following scope, sequence, and course recommendations be followed.

Recommended Prerequisite: **Automotive Maintenance and Light Repair 1, 2, 3, 4, & 5**
***Students enrolled in Automotive Maintenance and Light Repair 6 should also be enrolled in or have successfully completed Automotive Maintenance and Light Repair 4. Automotive Maintenance and Light Repair 6 expands on tasks highlighted in Automotive Maintenance and Light Repair 4.**

Recommended Grade Level: **11th/12th**
Recommended Credits: **1**

Course Description:
The Automotive Maintenance and Light Repair 6 prepare students for entry into the automotive workforce or into post- secondary training. Student's study and service automotive heating and air conditioning, engine performance, automatic transmission/transaxles, manual drive train and axles, as well as practice workplace soft skills.

For every task in Automotive Maintenance and Light Repair 6 the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science
HA = Heating and Air Conditioning
EP = Engine Performance
AT = Automatic Transmission/Transaxle
MD = Manual Drivetrain and Axles

HA Task List:	
P-1	**12**
P-2	**13**
P-3	**4**
Total	**29**

EP Task List:	
P-1	**7**
P-2	**10**
P-3	**6**
Total	**23**

AT Task List:	
P-1	**5**
P-2	**2**
P-3	**2**
Total	**9**

MD Task List:	
P-1	**8**
P-2	**7**
P-3	**2**
Total	**17**

CTE Standards and Benchmarks	**Priority Number**	**FS-M/LA**	**NGSSS-Sci**
22.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, heating, ventilation, engine cooling, operating and related control systems, refrigerant recovery, and recycling and handling--The student will be able to:			
General: A/C System Diagnosis and Repair			
22.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.		LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.1B	
22.02 Identify and interpret heating and air conditioning problems; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.03 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.		LAFS.1112.RI.2.4	
22.04 Locate and interpret vehicle and major component identification numbers.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.05 Performance test A/C system; identify problems.	P-1		
22.06 Identify abnormal operating noises in the A/C system; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.07 Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.	P-1	LAFS.1112.W.2.4, 6; 4.10 LAFS.1112.L.1.2B, LAFS.1112.RI.3.7	
22.08 Leak test A/C system; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
22.09 Inspect the condition of refrigerant oil removed from A/C system; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.10 Determine recommended oil and oil capacity for system application.	P-1	LAFS.1112.RI.1.1;2.4 3.7	SC.912.P.8.1, 2
22.11 Using a scan tool, observe and record related HVAC data and trouble codes.	P-3	LAFS.1112.W.2.4 LAFS.1112.L.1.2B	
Refrigeration System Component Diagnosis and Repair			
22.12 Inspect, test, service or replace A/C compressor clutch components and/or assembly; check compressor clutch air gap; adjust as needed.	P-2		
22.13 Remove, inspect, and reinstall A/C compressor and mountings; determine recommended oil quantity.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.14 Determine the need for an additional A/C system filter; perform necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.15 Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.16 Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine required oil quantity.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
22.17 Remove, inspect, and install expansion valve or orifice (expansion) tube.	P-1		
22.18 Inspect evaporator housing water drain; perform necessary action.	P-1		
22.19 Determine procedure to remove and reinstall evaporator; determine required oil quantity.	P-2	LAFS.1112.RI.3.7 LAFS.1112.L.3.4C	
Heating, Ventilation, and Engine Cooling Systems Diagnosis and Repair			
22.20 Perform cooling system pressure tests; check coolant condition, inspect and test radiator, cap (pressure/vacuum), coolant recovery tank, and hoses; perform necessary action.			
22.21 Determine procedure to remove, inspect, and reinstall heater core.	P-2		
22.22 Inspect, test, and replace thermostat and gasket/seal.			
22.23 Determine coolant condition and coolant type for vehicle application; drain and recover coolant.			
22.24 Flush system; refill system with recommended coolant; bleed system.			SC.912.P.8.2
22.25 Inspect and test cooling fan, fan clutch, fan shroud, and air dams; perform necessary action.			
22.26 Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.A-CED.1.4	SC.912.P.10.13, 14, 15

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
22.27 Inspect and test heater control valve(s); perform necessary action.	P-2		
Operating Systems and Related Controls Diagnosis and Repair			
22.28 Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; perform necessary action.	P-1	MAFS.912.A-CED.1.4	SC.912.P.10.13, 14, 15
22.29 Diagnose A/C compressor clutch control systems; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.A-CED.1.4	SC.912.P.10.13, 14, 15
22.30 Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.A-CED.1.4	SC.912.P.10.13, 14, 15
22.31 Inspect and test A/C-heater control panel assembly; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.A-CED.1.4	SC.912.P.10.13, 14, 15
22.32 Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action.	P-3		SC.912.P.10.13, 14, 15
22.33 Identify the source of A/C system odors.	P-2		
22.34 Check operation of automatic or semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
Refrigerant Recovery, Recycling, and Handling			
22.35 Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards.	P-1		
22.36 Identify and recover A/C system refrigerant.	P-1		
22.37 Recycle, label, and store refrigerant.	P-1		
22.38 Evacuate and charge A/C system; add refrigerant oil as required.	P-1		
23.0 Explain and apply proficiently the diagnosis, service and repair of engines, computerized controls, ignition, fuel, air induction, exhaust, and emission control systems --The student will be able to:			
General: Engine Diagnosis			
23.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.		LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.1B	
23.02 Identify and interpret engine performance concern; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
23.03 Locate and interpret vehicle and major component identification numbers.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2	
23.04 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
23.05 Diagnose abnormal engine noise or vibration concerns; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
23.06 Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
23.07 Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
23.08 Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
23.09 Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.		LAFS.1112.RI.2.4	SC.912.P.8.2, 8
23.10 Verify correct camshaft timing.	P-1		
Computerized Controls Diagnosis and Repair			
23.11 Check for module communication (including CAN/BUS systems) errors using a scan tool.			
23.12 Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1		
23.13 Perform active tests of actuators using a scan tool; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
Ignition System Diagnosis and Repair			
23.14 Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
23.15 Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.		LAFS.1112.RI.2.4	SC.912.P.10.13, 14, 15
23.16 Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1	LAFS.1112.RI.2.4	SC.912.P.10.13, 14, 15
23.17 Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3	LAFS.1112.RI.2.4	
Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
23.18 Check fuel for contaminants; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.8.2
23.19 Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	P-1	LAFS.1112.RI.2.4	
23.20 Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2		
23.21 Inspect and test fuel injectors.	P-2	LAFS.1112.RI.2.4	SC.912.P.10.13, 14, 15
23.22 Verify idle control operation.	P-1		
23.23 Perform exhaust system back-pressure test; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
Emissions Control Systems Diagnosis and Repair			
23.24 Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
23.25 Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	P-3	LAFS.1112.RI.2.4	
23.26 Inspect, test, service and replace components of the EGR system, including tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	P-2	LAFS.1112.RI.2.4	
23.27 Inspect and test mechanical components of secondary air injection systems; perform necessary action.		LAFS.1112.RI.2.4	
23.28 Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	P-3	LAFS.1112.RI.2.4	SC.912.P.10.13, 14, 15
23.29 Inspect and test catalytic converter efficiency.	P-2	LAFS.1112.RI.2.4	SC.912.P.8.2
23.30 Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	P-1	LAFS.1112.RI.2.4	
23.31 Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-3	LAFS.1112.RI.2.4	
23.32 Adjust valves on engines with mechanical or hydraulic lifters.			
23.33 Remove and replace timing belt; verify correct camshaft timing.			
23.34 Remove and replace thermostat and gasket/seal.			
23.35 Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.		LAFS.1112.RI.2.4	
23.36 Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
23.37 Perform engine oil and filter change.			
23.38 Identify hybrid vehicle internal combustion engine service precautions.		LAFS.1112.RI.1.1	
24.0 Explain and apply proficiently the diagnosis, service, maintenance, repair and overhaul of in-vehicle and off-vehicle automatic transmissions/transaxles--The student will be able to:			
General: Transmission and Transaxle Diagnosis			
24.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.		LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.1B	
24.02 Identify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
24.03 Locate and interpret vehicle and major component identification numbers.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
24.04 Perform stall test; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
24.05 Perform lock-up converter system tests; determine necessary action.	P-3	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	SC.912.P.10.13, 14, 15
24.06 Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.	P-1		
24.07 Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law).	P-2		
In-Vehicle Transmission/Transaxle Maintenance and Repair			
24.08 Inspect, test, adjust, repair, or replace electrical/electronic components and circuits, including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses.	P-1		SC.912.P.10.13, 14, 15
24.09 Diagnose electronic transmission control systems using a scan tool; determine necessary action.		LAFS.1112.RI.2.4	
Off-Vehicle Transmission and Transaxle Repair			
24.10 Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces.	P-1		
24.11 Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings.	P-1		

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
24.12 Inspect converter flex (drive) plate, converter attaching bolts, converter pilot, converter pump drive surfaces, converter end play, and crankshaft pilot bore.	P-2		
24.13 Install and seat torque converter to engage drive/splines.			
24.14 Inspect bands and drums; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.0 Explain and apply proficiently the diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, ring and pinion gears, differential case assembly, and drive axles- -The student will be able to:			
General: Drive Train Diagnosis			
25.01 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.		LAFS.1112.W.1.2A, B, C, D, E, F; 2.4, 6 LAFS.1112.L.1.1B	
25.02 Identify and interpret drive train concern; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.03 Locate and interpret vehicle and major component identification numbers.			
25.04 Diagnose fluid loss, level, and condition concerns; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
Clutch Diagnosis and Repair			
25.05 Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.06 Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.07 Inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.08 Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable).	P-1		
25.09 Bleed clutch hydraulic system.	P-1		
25.10 Inspect flywheel and ring gear for wear and cracks; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.11 Inspect engine block, core plugs, rear main engine oil seal, clutch (bell) housing, transmission/transaxle case mating surfaces, and alignment dowels; determine necessary action.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
25.12 Measure flywheel run out and crankshaft end play; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.13 Remove and reinstall transmission/transaxle.			
Transmission/Transaxle Diagnosis and Repair			
25.14 Inspect transmission/transaxle case, extension housing, case mating surfaces, bores, bushings, and vents; perform necessary action.			
25.15 Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers.	P-2		
25.16 Inspect, replace, and align powertrain mounts.			
25.17 Inspect and replace gaskets, seals, and sealants; inspect sealing surfaces.			
25.18 Remove and replace transaxle final drive.			
25.19 Inspect, adjust, and reinstall shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.			
25.20 Measure end play or preload (shim or spacer selection procedure) on transmission/transaxle shafts; perform necessary action.			
25.21 Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.			
25.22 Inspect lubrication devices (oil pump or slingers); perform necessary action.			
25.23 Inspect, test, and replace transmission/transaxle sensors and switches.		LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair			
25.24 Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action.	P-1	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B	
25.25 Diagnose universal joint noise and vibration concerns; perform necessary action.	P-2		
25.26 Inspect, service, and replace shaft center support bearings.			
25.27 Check shaft balance and phasing; measure shaft run out; measure and adjust driveline angles.	P-2	MAFS.912.N-Q.1.1	
25.28 Diagnose noise and vibration concerns; determine necessary action.			
Drive Axle Diagnosis and Repair; Ring and Pinion Gears and Differential Case Assembly; Drive Axles			

CTE Standards and Benchmarks	Priority Number	FS-M/LA	NGSSS-Sci
25.29 Inspect and replace companion flange and pinion seal; measure companion flange run out.	P-2		
25.30 Inspect and reinstall limited slip differential components.			
25.31 Remove and replace drive axle shafts.	P-1		
25.32 Inspect and replace drive axle shaft seals, bearings, and retainers.	P-2		
25.33 Measure drive axle flange run out and shaft end play; determine necessary action.	P-2	LAFS.1112.W.2.4, 6 LAFS.1112.L.1.2B MAFS.912.N-Q.1.1	
25.34 Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.	P-3		
25.35 Remove and reinstall transfer case.			
25.36 Identify concerns related to variations in tire circumference and/or final drive ratios.	P-3		

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

The occupational standards and benchmarks outlined in this secondary program **partially correlate** to the standards and benchmarks of the following postsecondary Automotive Service Technology programs:

Automotive Service Technology - I470608 (0647060405)
Automotive Service Technology 1 - T400700 (0647060411)
Automotive Service Technology 2 - T400800 (0647060412)

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Outboard Marine Service Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9504200
CIP Number	0647061612
Grade Level	9-12, 30, 31
Standard Length	7 credits
Teacher Certification	DIESEL MECH @7 7G GASENG RPR @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3051 – Motorboat Mechanics and Service 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: service, repair and overhaul of four-stroke and two-stroke cycle engines and outboard motors; and service and repair of boating accessories. With regard to the above, course content will include electrical systems, fuel systems, power transfer systems, ignition systems, cooling systems, lubrication systems, drive systems and boat and trailer rigging.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

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 occupational completion points.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	9504210 9504220	Outboard Marine Service 1 Outboard Marine Service 2	1 credit 1 credit	49-3051 49-3051	3 3	VO VO
B	9504230 9504240	Outboard Marine Service 3 Outboard Marine Service 4	1 credit 1 credit	49-3051 49-3051	3 3	VO VO
C	9504250 9504260	Advanced Marine Technology 1 Advanced Marine Technology 2	1 credit 1 credit	49-3051 49-3051	3 3	VO VO
D	9504270	Outboard Marine Service Capstone 5	1 credit	49-3051	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.

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
9504210	1/87 1%	3/80 4%	3/83 4%	6/69 9%	3/67 4%	1/70 1%	2/69 3%	6/82 7%	3/66 5%	11/74 15%	7/72 10%
9504220	1/87 1%	3/80 4%	2/83 2%	4/69 6%	3/67 4%	1/70 1%	2/69 3%	5/82 6%	2/66 3%	9/74 12%	7/72 10%
9504230	3/87 3%	5/80 6%	2/83 2%	7/69 10%	3/67 4%	2/70 3%	3/69 4%	4/82 5%	3/66 5%	10/74 14%	10/72 14%
9504240	3/87 3%	6/80 8%	2/83 2%	9/69 13%	3/67 4%	3/70 4%	3/69 4%	6/82 7%	5/66 8%	8/74 11%	9/72 13%
9504250	1/87 1%	3/80 4%	1/83 1%	4/69 6%	1/67 1%	#	1/69 1%	2/82 2%	1/66 2%	7/74 9%	6/72 8%
9504260	1/87 1%	3/80 4%	1/83 1%	4/69 6%	1/67 1%	#	1/69 1%	3/82 4%	1/66 2%	7/74 9%	6/72 8%
9504270	**	**	**	**	**	**	**	**	**	**	**

** *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
9504210	2/67 3%	#	1/54 2%	5/46 15%	5/45 16%	#	#
9504220	2/67 3%	#	3/54 6%	15/46 33%	15/45 33%	#	#
9504230	2/67 3%	1/75 1%	#	#	#	4/45 9%	4/45 9%
9504240	2/67 3%	1/75 1%	#	#	#	8/45 18%	8/45 18%
9504250	1/67 1%	#	#	2/46 4%	2/45 4%	2/45 4%	2/45 4%
9504260	1/67 1%	#	#	4/46 9%	4/45 9%	4/45 9%	4/45 9%
9504270	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

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 Outboard Marine Service Technology.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Outboard Marine Service Technology.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Outboard Marine Service Technology.
04.0 Demonstrate an understanding of workplace safety and workplace organization.
05.0 Adjust and repair trailers.
06.0 Use marine woods, metals, and fiberglass.
07.0 Maintain and repair basic two-stroke cycle outboard engines.
08.0 Maintain and repair fuel systems on boats.
09.0 Maintain and repair electrical systems.
10.0 Prepare delivery checklist.
11.0 Maintain and repair outboard capacitor discharge ignition systems.
12.0 Maintain and repair outboard fuel systems.
13.0 Parts specialist and computer skills to industry standards.
14.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Outboard Marine Service Technology.
15.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Outboard Marine Service Technology.
16.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Outboard Marine Service Technology.
17.0 Maintain and repair basic four-stroke cycle outboard engines.
18.0 Maintain and repair outboard charging systems.
19.0 Maintain and repair outboard battery ignition systems.
20.0 Maintain and repair outboard cranking systems.
21.0 Maintain and repair outboard lubrication systems.
22.0 Maintain and repair outboard cooling systems.
23.0 Maintain and repair outboard lower gear cases.
24.0 Assemble and maintain outboard lower units and housing assemblies.
25.0 Demonstrate employability skills.
26.0 Demonstrate an understanding of entrepreneurship.
27.0 Maintain and repair basic four-stroke cycle inboard gas engine.
28.0 Maintain and repair inboard fuel systems.
29.0 Maintain and repair inboard gas cooling systems.
30.0 Maintain and repair inboard gas lubrication systems.
31.0 Maintain and repair battery ignition systems.
32.0 Maintain and repair capacitor discharge ignition systems.

33.0 Conceive, design, and present a marine project(s) that encompass all the skills learned in the Outboard Marine Service Technology program.
34.0 Plan, organize, and carry out a project plan.
35.0 Formulate strategies to properly manage resources.
36.0 Use tools, materials, and processes in an appropriate and safe manner.
37.0 Create a project portfolio describing the marine project, including drawings and specifications, the tasks and rationale, process journal, budget report, and the results.

Florida Department of Education
Student Performance Standards

Course Title: **Outboard Marine Service 1**
Course Number: **9504210**
Course Credit: **1**

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of workplace safety and organization, trailer service, various boat materials, 2-stroke cycle outboard engines, and fuel systems on boats.

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 Marine Service Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Marine Service 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Marine Service 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	

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
04.0 Demonstrate an understanding of workplace safety and workplace organization--The student will be able to:		
04.01 Identify safety requirements for manual, electrical-powered, and pneumatic tools.		
04.02 Demonstrate, apply, and provide evidence of safely using manual, electrical-powered, and pneumatic tools.		
04.03 Identify safety requirements for operation of automated machines and equipment.		
04.04 Demonstrate, apply, and provide evidence of safely operating automated machines and equipment.		
04.05 Set up and use precision measurement tools.	MAFS.912.N-Q.1.3	
04.06 Drill and remove broken fasteners and install helicoils.		
04.07 Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.	LAFS.910.RI.1.3 LAFS.910.W.2.4 LAFS.910.L.3.4 MAFS.912.N-Q.1.3	
04.08 Demonstrate appropriate heating techniques and skills.		SC.912.P.10.5
04.09 Read, interpret, and apply service manuals.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
04.10	Identify the safe use of paints, chemicals, fiberglass, and compounds		
04.11	Demonstrate, apply, and provide evidence of safely using paints, chemicals, fiberglass, and compounds.		
04.12	Identify the safe use of electrical connectors and cords.		
04.13	Demonstrate, apply, and provide evidence of safely using electrical connectors and cords.		
04.14	Identify, demonstrate, apply, and provide evidence of understanding of shop safety rules on an ongoing basis.		
04.15	Research and identify class A, B, and C type fires.		
04.16	Demonstrate and apply the proper procedures for extinguishing class A, B, and C type fires.		
04.17	Identify various workplace injuries related to the marine industry.		
04.18	Demonstrate and practice knowledge of first aid and first response procedures appropriate for this course.		
04.19	Identify and apply safety procedures in case of smoke or chemical inhalation.		
04.20	Demonstrate and apply material handling techniques to safely move materials.		
04.21	Demonstrate and apply proper techniques for lifting loads.		
04.22	Research and identify Occupational Safety Health Administration (OSHA) safety standards related to the marine industry.		
04.23	Demonstrate, apply, and provide evidence of understanding Occupational Safety Health Administration (OSHA) safety standards related to the marine industry.		
04.24	Demonstrate knowledge of safety requirements for material handling equipment such as rigging, ladders, and scaffolds related to the marine industry.		
04.25	Demonstrate knowledge of National Institute of Occupational Safety and Health (NIOSH), Environmental Protection Agency (EPA) and other regulatory agencies recommendations, guidelines and best practices.		
04.26	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200)		
04.27	Locate Safety Data Sheets (SDS).		
04.28	Demonstrate understanding and knowledge of using and applying the information located on Safety Data Sheets (SDS).		
04.29	Proactively respond to a safety concern and then document occurrences.		
04.30	Identify and report unsafe conditions.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.31 Determine the appropriate corrective action after an unsafe condition is identified.		
04.32 Demonstrate knowledge of various emergency alarms and procedures.		
04.33 Demonstrate knowledge and apply clean-up procedures for spills.		
04.34 Identify and apply procedures for handling hazardous material.		
04.35 Perform safety and environmental inspections.		
04.36 Perform leak checks to determine if toxic or hazardous material is escaping from a piece of equipment.		
04.37 Demonstrate knowledge of proper and safe installation techniques as described in manuals, checklists, and regulations.		
04.38 Demonstrate and apply proper equipment shutdown procedures.		
04.39 Identify, select, and use personal protective equipment (PPE).		
04.40 Identify, demonstrate, and apply ergonomic work techniques.		
04.41 Train other students to use and apply safety skills outlined in this standard.		
05.0 Adjust and repair trailers--The student will be able to:		
05.01 Make boat to trailer adjustments.	MAFS.912.N-Q.1.3	
05.02 Remove and replace lighting systems.		
05.03 Remove, inspect, repack, and replace wheel bearings and springs.		
05.04 Remove and replace brakes.		
05.05 Check lug nuts on trailer for correct torque.		
06.0 Use marine woods, metals, and fiberglass--The student will be able to:		
06.01 Explain the hazards of a marine environment to woods, metals and fiberglass.	LAFS.910.W.1.2 LAFS.910.SL.2.4 LAFS.910.L.1.1	SC.912.L.17.2, 3
06.02 Explain a galvanic series.	LAFS.910.W.1.2 LAFS.910.SL.2.4 LAFS.910.L.1.1	SC.912.P.10.14
06.03 Explain the theory for using given materials in boat repair activities.	LAFS,910.SL.2.4 LAFS.910.W.3.9 LAFS,910.RI.1.3 LAFS.910.L.1.1	SC.912.P.12.12

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
07.0	Maintain and repair basic two-stroke cycle outboard engines--The student will be able to:		
07.01	Explain the basic principles of the operation of two-stroke cycle internal combustion engines.	LAFS.910.W.1.2 LAFS.910.RI.2.4 LAFS.910.SL.2.4	SC.912.P.10.1, 15; 12.2, 3, 11
07.02	Identify types of two-stroke cycle engines.	LAFS.910.W.1.2 LAFS.910.RI.2.4 LAFS.910.SL.2.4	
07.03	Locate engine serial and model numbers.		
07.04	Identify engine assemblies and systems.	LAFS.910.W.1.2 LAFS.910.SL.2.4	
07.05	Disassemble engines and inspect parts.		
07.06	Remove, clean and inspect heads for cracks, warpage and damaged spark plug threads.	MAFS.912.N-Q.1.3	
07.07	Diagnose powerhead problems by use of the visual inspection method.		
07.08	Diagnose powerhead problems by use of the compression tester method.		SC.912.P.10.1; 12.10, 11
07.09	Diagnose powerhead problems by use of the stethoscope method.		
07.10	Remove, clean and inspect piston and rod assemblies.		
07.11	Measure out-of-round of pistons and cylinders.	MAFS.912.N-Q.1.3	
07.12	Hone cylinders.	MAFS.912.N-Q.1.3	SC.912.P.12.3
07.13	Check the total bearing surface of connecting rod bearings.		
07.14	Measure piston skirts and ring grooves.	MAFS.912.N-Q.1.3	
07.15	Measure the piston ring gap in cylinder bores.	MAFS.912.N-Q.1.3	
07.16	Install piston pins according to manufacturer's specifications.		
07.17	Check rod and piston assembly alignment.		
07.18	Install rings on pistons.		
07.19	Install piston rod assemblies.		
07.20	Measure and check crankshafts with a micrometer.	MAFS.912.N-Q.1.3	

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
07.21	Check needle bearings.		
07.22	Inspect crankshafts and install seal.		
07.23	Inspect, clean and/or replace reed valves.		
07.24	Reassemble engines.		
08.0	Maintain and repair fuel systems on boats--The student will be able to:		
08.01	Identify and locate fuel system components (fuel tanks, lines, filters, etc.).	LAFS.910.W.1.2 LAFS.910.SL.2.4	
08.02	Sketch and label the parts of total fuel systems.	LAFS.910.W.1.2	
08.03	Service fuel lines and primer bulbs (vacuum test).		SC.912.P.12.10, 11
08.04	Describe or demonstrate the process for removing, cleaning, inspecting and installing fuel tanks.		
08.05	Locate and identify fuel pumps and test the vacuum and pressure.		
08.06	Determine and make appropriate fuel oil mixtures.		

Florida Department of Education
Student Performance Standards

Course Title: **Outboard Marine Service 2**
Course Number: **9504220**
Course Credit: **1**

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of marine electrical systems, procedures for preparing boats to customers, capacitor discharge ignition systems, outboard engine fuel systems, and proper use of computer systems related to parts specialization.

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 Marine Service Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Marine Service 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Marine Service 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	

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
09.0 Maintain and repair electrical systems--The student will be able to:		
09.01 Locate and match electrical units by their symbols on a wiring diagram.		
09.02 Set up and use voltmeters, ammeters and ohmmeters.		SC.912.P.10.13,14, 15
09.03 Locate and identify electrical circuit components.	LAFS.910.W.1.2	
09.04 Sketch a typical circuit using a single wire system.		
09.05 Test storage batteries using proper industry recognized battery testing equipment.		SC.912.P.10.13
09.06 Charge storage batteries.		
09.07 Remove and replace batteries and service battery boxes.		
09.08 Repair damaged wire and electrical harnesses.		
09.09 Diagnose circuit troubles using continuity or a test light and low reading voltmeters to record voltage drop.		
09.10 Sketch and label typical fuel gage systems.	LAFS.910.W.1.2	
09.11 Remove and replace ammeters or indicating lights.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
09.12	Remove and replace fuel gages.		
09.13	Remove and replace fuel-sending units.		
09.14	Diagnose gages and accessory system troubles using voltmeters, ammeters or detached sending units.		
09.15	Sketch typical circuits such as those for auto bilge pumps or navigation lights.	LAFS.910.W.1.2	
09.16	Locate opens, shorts and grounds.		SC.912.P.10.2
09.17	Demonstrate proficiency in applying industry standard wire terminal practices.		SC.912.P.8.2; 10.4
09.18	Demonstrate proper installation of 2 position and 3 position battery switches.		
09.19	Demonstrate correct procedure for connecting batteries in series and parallel.		
09.20	Check alternator output voltage with engine running compare with specifications.		
10.0	Prepare delivery checklist--The student will be able to:		
10.01	Make center line measurements for transom drilling and motor installation	MAFS.912.N-Q.1.3 MAFS.912.G-CO.1.1; 4.12	
10.02	Locate manufacturers' I.D. plates.		
10.03	Mount control boxes at the helm.	MAFS.912.N-Q.1.3	
10.04	Place wiring and cables in a neat and orderly manner.		
10.05	Adjust the control cables from the engine to the control box.		
10.06	Center the steering cable to the engine.		
10.07	Find suitable locations for accessories and mount them to the boat.	MAFS.912.N-Q.1.3	
10.08	Lubricate shafts, install propellers and fasten both securely.		
10.09	Check for proper levels.		
10.10	Check manufacturers' specifications.	LAFS.910.RI.2.4, 5 LAFS.910.L.2.3	
10.11	Describe how to or test-run boats.		
10.12	Recheck work completed.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
10.13	Check manufacturers' installation procedures for stern drive units.		
10.14	Demonstrate proper procedures for checking oil level capacity.		
10.15	Install or connect drain plugs, petcocks, hose clamps, hoses, etc.		
10.16	Remove and replace running lights.		
10.17	Troubleshoot lighting systems and accessories.		
10.18	Check and adjust throttles, cables, horns, lights and tachometers.		
10.19	Check steering system for proper operation.		
11.0	Maintain and repair outboard capacitor discharge ignition systems--The student will be able to:		
11.01	Sketch and label electrical symbols.	LAFS.910.W.1.2 LAFS.910.L.1.2	SC.912.P.10.13, 14, 15
11.02	Set up and use ohmmeters.		SC.912.P.10.13, 14, 15
11.03	Set up and use a DVA tester or equivalent.		SC.912.P.10.13, 14, 15
11.04	Set up and use spark testers.		SC.912.P.10.13, 14, 15
11.05	Set up and use neon test lights.		SC.912.P.10.13, 14, 15
11.06	Set up and use low/high ammeters.		SC.912.P.10.13, 14, 15
11.07	Set up and use voltmeters.		SC.912.P.10.13, 14, 15
11.08	Locate and identify parts of capacitor discharge ignition systems.	LAFS.910.W.1.2 LAFS.910.L.1.2	SC.912.P.10.13, 14, 15
11.09	Locate and match electrical units by their symbols on a wiring diagram.	LAFS.910.RI.2.4 LAFS.910.W.4.10	SC.912.P.10.13, 14, 15
11.10	Sketch and label complete C/D ignition systems.	LAFS.910.W.1.2; 2.4,5, 6; 3.7, 8, 9; 4.10 LAFS. 910.L.1.2	SC.912.P.10.13, 14, 15
11.11	Check coil resistance, shorts and grounds with an ohmmeter.		SC.912.P.10.13, 14, 15
11.12	Check stator windings with an ohmmeter.		SC.912.P.10.13, 14, 15
11.13	Check sensor coils, charge coils, ignition coils and shorts to ground with a DVA tester or equivalent.		SC.912.P.10.13, 14, 15

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
11.14 Check power packs with an ohmmeter and a DVA tester or equivalent.		SC.912.P.10.13, 14, 15
12.0 Maintain and repair outboard fuel systems--The student will be able to:		
12.01 Identify the major types of carburetors.	LAFS.910.W.2.4 LAFS.910.SL.2.4, 6	SC.912.P.12.3, 10, 11
12.02 Check and adjust throttle.		
12.03 Identify and understand different types of Vapor Separator Tank (VST) systems.		
12.04 Remove, service, and replace air cleaners.		
12.05 Identify basic carburetor circuits (chokes, floats, fuel inlets; idle, intermediate and high speeds; mains, etc.)		
12.06 Diagnose carburetor problems.		
12.07 Remove, clean, overhaul, replace and make final adjustments to carburetors.		
12.08 Diagnose exhaust problems such as back pressure and scavenging.		
12.09 Remove, service, and replace flame arrestors.		
13.0 Parts specialist and computer skills to industry standards--The student will be able to:		
13.01 Identify the skills needed to be a service writer.	LAFS.910.W.1.2 LAFS.910.L.1.1, 2	
13.02 Identify the skills needed to be a parts specialist.	LAFS.910.W.1.2 LAFS.910.L.1.1, 2	
13.03 Demonstrate appropriate computer skills.		
13.04 Demonstrate knowledge of different parts and accessories.	LAFS.910.SL.2.4 LAFS.910.W.3.8	

Florida Department of Education
Student Performance Standards

Course Title: **Outboard Marine Service 3**
Course Number: **9504230**
Course Credit: **1**

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of outboard 4-stroke cycle engines, charging systems, battery ignition systems, and cranking systems.

Florida Standards			Correlation to CTE Program Standard #
14.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Marine Service Technology.		
	14.01 Key Ideas and Details		
	14.01.1	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	
	14.01.2	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	
	14.01.3	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	
	14.02 Craft and Structure		
	14.02.1	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	
	14.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	14.02.3	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 #
14.03	Integration of Knowledge and Ideas		
	14.03.1	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	
	14.03.2	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	
	14.03.3	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	
14.04	Range of Reading and Level of Text Complexity		
	14.04.1	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.	
	14.04.2	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Marine Service Technology.		
15.01	Text Types and Purposes		
	15.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	15.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
15.02	Production and Distribution of Writing		
	15.02.1	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 #
	15.02.2	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	
	15.02.3	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	
	15.03	Research to Build and Present Knowledge	
	15.03.1	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	
	15.03.2	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	
	15.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	15.04	Range of Writing	
	15.04.1	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	
16.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Marine Service Technology.		
	16.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	16.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	16.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
16.04 Model with mathematics. MAFS.K12.MP.4.1	
16.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
16.06 Attend to precision. MAFS.K12.MP.6.1	
16.07 Look for and make use of structure. MAFS.K12.MP.7.1	
16.08 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
17.0 Maintain and repair basic four-stroke cycle outboard engines--The student will be able to:		
17.01 Explain the basic principles of the operation of four-stroke cycle internal combustion engines.	LAFS.1112.SL.2.4 LAFS.1112.W.1.2 LAFS.1112.RI.2.4	SC.912.P.10.1, 5; 12.2, 3
17.02 Identify types of four-stroke cycle engines.	LAFS.1112.SL.2.4	
17.03 Locate engine serial and model numbers.	LAFS.1112.SL.2.4	
17.04 Identify engine assemblies and systems.	LAFS.1112.W.1.2 LAFS.1112.SL.2.4	
17.05 Diagnose valve and head problems by use of the visual inspection method.		
17.06 Diagnose valve and head problems by use of the compression tester and Leak Down tester method.		SC.912.P.10.1; 12.10, 11
17.07 Disassemble engines and inspect parts.		
17.08 Clean and inspect heads for cracks, warpage and damaged spark plug threads.	MAFS.912.N-Q.1.1, 3	
17.09 Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.		
17.10 Adjust valves.	MAFS.912.N-Q.1.3	
17.11 Remove and inspect camshafts and lifters.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
17.12 Clean and inspect lifters for wear.		
17.13 Time valve drive assemblies.		
17.14 Remove pistons from rod assemblies.		
17.15 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.	MAFS.912.N-Q.1.3	
17.16 Check piston pins and bosses for wear.	MAFS.912.N-Q.1.3	
17.17 Measure piston ring lands width, out-of-round and taper.	MAFS.912.N-Q.1.3	
17.18 Measure the piston ring gap in cylinder bores.	MAFS.912.N-Q.1.3	
17.19 Install and fit piston pins.	MAFS.912.N-Q.1.3	
17.20 Check rod and piston assembly alignment.		
17.21 Remove and replace rod bearings.		
17.22 Hone and clean cylinders.	MAFS.912.N-Q.1.3	SC.912.P.12.3
17.23 Install rings on pistons.		
17.24 Measure and check crankshafts with a micrometer.	MAFS.912.N-Q.1.3	
17.25 Check for end play.	MAFS.912.N-Q.1.3	
17.26 Check bearing bores with a telescoping gage.	MAFS.912.N-Q.1.3	
17.27 Reassemble engines.		
17.28 Install oil seals.		
17.29 Inspect/replace timing belt/chain.		
17.30 After rebuild, final Compression Test and Lead Down Test.		
18.0 Maintain and repair outboard charging systems--The student will be able to:		
18.01 Sketch and label the units of complete charging circuits.	LAFS.1112.W.1.2 LAFS.1112.L.1.2	SC.912.P.10.13, 14, 15
18.02 Disassemble charging systems and identify the components.		SC.912.P.10.13, 14, 15
18.03 Perform stator and rectifier testing on charging systems.		SC.912.P.10.13, 14, 15

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
18.04 Reassemble and test charging systems.		SC.912.P.10.13, 14, 15
18.05 Set up and use ohmmeters.		SC.912.P.10.13, 14, 15
18.06 Reassemble and test complete units.		SC.912.P.10.13, 14, 15
19.0 Maintain and repair outboard battery ignition systems--The student will be able to:		
19.01 Locate and identify parts of battery ignition systems.	LAFS.1112.L.1.2 LAFS.1112.W.1.2	
19.02 Locate and match electrical units by their symbols on a wiring diagram.	LAFS.1112.RI.2.4 LAFS.1112.W.4.10	SC.912.P.10.13
19.03 Sketch and label complete battery ignition systems.	LAFS.1112.L.1.2 LAFS.1112.W.1.2	
19.04 Check coil resistance with an ohmmeter.		SC.912.P.10.13, 14, 15
19.05 Set up and use test equipment.		
19.06 Set timing using timing light.		
19.07 Clean and regap spark plugs.		
20.0 Maintain and repair outboard cranking systems--The student will be able to:		
20.01 Disassemble recoil starters.		
20.02 Inspect components of recoil starters.		
20.03 Reassemble recoil starters.		
20.04 Identify components of electrical starting systems.	LAFS.1112.L.1.2 LAFS.1112.W.1.2;2.4	SC.912.P.10.13, 14, 15
20.05 Bench test switches.		SC.912.P.10.13, 14, 15
20.06 Troubleshoot starting systems using multimeter.		SC.912.P.10.13, 14, 15
20.07 Locate opens, short and grounds.		SC.912.P.10.13, 14, 15

Florida Department of Education
Student Performance Standards

Course Title: **Outboard Marine Service 4**
Course Number: **9504240**
Course Credit: **1**

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of outboard engine lubrication systems, cooling systems, lower gear cases, lower units and housing assemblies, employability, and entrepreneurship.

Florida Standards			Correlation to CTE Program Standard #
14.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Marine Service Technology.		
	14.01 Key Ideas and Details		
	14.01.1	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	
	14.01.2	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	
	14.01.3	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	
	14.02 Craft and Structure		
	14.02.1	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	
	14.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	14.02.3	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 #
14.03	Integration of Knowledge and Ideas		
	14.03.1	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	
	14.03.2	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	
	14.03.3	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	
14.04	Range of Reading and Level of Text Complexity		
	14.04.1	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.	
	14.04.2	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	
15.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Marine Service Technology.		
15.01	Text Types and Purposes		
	15.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	15.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
15.02	Production and Distribution of Writing		
	15.02.1	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 #
	15.02.2	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	
	15.02.3	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	
	15.03	Research to Build and Present Knowledge	
	15.03.1	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	
	15.03.2	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	
	15.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	15.04	Range of Writing	
	15.04.1	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	
16.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Marine Service Technology.		
	16.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	16.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	16.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
16.04 Model with mathematics. MAFS.K12.MP.4.1	
16.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
16.06 Attend to precision. MAFS.K12.MP.6.1	
16.07 Look for and make use of structure. MAFS.K12.MP.7.1	
16.08 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
21.0 Maintain and repair outboard lubrication systems--The student will be able to:		
21.01 Identify the types and functions of lubrication systems.	LAFS.1112.L.1.2 LAFS.1112.W.1.2	
21.02 Explain the principles of lubrication systems.		SC.912.P.10.5
21.03 Identify and locate components of lubrication systems.	LAFS.1112.SL.2.4, 6	
21.04 Check engines for oil leaks.		
21.05 Change engine oil and filters.		
21.06 Check engine oil pressure and level.		
21.07 Recognize and use only recommended oil.		
21.08 Inspect and service oil metering systems.		
22.0 Maintain and repair outboard cooling systems--The student will be able to:		
22.01 Explain the principles of cooling systems.	LAFS.1112.SL.2.4 LAFS.1112.W.1.2	SC.912.P.10.5, 7, 20
22.02 Trace water flow through cooling systems.		
22.03 Disassemble, examine for problems and reassemble water pumps.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	22.04 Remove, check and replace thermostats		SC.912.P.12.3
	22.05 Service poppet valves.		
	22.06 Service or replace thermostat and thermostat housings.		
23.0	Maintain and repair outboard lower gear cases--The student will be able to:		
	23.01 Remove and replace lower gear cases.		
	23.02 Identify the components of lower gear case.	MAFS.912.N-Q.1.1, 3	
	23.03 Refill lower gear cases with specified oil.		
	23.04 Determine propeller pitch diameter and hub type.	LAFS.1112.L.3.4	SC.912.P.10.6 SC.912.P.12.5, 6
24.0	Assemble and maintain outboard lower units and housing assemblies--The student will be able to:		
	24.01 Disassemble and reassemble steering handle groups.		
	24.02 Disassemble and assemble exhaust housings and water tube assemblies.		
	24.03 Replace motor mounts and shock absorbers.		
	24.04 Lubricate all fittings.		
	24.05 Pressure and vacuum test gear cases.		SC.912.P.12.10, 11
	24.06 Remove and service cylinders and rams.		SC.912.P.10.2; 12.10
	24.07 Adjust the trim and tilt.		
	24.08 Determine the differences between mechanical, electrical and hydraulic shifting units.	LAFS.1112.RI.2.4	SC.912.P.10.1; 12.3
	24.09 Explain the shifting theory of the lower unit.	LAFS.1112.W.1.2;4.10 LAFS.1112.L.1.1, 2	SC.912.P.10.1; 12.3
	24.10 Perform correct procedure for filling trim and tilt with hydraulic oil.		
25.0	Demonstrate employability skills--The student will be able to:		
	25.01 Conduct a job search using periodicals and the internet.		
	25.02 Secure information about a job.		
	25.03 Identify documents that may be required when applying for a job interview.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
25.04	Complete a job application form correctly.		
25.05	Demonstrate competence in job interview techniques.		
25.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.		
25.07	Identify acceptable work habits.		
25.08	Demonstrate knowledge of how to make appropriate job changes.		
25.09	Demonstrate acceptable employee health habits.		
25.10	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200).		
26.0	Demonstrate an understanding of entrepreneurship--The student will be able to:		
26.01	Define entrepreneurship.		
26.02	Describe the importance of entrepreneurship to the American economy.		
26.03	List the advantages and disadvantages of business ownership.		
26.04	Identify and explain the risks involved in ownership of a business.		
26.05	Identify and explain the necessary personal characteristics of a successful entrepreneur.		
26.06	Identify and explain the business skills needed to operate a small business efficiently and effectively.		
26.07	Identify and explain the various types of business structures, e.g. sole proprietor, S-Corporation, etc.		

Florida Department of Education
Student Performance Standards

Course Title: **Advanced Marine Technology 1**
Course Number: **9504250**
Course Credit: **1**

Course Description:
Students will learn advanced-level skills for the marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student an understanding of basic four-stroke cycle engines, fuel systems, cooling systems, lubrication systems, ignition systems, and capacitor discharge ignition systems.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
27.0 Maintain and repair basic four-stroke cycle inboard gas engines--The student will be able to:		
27.01 Diagnose valve and head problems by use of the visual inspection method.		
27.02 Diagnose valve and head problems by use of the compression tester and Leak Down tester method.		
27.03 Disassemble engines and inspect parts.		
27.04 Clean and inspect heads for cracks, warpage and damaged spark plug threads.	MAFS.912.N-Q.1.3	
27.05 Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.		
27.06 Adjust valves.		
27.07 Remove and inspect camshafts and lifters.	MAFS.912.N-Q.1.3	
27.08 Clean and inspect lifters for wear.		
27.09 Time valve drive assemblies.		
27.10 Remove pistons from rod assemblies.		
27.11 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.		
27.12 Check piston pins and bosses for wear.		
28.0 Maintain and repair inboard fuel systems--The student will be able to:		
28.01 Identify and locate fuel system components (fuel tanks, lines, filters, etc.).		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	28.02 Sketch and label the parts of total fuel systems.		
	28.03 Service fuel lines.		
	28.04 Describe or demonstrate the process for removing, cleaning, inspecting and installing fuel tanks.		
	28.05 Vacuum test fuel system.		SC.912.P.12.10
	28.06 Remove, replace service and check the pressure of fuel pumps.		SC.912.P.12.10
29.0	Maintain and repair inboard gas cooling systems--The student will be able to:		
	29.01 Explain the principles of cooling systems, including fresh water cooling systems.		SC.912.P.12.3, 11
	29.02 Trace water flow through cooling systems.		SC.912.P.12.10, 11
	29.03 Disassemble and reassemble water pumps.		
30.0	Maintain and repair inboard gas lubrication systems--The student will be able to:		
	30.01 Identify the types and functions of lubrication systems.		SC.912.P.12.10, 11
	30.02 Explain the principles of lubrication systems.		SC.912.P.12.10, 11
	30.03 Identify and locate components of lubrication systems.		SC.912.P.12.10, 11
31.0	Maintain and repair battery ignition systems--The student will be able to:		
	31.01 Locate and match electrical units by their symbols on a wiring diagram.		SC.912.P.10.13
	31.02 Sketch and label complete battery ignition systems.	LAFS.910.W.1.2 LAFS.910.L.1.2 LAFS.1112.W.1.2 LAFS.1112.L.1.2	
32.0	Maintain and repair capacitor discharge ignition systems--The student will be able to:		
	32.01 Sketch and label electrical symbols.	LAFS.910.W.1.2 LAFS.910.L.1.2 LAFS.1112.W.1.2 LAFS.1112.L.1.2	SC.912.P.10.13, 14, 15
	32.02 Set up and use ohmmeters.		SC.912.P.10.13, 14, 15
	32.03 Set up and use appropriate test equipment.		SC.912.P.10.13, 14, 15
	32.04 Set up and use spark testers.		SC.912.P.10.13, 14, 15; 12.7
	32.05 Set up and use neon test lights.		SC.912.P.10.13, 14, 15

Florida Department of Education
Student Performance Standards

Course Title: **Advanced Marine Technology 2**
Course Number: **9504260**
Course Credit: **1**

Course Description:
Students will continue to learn advanced-level skills for the marine service industry. Additional hands-on training combined with laboratory and classroom experiences gives the student a full understanding of basic four-stroke cycle engines, fuel systems, cooling systems, lubrication systems, ignition systems, and capacitor discharge ignition systems.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
27.0 Maintain and repair basic four-stroke cycle inboard gas engines--The student will be able to:		
27.13 Measure piston ring lands width, out-of-round and taper.	MAFS.912.N-Q.1.3	
27.14 Measure the piston ring gap in cylinder bores.	MAFS.912.N-Q.1.3	
27.15 Install and fit piston pins.	MAFS.912.N-Q.1.3	
27.16 Check rod and piston assembly alignment.		
27.17 Remove and replace rod bearings.		
27.18 Hone and clean cylinders.	MAFS.912.N-Q.1.3	SC.912.P.12.3
27.19 Install rings on pistons.		
27.20 Measure and check crankshafts with a micrometer.	MAFS.912.N-Q.1.3	
27.21 Check for end play.	MAFS.912.N-Q.1.3	
27.22 Check bearing bores with a telescoping gage.	MAFS.912.N-Q.1.3	
27.23 Reassemble engines.		
27.24 Install oil seals.		
27.25 Inspect/replace timing belt/chain.		
28.0 Maintain and repair inboard fuel systems--The student will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
28.07 Remove, clean and replace in-line filters.		SC.912.P.8.1
28.08 Identify the major types of carburetors.		SC.912.P.12.10
28.09 Check and adjust throttle linkages.		
28.10 Identify and service different types of EFI systems.		
28.11 Identify and understand different types of Vapor Separator Tank (VST) systems.		
28.12 Remove, service, and replace flame arrestors.		
29.0 Maintain and repair inboard gas cooling systems--The student will be able to:		
29.04 Remove, check and replace thermostats.		
29.05 Check thermostat pressure relief systems.		
29.06 Service manifolds, risers and thermostat housings.		
30.0 Maintain and repair inboard gas lubrication systems--The student will be able to:		
30.04 Check engines for oil leaks.		
30.05 Change engine oil and filters.		
30.06 Check engine oil pressure and level.		SC.912.P.12.10, 11
30.07 Recognize and use only recommended oil.		SC.912.P.12.10, 11
31.0 Maintain and repair battery ignition systems--The student will be able to:		
31.03 Set up and use test equipment.		SC.912.P.10.13, 14, 15
31.04 Set timing using a timing light		
32.0 Maintain and repair capacitor discharge ignition systems--The student will be able to:		
32.06 Set up and use low/high ammeters.		SC.912.P.10.13, 14, 15
32.07 Set up and use voltmeters.		SC.912.P.10.13, 14, 15
32.08 Locate and identify parts of capacitor discharge ignition systems.	LAFS.910.W.1.2 LAFS.910.L.1.2 LAFS.1112.W1.2 LAFS.1112.L.1.2	SC.912.P.10.13, 14, 15

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
32.09 Locate and match electrical units by their symbols on a wiring diagram.	LAFS.910.RI.2.4, LAFS.910.W.1.2;4.10 LAFS.910.L.1.2 LAFS.1112.RI.2.4 LAFS.1112.W.1.2;4.10 LAFS.1112.L.1.2	SC.912.P.10.13, 14, 15
32.10 Check coil resistance, shorts and grounds with an ohmmeter.		SC.912.P.10.13, 14, 15
32.11 Check sensor coils, charge coils, ignition coils and shorts to ground with appropriate test equipment.		SC.912.P.10.13, 14, 15

Florida Department of Education
Student Performance Standards

Course Title: **Outboard Marine Service Capstone**
Course Number: **9504270**
Course Credit: **1**

Course Description:
This course provides students with extended content and skills essential to the planning, design, creation, and presentation of an outboard marine technology capstone project.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
33.0	Conceive, design, and present a marine project(s) that encompass all the skills learned in the Outboard Marine Service Technology program--The student will be able to:		
33.01	Create and produce an original working drawing using outboard marine nomenclature.		
33.02	Compose a well written design proposal and present to instructor for approval.		
33.03	Incorporate principles and practices of outboard marine technology into the project.		
34.0	Plan, organize, and carry out a project plan--The student will be able to:		
34.01	Determine the scope of a project.		
34.02	Organize tasks.		
34.03	Determine project priorities.		
34.04	Identify required resources.		
34.05	Record project progress in a process journal.		
34.06	Record and account for budget expenses during the life of the project.		
34.07	Carry out the project plan to successful completion and delivery.		
35.0	Formulate strategies to properly manage resources--The student will be able to:		
35.01	Identify required resources and associated costs for each stage of the project plan.		
35.02	Create a project budget based on the identified resources.		
35.03	Determine the methods needed to acquire needed resources.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	35.04 Demonstrate good judgment in the use of resources.		
	35.05 Recycle and reuse resources where appropriate.		
	35.06 Demonstrate an understanding of proper legal and ethical waste disposal.		
36.0	Use tools, materials, and processes in an appropriate and safe manner--The student will be able to:		
	36.01 Identify and use the proper tool for a given job.		
	36.02 Use tools and machines in a safe manner.		
	36.03 Adhere to laboratory safety rules and procedures.		
	36.04 Identify the application of processes appropriate to the task at hand.		
	36.05 Identify materials appropriate to their application.		
37.0	Create a project portfolio describing the marine project, including drawings and specifications, the tasks and rationale, process journal, budget report, and the results--The student will be able to:		
	37.01 Create a Design Portfolio documenting project timeline, drawings, and specifications.		
	37.02 Create a Bill of Material (BOM) for your project.		
	37.03 Create and deliver a presentation to communicate project results to other teams.		

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

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the following postsecondary Marine Service Technologies (T400210) courses:

Marine Rigger - MTE0003 (300 hours)
Outboard Engine Technician - MTE0090 (300 hours)
Inboard Gas Engine Technician - MTE0092 (300 hours)

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Avionics Systems**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9504300
CIP Number	0647060906
Grade Level	9-12, 30, 31
Standard Length	5 credits
Teacher Certification	AVIONICS @7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA, FL-TSA
SOC Codes (all applicable)	49-2091 – Avionics 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students for employment as avionics installation and repair technicians.

The course content includes, but is not limited to, troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product 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 five occupational completion points.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	9504310	Avionics Fundamentals 1	1 credit	49-2091	3	VO
B	9504320	Avionics Fundamentals 2	1 credit	49-2091	3	VO
C	9504330	Avionics Fundamentals 3	1 credit	49-2091	3	VO
D	9504340	Avionics Fundamentals 4	1 credit	49-2091	3	VO
E	9504350	Avionics Fundamentals Capstone	1 credit	49-2091	3	PA

(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
9504310	**	**	**	**	**	**	**	**	**	**	**
9504320	**	**	**	**	**	**	**	**	**	**	**
9504330	**	**	**	**	**	**	**	**	**	**	**
9504340	**	**	**	**	**	**	**	**	**	**	**
9504350	**	**	**	**	**	**	**	**	**	**	**

*** 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
9504310	**	**	**	**	**	**	**
9504320	**	**	**	**	**	**	**

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
9504330	**	**	**	**	**	**	**
9504340	**	**	**	**	**	**	**
9504350	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Avionics Systems program can be found using the following links:

www.faa.gov/
www.eta-i.org/

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 Avionics Systems.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Avionics Systems.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Avionics Systems.
04.0 Demonstrate proficiency in the fundamentals of aviation maintenance technology.
05.0 Demonstrate skills in technical communications.
06.0 Demonstrate proficiency in basic aircraft wiring and PCB practices.
07.0 Demonstrate proficiency in basic direct current (DC) circuits.
08.0 Demonstrate proficiency in advanced direct current (DC) circuits.
09.0 Demonstrate proficiency in aircraft direct current (DC) power systems.
10.0 Demonstrate proficiency in alternating current (AC) circuits.
11.0 Demonstrate proficiency in advanced alternating current (AC) circuits.
12.0 Demonstrate proficiency in alternating current (AC) circuit components.
13.0 Demonstrate proficiency in aircraft alternating current (AC) power systems.
14.0 Demonstrate proficiency with aircraft drawings.
15.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Avionics Systems.
16.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Avionics Systems.
17.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Avionics Systems.
18.0 Demonstrate proficiency in solid state devices.
19.0 Demonstrate proficiency in analog circuits.
20.0 Demonstrate an understanding of basic avionics corrosion.
21.0 Demonstrate proficiency in aircraft aerodynamic fundamentals.
22.0 Demonstrate proficiency in Unmanned Aerial Systems Foundations.
23.0 Demonstrate knowledge in Unmanned Aerial Vehicle Operations.
24.0 Demonstrate proficiency in digital circuits.
25.0 Demonstrate proficiency in fundamental microprocessors.
26.0 Demonstrate an understanding of workplace safety practices.
27.0 Demonstrate appropriate communication skills.
28.0 Demonstrate employability skills.
29.0 Demonstrate an understanding of entrepreneurship.
30.0 Demonstrate knowledge of basic avionics systems.
31.0 Conceive, design, and present an avionics project(s) that encompass all the skills learned in the Avionics Systems program.
32.0 Plan, organize, and carry out a project plan.
33.0 Formulate strategies to properly manage resources.
34.0 Use tools, materials, and processes in an appropriate and safe manner.
35.0 Create a project portfolio describing the avionics project, including drawings and specifications, the tasks and rationale, process journal, budget report, and the results.

Florida Department of Education
Student Performance Standards

Course Title: **Avionics Fundamentals 1**
Course Number: **9504310**
Course Credit: **1**

Course Description:
This course introduces students to the fundamentals of aviation maintenance, technical communication skills, basic aircraft wiring, PCB practices, basic and advanced DC circuits and power systems. It emphasizes troubleshooting techniques and it brings elements that help to develop fine motor skills. This course defines techniques, requirements and expectations for those seeking to enter the job market as employees or small business owners.

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 Avionics Systems.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Avionics Systems.		
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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Avionics Systems.		
	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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate proficiency in the fundamentals of aviation maintenance technology--The student will be able to:		
04.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.		
04.02 Research and report on a career field that supports aviation maintenance technology		
04.03 Identify the parts of an aircraft.		
04.04 Describe how avionics systems integrate with aircraft airframe and propulsion systems.		
04.05 Research and describe the certifications associated with the avionics maintenance technician.		
04.06 Research and report on a type of unmanned aerial vehicle (UAV) or unmanned aerial system (UAS).		
05.0 Demonstrate skills in technical communications – The student will be able to:		
05.01 Draw and interpret electronic schematics		
05.02 Write reports and make oral presentations.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	05.03 Maintain test logs.		
	05.04 Write formal reports of laboratory experiences		
	05.05 Read and follow written instructions.		
	05.06 Answer and ask questions coherently and concisely		
	05.07 Read critically by recognizing assumptions and implications and evaluating ideas.		
06.0	Demonstrate proficiency in basic aircraft wiring and PCB practices – The student will be able to:		
	06.01 Explain the theoretical concepts and safety precautions of soldering.		
	06.02 Use appropriate hand tools to cut, strip, crimp, splice, solder, and stamp/identify wires and cables to industry standards for aircraft installation.		
	06.03 Prepare, use, install, and inspect general purpose connectors.		
	06.04 Research and identify the proper AN-MS connectors for use in aircraft electrical systems.		
	06.05 Identify and use power tools properly.		
	06.06 Demonstrate acceptable PCB soldering techniques.		
	06.07 Demonstrate acceptable desoldering techniques.		
	06.08 Demonstrate electrostatic discharge (ESD) safety procedures.		
	06.09 Describe the construction of printed circuit boards (PCB's).		
	06.10 Demonstrate proficiency in reworking and repairing aircraft wiring and PCB’s.		
07.0	Demonstrate proficiency in basic direct current (DC) circuits--The student will be able to:		
	07.01 Solve problems in electronic units utilizing metric prefixes.		
	07.02 Identify sources of electricity.		
	07.03 Define voltage, current, resistance, power and energy.		
	07.04 Apply Ohm's law and power formulas.		
	07.05 Read and interpret color codes and symbols to identify electrical components and values.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
07.06	Measure properties of a DC circuit using an analog volt-ohm (VOM) meter.		
07.07	Measure properties of a DC circuit using a digital multimeter (DMM).		
07.08	Measure properties of a DC circuit using an oscilloscope.		
07.09	Compute conductance and compute and measure resistance of conductors and insulators.		
07.10	Apply Ohm's law to series circuits.		
07.11	Analyze and troubleshoot series circuits.		
07.12	Apply Ohm's law to parallel circuits.		
07.13	Analyze and troubleshoot parallel circuits.		
08.0	Demonstrate proficiency in advanced direct current (DC) circuits--The student will be able to:		
08.01	Solve algebraic problems to include exponentials to DC.		
08.02	Relate electricity to the nature of matter.		
08.03	Apply Ohm’s law to series-parallel and parallel-series circuits.		
08.04	Verify the operation of series-parallel, parallel-series, and bridge circuits.		
08.05	Troubleshoot series-parallel and parallel-series and bridge circuits.		
08.06	Identify and define voltage divider circuits (loaded and unloaded).		
08.07	Verify the operation of voltage divider circuits (loaded and unloaded).		
08.08	Analyze and troubleshoot voltage divider circuits (loaded and unloaded).		
08.09	Describe magnetic properties of circuits and devices.		
08.10	Determine the physical and electrical characteristics of capacitors and inductors.		
08.11	Define resistor-capacitor (R-C) and resistor-inductor (R-L) time constants.		
08.12	Adjust and operate power supplies for DC circuits.		
09.0	Demonstrate proficiency in aircraft direct current (DC) power systems--The student will be able to:		
09.01	Identify the types and construction of aircraft batteries.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
09.02	Define battery shop safety features and precautions when servicing various types of aircraft batteries.		
09.03	Explain the process of servicing lead-acid and nickel-cadmium batteries.		
09.04	Describe the types of aircraft DC generation systems.		
09.05	Describe the purpose and operation of aircraft DC current limiters, regulators, reverse current relays.		

Florida Department of Education
Student Performance Standards

Course Title: **Avionics Fundamentals 2**
Course Number: **9504320**
Course Credit: **1**

Course Description:
This course builds on the skills identified in Avionics Fundamentals 1. Students will learn basic and advanced AC circuitry, components, aircraft AC power systems, and aircraft drawings.

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 Avionics Systems.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Avionics Systems.		
	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 Avionics Systems.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
10.0 Demonstrate proficiency in alternating current (AC) circuits--The student will be able to:		
10.01 Solve basic trigonometric problem as applicable to electronics.		
10.02 Measure the properties of AC circuits using multimeters.		
10.03 Measure the properties of an AC circuit using an oscilloscope.		
10.04 Identify the sources of AC electricity.		
10.05 Use a function generator to inject signals into an AC circuits.		
10.06 Define frequency, cycle, Hertz, wavelength, sine wave, phase angle, and period.		
10.07 Calculate peak-to-peak, average, and RMS values of an AC signal.		
10.08 Identify sine waves, square waves, saw-tooth waves, and ramp waveforms.		
10.09 Use Ohm’s law to determine resistance in an AC circuit.		
10.10 Define the characteristics of AC capacitive circuits.		
10.11 Analyze and troubleshoot AC capacitive circuits.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	10.12 Define the characteristics of AC inductive circuits.		
	10.13 Analyze and troubleshoot AC inductive circuits.		
11.0	Demonstrate proficiency in advanced alternating current (AC) circuits --The student will be able to:		
	11.01 Define characteristics of resistive, inductive and capacitive (RLC) circuits (series, parallel and complex).		
	11.02 Define the characteristics of series and parallel resonant circuits.		
	11.03 Analyze and troubleshoot R-C, R-L, and RLC circuits.		
	11.04 Define the characteristics of frequency selective filter circuits.		
	11.05 Analyze and troubleshoot frequency selective filter circuits.		
	11.06 Define the characteristics of polyphase circuits.		
12.0	Demonstrate proficiency in alternating current (AC) circuit components--The student will be able to:		
	12.01 Define and apply the principles of transformers to AC circuits.		
	12.02 Calculate transformer primary and secondary voltage, turn ratio, current, and power.		
	12.03 Analyze and troubleshoot step-up, step-down, and auto transformers.		
	12.04 Describe the characteristics and operation of relays and switches.		
	12.05 Analyze and troubleshoot relays and switches.		
	12.06 Define basic AC generator theory and operation.		
	12.07 Define basic AC motor theory and operation.		
	12.08 Adjust and operate power supplies for AC circuits.		
	12.09 Analyze and measure power in AC circuits.		
13.0	Demonstrate proficiency in aircraft alternating current (AC) power systems--The student will be able to:		
	13.01 Describe the types and operation of aircraft AC generation systems.		
	13.02 Describe the operation of basic aircraft DC and AC power distribution systems.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
13.03	Describe the operation of aircraft multi-engine power distribution systems.		
14.0	Demonstrate proficiency with aircraft drawings--The student will be able to:		
14.01	Identify and define the symbols, lines, and markings on aircraft flowcharts, drawings and diagrams.		
14.02	Read and interpret aircraft drawings and blueprints.		
14.03	Prepare sketches of aircraft repairs and alterations.		
14.04	Use of charts and graphs.		
14.05	Describe the types of CAD systems and demonstrate the basic functions of a CAD program.		

Florida Department of Education
Student Performance Standards

Course Title: **Avionics Fundamentals 3**
Course Number: **9504330**
Course Credit: **1**

Course Description:
This course builds on the knowledge and skills found in Avionics Fundamentals 1 & 2. Students will learn solid state devices, analog circuits, basic avionics corrosion, aircraft aerodynamics, foundations of Unmanned Aerial Systems, and Unmanned Aerial Systems operations.

Florida Standards			Correlation to CTE Program Standard #
15.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Avionics Systems.		
	15.01 Key Ideas and Details		
	15.01.1	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	
	15.01.2	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	
	15.01.3	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	
	15.02 Craft and Structure		
	15.02.1	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	
	15.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	15.02.3	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 #
15.03	Integration of Knowledge and Ideas		
	15.03.1	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	
	15.03.2	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	
	15.03.3	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	
15.04	Range of Reading and Level of Text Complexity		
	15.04.1	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.	
	15.04.2	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	
16.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Avionics Systems.		
16.01	Text Types and Purposes		
	16.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	16.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
16.02	Production and Distribution of Writing		
	16.02.1	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 #
	16.02.2	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	
	16.02.3	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	
	16.03	Research to Build and Present Knowledge	
	16.03.1	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	
	16.03.2	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	
	16.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	16.04	Range of Writing	
	16.04.1	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	
17.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Avionics Systems.		
	17.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	17.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	17.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
17.04 Model with mathematics. MAFS.K12.MP.4.1	
17.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
17.06 Attend to precision. MAFS.K12.MP.6.1	
17.07 Look for and make use of structure. MAFS.K12.MP.7.1	
17.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
18.0 Demonstrate proficiency in solid state devices--The student will be able to:		
18.01 Identify and define properties of semiconductor materials.		
18.02 Identify and define operating characteristics and applications of junction diodes.		
18.03 Identify and define operating characteristics and applications of special diodes.		
18.04 Analyze and troubleshoot diode circuits.		
18.05 Identify and define operating characteristics and applications of bipolar transistors,		
18.06 Identify and define operating characteristics and applications of field effect transistors.		
18.07 Identify and define operating characteristics and applications of single-stage amplifiers.		
18.08 Analyze and troubleshoot single-stage amplifiers.		
18.09 Analyze and troubleshoot thyristor circuitry.		
18.10 Set up and operate DVM for solid-state devices.		
18.11 Set up and operate power supplies for solid-state devices.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
18.12	Set up and operate oscilloscopes for solid-state devices.		
18.13	Set up and operate function generators for solid-state devices.		
18.14	Demonstrate transistor testing techniques.		
19.0	Demonstrate proficiency in analog circuits--The student will be able to:		
19.01	Identify and define operational characteristics and applications of multistage amplifiers.		
19.02	Analyze and troubleshoot multistage amplifiers.		
19.03	Identify and define operating characteristics and applications of linear integrated circuits.		
19.04	Identify and define operating characteristics and applications of basic power supplies and filters.		
19.05	Analyze and troubleshoot differentiator and integrator circuits.		
19.06	Identify and define operating characteristics and applications of differential and operational amplifiers.		
19.07	Analyze and troubleshoot differential and operational amplifier circuits.		
19.08	Identify and define operating characteristics of audio power amplifiers.		
19.09	Analyze and troubleshoot audio power amplifiers.		
19.10	Identify and define operating characteristics and applications of power supply regulator circuits.		
19.11	Analyze and troubleshoot power supply regulator circuits.		
19.12	Identify and define operating characteristics and applications of active filters.		
19.13	Analyze and troubleshoot active filter circuits.		
19.14	Identify and define operating characteristics and applications of sinusoidal and non-sinusoidal oscillator circuits.		
19.15	Analyze and troubleshoot oscillator circuits.		
19.16	Identify and define operating characteristics and applications of cathode ray tubes.		
19.17	Identify and define operating characteristics and applications of optoelectronic devices.		
19.18	Define the operating characteristics of analog-type servo motors.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
19.19	Use basic electronics test equipment to measure and analyze analog circuits..		
20.0	Demonstrate an understanding of basic avionics corrosion--The student will be able to:		
20.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.		
20.02	Describe the types of corrosion and explain their effects on avionics equipment.		
20.03	Describe the preventative processes to reduce or eliminate avionics corrosion.		
21.0	Demonstrate proficiency in aircraft aerodynamic fundamentals--The student will be able to:		
21.01	Identify and explain the effects of aerodynamic forces on aircraft structures and components		
21.02	Identify and describe the purpose aircraft flight controls and aircraft how they affect flight operations.		
21.03	Define the concept of weight and balance in aircraft to include arms, weights, moments, the Law of Lever, and the center of gravity.		
21.04	Describe the effects of installing equipment, modifying equipment, modifying airframe structures and repositioning equipment on weight and balance.		
22.0	Demonstrate proficiency in Unmanned Aerial Systems Foundations--The students will be able to:		
22.01	Compare and contrast the differences between UAS and UAV components, elements and systems.		
22.02	Identify UAV structures, fabrication methods, and components.		
22.03	Describe the types of UAV aerodynamics and flight characteristics		
22.04	Define the certifications and requirements required of UAS operators and technicians		
22.05	Explain cost and risk factors associated with and alleviated by the usage of Unmanned Aerial System.		
23.0	Demonstrate knowledge in Unmanned Aerial Vehicle Operations--The students will able to:		
23.01	Demonstrate an understanding of the levels of direct and autonomous control currently in use for guiding, navigating, and controlling a UAV.		
23.02	Discriminate the various types of UAV payloads, power, and communications systems		
23.03	Understand and apply the regulatory requirements outlined by the FAA (Federal Aviation Administration) in the ownership, use, and operation of an Unmanned Aerial Vehicle.		

Florida Department of Education
Student Performance Standards

Course Title: **Avionics Fundamentals 4**
Course Number: **9504340**
Course Credit: **1**

Course Description:
This course builds on the knowledge and skills found in Avionics Fundamentals 1, 2, & 3. Students will learn digital circuitry, microprocessors, workplace safety skills, communication skills, employability skills, entrepreneurship, and the basics of avionic systems.

Florida Standards			Correlation to CTE Program Standard #
15.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Avionics Systems.		
	15.01 Key Ideas and Details		
	15.01.1	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	
	15.01.2	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	
	15.01.3	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	
	15.02 Craft and Structure		
	15.02.1	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	
	15.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	15.02.3	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 #
15.03	Integration of Knowledge and Ideas		
	15.03.1	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	
	15.03.2	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	
	15.03.3	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	
15.04	Range of Reading and Level of Text Complexity		
	15.04.1	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.	
	15.04.2	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	
16.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Avionics Systems.		
16.01	Text Types and Purposes		
	16.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	16.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
16.02	Production and Distribution of Writing		
	16.02.1	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 #
	16.02.2	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	
	16.02.3	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	
	16.03	Research to Build and Present Knowledge	
	16.03.1	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	
	16.03.2	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	
	16.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	16.04	Range of Writing	
	16.04.1	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	
17.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Avionics Systems.		
	17.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	17.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	17.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
17.04 Model with mathematics. MAFS.K12.MP.4.1	
17.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
17.06 Attend to precision. MAFS.K12.MP.6.1	
17.07 Look for and make use of structure. MAFS.K12.MP.7.1	
17.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
24.0 Demonstrate proficiency in digital circuits—The student will be able to:		
24.01 Define and apply numbering systems to codes and arithmetic operations.		
24.02 Analyze and minimize logic circuits using Boolean operations.		
24.03 Set up and operate logic probes for digital circuits.		
24.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.		
24.05 Set up and operate pulsers for digital circuits.		
24.06 Set up and operate oscilloscopes for digital circuits.		
24.07 Set up and operate logic analyzers for digital circuits.		
24.08 Set up and operate pulse generators for digital circuits.		
24.09 Identify types of logic gates and their truth tables.		
24.10 Verify combinational logic circuits made up of integrated circuits.		
24.11 Troubleshoot logic circuits.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
24.12 Analyze types of flip-flops and their truth tables.		
24.13 Troubleshoot flip-flops.		
24.14 Identify, define and measure characteristics of integrated circuit (IC) logic families.		
24.15 Identify types of registers and counters.		
24.16 Troubleshoot registers and counters.		
24.17 Analyze clock and timing circuits.		
24.18 Troubleshoot clock and timing circuits.		
24.19 Identify types of arithmetic-logic circuits.		
24.20 Troubleshoot arithmetic-logic circuits.		
24.21 Identify types of encoding and decoding devices.		
24.22 Troubleshoot encoders and decoders.		
24.23 Identify types of multiplexer and demultiplexer circuits.		
24.24 Troubleshoot multiplexer and demultiplexer circuits.		
24.25 Identify types of memory circuits.		
24.26 Relate the uses of digital-to-analog and analog-to-digital conversions.		
24.27 Troubleshoot digital-to-analog and analog-to-digital circuits.		
24.28 Identify types of digital displays.		
24.29 Troubleshoot digital display circuits.		
24.30 Demonstrate the operating characteristics of digital-type servo and stepper motors		
25.0 Demonstrate proficiency in fundamental microprocessors—The student will be able to:		
25.01 Identify central processing unit (CPU) building blocks and their uses (architecture).		
25.02 Analyze bus concepts.		
25.03 Analyze various memory schemes.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
25.04 Verify memory device operation.		
25.05 Set up and operate oscilloscopes for microprocessor systems.		
25.06 Identify types of input and output devices and peripherals.		
25.07 Interface input and output ports to peripherals.		
25.08 Analyze and troubleshoot input and output ports.		
25.09 Develop a simple microprocessor and/or microcontroller application program.		
26.0 Demonstrate an understanding of workplace safety practices--The student will be able to:		
26.01 Use Safety Data Sheets (SDS) information to determine the use, safety precautions, and disposition of chemicals used in avionics applications.		
26.02 Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.		
26.03 Describe flight line safety to include foreign object elimination, situational awareness, aircraft movement precautions, fire classifications, and fire extinguishing.		
27.0 Demonstrate appropriate communication skills—The student will be able to:		
27.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.		
27.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.		
27.03 Demonstrate appropriate telephone/communication skills.		
27.04 Make equipment failure reports.		
27.05 Specify and requisition simple electronic components.		
27.06 Compose technical letters and memoranda.		
27.07 Draft preventive maintenance procedures.		
27.08 Use an analysis of technical data to form conclusions and recommend changes.		
28.0 Demonstrate employability skills – The student will be able to:		
28.01 Discuss elements of job search.		
28.02 Develop sources of information about a job.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
28.03	Identify documents that may be required when applying for a job.		
28.04	Complete a job application correctly.		
28.05	Demonstrate competence in job interview techniques.		
28.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.		
28.07	Identify acceptable work habits.		
28.08	Demonstrate knowledge of how to make appropriate job changes.		
28.09	Demonstrate acceptable employee health habits.		
28.10	Demonstrate knowledge of the “Right-to-Know Law” as recorded in 29CFR – 1919.1200.		
28.11	Write a proper resume.		
29.0	Demonstrate an understanding of entrepreneurship – The student will be able to:		
29.01	Define entrepreneurship.		
29.02	Describe the importance of entrepreneurship to the American economy.		
29.03	List the advantages and disadvantages of business ownership.		
29.04	Identify the risks involved in ownership of a business.		
29.05	Identify the necessary personal characteristics of an entrepreneur.		
29.06	Identify the business skills needed to operate a small business efficiently and effectively.		
29.07	Define various corporate structures. (e.g., S-Corp, C-Corp, Sole Proprietor, LLC, and ESOP).		
30.0	Demonstrate knowledge of basic avionics systems – The student will be able to:		
30.01	Identify and describe aircraft communications systems.		
30.02	Identify and describe aircraft short-range navigation systems.		
30.03	Identify and describe aircraft long-range navigation systems		
30.04	Identify the types of flight instruments and state their purpose.		

Florida Department of Education
Student Performance Standards

Course Title: **Avionics Fundamentals Capstone**
Course Number: **9504350**
Course Credit: **1**

Course Description:
This course provides students with extended content and skills essential to the planning, design, creation, and presentation of an Avionics Systems capstone project.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
31.0	Conceive, design, and present an avionics project(s) that encompass all the skills learned in the Avionics Fundamentals program.--The student will be able to:		
31.01	Create and produce an original working drawing using avionics nomenclature.		
31.02	Compose a well written design proposal and present to instructor for approval.		
31.03	Incorporate principles and practices of Avionics Systems into the project.		
32.0	Plan, organize, and carry out a project plan--The student will be able to:		
32.01	Determine the scope of a project.		
32.02	Organize tasks.		
32.03	Determine project priorities.		
32.04	Identify required resources.		
32.05	Record project progress in a process journal.		
32.06	Record and account for budget expenses during the life of the project.		
32.07	Carry out the project plan to successful completion and delivery.		
33.0	Formulate strategies to properly manage resources--The student will be able to:		
33.01	Identify required resources and associated costs for each stage of the project plan.		
33.02	Create a project budget based on the identified resources.		
33.03	Determine the methods needed to acquire needed resources.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	33.04 Demonstrate good judgment in the use of resources.		
	33.05 Recycle and reuse resources where appropriate.		
	33.06 Demonstrate an understanding of proper legal and ethical waste disposal.		
34.0	Use tools, materials, and processes in an appropriate and safe manner--The student will be able to:		
	34.01 Identify and use the proper tool for a given job.		
	34.02 Use tools and machines in a safe manner.		
	34.03 Adhere to laboratory safety rules and procedures.		
	34.04 Identify the application of processes appropriate to the task at hand.		
	34.05 Identify materials appropriate to their application.		
35.0	Create a project portfolio describing the avionics project, including drawings and specifications, the tasks and rationale, process journal, budget report, and the results--The student will be able to:		
	35.01 Create a Design Portfolio documenting project timeline, drawings, and specifications.		
	35.02 Create a Bill of Material (BOM) for your project.		
	35.03 Create and deliver a presentation to communicate project results to other teams.		

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

The occupational standards and benchmarks of courses 9504310, 9504320, 9504330, & 9504340 outlined in this secondary program correlate to the first 600hrs of the standards and benchmarks for the Avionics Systems Technician (T400310) postsecondary program.

Career and Technical Student Organization (CTSO)

SkillsUSA and Florida Technology Student Association (FL-TSA) are the intercurricular career and technical student organizations for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

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: **Power Equipment Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9504500
CIP Number	0647060605
Grade Level	9-12, 30, 31
Standard Length	6 credits
Teacher Certification	GASENG RPR @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3053 – Outdoor Power Equipment and Other Small Engine Mechanics
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students for employment or advanced training in the power and equipment technology industry and for a career as a small gas engine mechanic.

The content includes but is not limited to all aspects of the gasoline engine services technology industry, and demonstrates such elements of the industry as planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
	9504510	Power and Equipment Technology 1	1 credit		3	VO
A	9504520	Power and Equipment Technology 2	1 credit	49-3053	3	VO
	9504530	Power and Equipment Technology 3	1 credit		3	VO
B	9504540	Power and Equipment Technology 4	1 credit	49-3053	3	VO
	9504550	Power and Equipment Technology 5	1 credit		3	VO
C	9504560	Power and Equipment Technology 6	1 credit	49-3053	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.

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
9504510	**	**	**	**	**	**	**	**	**	**	**
9504520	**	**	**	**	**	**	**	**	**	**	**
9504530	**	**	**	**	**	**	**	**	**	**	**
9504540	**	**	**	**	**	**	**	**	**	**	**
9504550	**	**	**	**	**	**	**	**	**	**	**
9504560	**	**	**	**	**	**	**	**	**	**	**

** *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
9504510	**	**	**	**	**	**	**
9504520	**	**	**	**	**	**	**
9504530	**	**	**	**	**	**	**

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
9504540	**	**	**	**	**	**	**
9504550	**	**	**	**	**	**	**
9504560	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Power Equipment Technology.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Power Equipment Technology.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Power Equipment Technology.
04.0 Demonstrate an understanding of workplace safety and workplace organization.
05.0 Demonstrate proficiency in performing pre-delivery maintenance services and set-up procedures
06.0 Demonstrate industry-related math skills
07.0 Demonstrate industry-related science skills
08.0 Demonstrate industry-related communication skills.
09.0 Demonstrate proficiency in parts inventory identification and repair order processing.
10.0 Perform basic fuel and exhaust system service.
11.0 Perform basic engine service and minor repairs.
12.0 Perform basic tune-up service.
13.0 Perform power transfer system service and engine controls adjustments.
14.0 Service and repair lubrication systems.
15.0 Diagnose, service, repair and adjust electrical systems
16.0 Service and repair cooling and exhaust systems.
17.0 Service and repair starting systems.
18.0 Diagnose and repair ignition systems.
19.0 Service, repair and adjust engine controls.
20.0 Understand basic two-stroke and four-stroke engines.
21.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Power Equipment Technology.
22.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Power Equipment Technology.
23.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Power Equipment Technology.
24.0 Demonstrate proficiency in repairing and maintaining two-stroke cycle engines.
25.0 Demonstrate proficiency in repairing and maintaining four-stroke cycle engines.
26.0 Demonstrate proficiency in repairing engine interior components.
27.0 Demonstrate proficiency in diagnosing and repairing power transfer systems.
28.0 Demonstrate proficiency in servicing, repairing, and adjusting various types of industry-related power and equipment
29.0 Demonstrate employability skills.
30.0 Demonstrate proficiency in acceptable employee behavior.
31.0 Demonstrate an understanding of entrepreneurship.
32.0 Diagnose, service, repair and adjust portable generators.

33.0 Demonstrate and identify basic principles of electronic fuel management (EFI) systems.

Florida Department of Education
Student Performance Standards

Course Title: **Power and Equipment Technology 1**
Course Number: **9504510**
Course Credit: **1**

Course Description:
The Power and Equipment Technology 1 course prepares students for entry into Power and Equipment Technology 2. Students learn entry-level skills for entry into the outdoor power equipment and other small engine mechanical industries. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of workplace safety and organization; pre-service maintenance and set-up procedures; industry related math, science, and communication skills; part inventory identification; basic fuel and exhaust systems; basic engine service; and basic tune-up.

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 Power Equipment Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Power Equipment 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Power Equipment 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	

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate an understanding of workplace safety and workplace organization--The student will be able to:		
04.01 Identify federal and state standards for health and safety, including the "Right-to-Know" law, as recorded in (29 CFR-1910.1200).		
04.02 Identify, demonstrate, apply, and provide evidence of understanding shop safety requirements, organization and management on an ongoing basis.		
04.01 Identify safety requirements for manual, electrical-powered, and pneumatic tools.		
04.02 Demonstrate, apply, and provide evidence of safely using manual, electrical-powered, and pneumatic tools.		
04.03 Identify safety requirements for operation of automated machines and equipment.		
04.04 Demonstrate, apply, and provide evidence of safely operating automated machines and equipment.		
04.05 Identify the safe use of fuels, chemicals, and compounds		
04.06 Demonstrate, apply, and provide evidence of safely using fuels, chemicals, and compounds.		
04.07 Identify and apply electrical-safety procedures.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
04.08	Identify the safe use of electrical connectors and cords.		
04.09	Demonstrate, apply, and provide evidence of safely using electrical connectors and cords.		
04.10	Identify and apply fire-safety precautions.		
04.11	Research and identify class A, B, and C type fires.		
04.12	Demonstrate and apply the proper procedures for extinguishing class A, B, and C type fires.		
04.13	Identify various workplace injuries.		
04.14	Demonstrate and practice knowledge of first aid and first response procedures appropriate for this course.		
04.15	Identify and apply safety procedures in case of smoke or chemical inhalation.		
04.16	Demonstrate and apply material handling techniques to safely move materials.		
04.17	Demonstrate and apply proper techniques for lifting loads.		
04.18	Research and identify Occupational Safety Health Administration (OSHA) safety standards.		
04.19	Demonstrate, apply, and provide evidence of understanding Occupational Safety Health Administration (OSHA) safety standards.		
04.20	Locate Safety Data Sheets (SDS).		
04.21	Demonstrate understanding and knowledge of using and applying the information located on Safety Data Sheets (SDS).		
04.22	Proactively respond to a safety concern and then document occurrences.		
04.23	Identify and report unsafe conditions.		
04.24	Determine the appropriate corrective action after an unsafe condition is identified.		
04.25	Demonstrate knowledge of various emergency alarms and procedures.		
04.26	Demonstrate knowledge and apply clean-up procedures for spills.		
04.27	Identify and apply procedures for handling hazardous material.		
04.28	Perform safety and environmental inspections.		
04.29	Perform leak checks to determine if toxic or hazardous material is escaping from a piece of equipment.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
04.30	Demonstrate knowledge of proper and safe installation techniques as described in manuals, checklists, and regulations.		
04.31	Demonstrate and apply proper equipment shutdown procedures.		
04.32	Identify, select, and use personal protective equipment (PPE).		
04.33	Identify, demonstrate, and apply ergonomic work techniques.		
04.34	Train other students to use and apply safety skills outlined in this standard.		
05.0	Demonstrate proficiency in performing pre-delivery maintenance services and set-up procedures--The student will be able to:		
05.01	Locate, identify, and interpret manufacturer's identification number information.		
05.02	Inspect tires; determine necessary action.		
05.03	Identify and describe typical gasoline engine lubricants and lubricant properties.		
05.04	Check for proper fluid levels; determine necessary action.		
05.05	Check radiator coolant level (if applicable); determine necessary action.		
05.06	Check filters; determine necessary action.		
05.07	Check accessory circuits; determine necessary action.		
05.08	Test and inspect battery; determine necessary action.		
05.09	Perform battery state-of-charge test; perform slow/fast battery charge.		
05.10	Inspect battery cables, connectors, clamps and hold-downs; determine necessary action.		
05.11	Inspect and test fuses; replace as needed.		
05.12	Detail engine and prepare unit for delivery.		
05.13	Install cables, hoses and electrical assemblies.		
05.14	Inspect cables, connectors, clamps and hold-downs; adjust as necessary.		
05.15	Check drive-chain tension; determine necessary action		
06.0	Demonstrate industry-related math skills--The student will be able to:		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
06.01	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.		
06.02	Perform metric to SAE (and SAE to metric) conversions.		
06.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.		
06.04	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.		
07.0	Demonstrate industry-related science skills--The student will be able to:		
07.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.		
07.02	Draw conclusions or make inferences from data.		
07.03	Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.		
07.04	Understand pressure measurement in terms of Pounds per Square Inch (PSI).		
08.0	Demonstrate industry-related communication skills--The student will be able to:		
08.01	Draw and interpret hydraulic and mechanical schematics.		
08.02	Correctly write reports.		
08.03	Accurately maintain test logs.		
08.04	Create equipment failure reports.		
08.05	Specify and requisition components.		
08.06	Compose technical letters.		
08.07	Write formal reports of laboratory experiences.		
09.0	Demonstrate proficiency in parts inventory identification and repair order processing--The student will be able to:		
09.01	Read and interpret information in parts and service manuals and other technical media.		
09.02	Perform basic parts inventory tracking.		
09.03	Identify and locate parts to service equipment.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
09.04	Write logical and understandable statements, or phrases, to accurately fill out forms, invoices, and work orders.		
09.05	Prepare cost estimates for jobs using service- and flat-rate standards.		
09.06	Interpret and verify customer concerns; determine needed repairs.		
09.07	Answer and ask questions coherently, concisely, and professionally.		
09.08	Read and follow written and oral instructions.		
10.0	Perform basic fuel and exhaust system service--The student will be able to:		
10.01	Service air filters; determine necessary action.		
10.02	Inspect exhaust system, mufflers, and heat shields; determine necessary action.		
10.03	Service fuel filters; determine necessary action.		
10.04	Inspect fuel tank and fuel cap; inspect fuel lines, fittings, and hoses; determine necessary action.		
10.05	Determine and use correct fuel and fuel mixtures.		
10.06	Check fuel for contaminants and quality; determine necessary action.		
11.0	Perform basic engine service and minor repairs--The student will be able to:		
11.01	Identify and demonstrate knowledge of types of engines.		
11.02	Identify and demonstrate knowledge of engine assemblies and systems.		
11.03	Service crankcase breathers.		
11.04	Identify types and ratios of two-cycle mix oils and their application to specific types of equipment.		
11.05	Remove and inspect spark plug(s); determine necessary action.		
11.06	Inspect and test fusible links and fuses; replace as needed.		
12.0	Perform basic tune-up service--The student will be able to:		
12.01	Drain and refill oil, if applicable.		
12.02	Remove and replace spark plug(s).		
12.03	Service filters and breathers.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
12.04 Adjust ignition systems timing.		
12.05 Inspect and service power transfer system.		
12.06 Adjust valves.		

Florida Department of Education
Student Performance Standards

Course Title: **Power and Equipment Technology 2**
Course Number: **9504520**
Course Credit: **1**

Course Description:
The Power and Equipment Technology 2 course prepares students for entry into Power and Equipment Technology 3. Students will learn entry-level skills for entry into the outdoor power equipment and other small engine mechanical industries. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of transfer systems and engine controls; lubrication; electrical systems; cooling and exhaust systems; starting and ignition systems; and basic two-stroke and four-stroke engines.

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 Power Equipment Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Power Equipment 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Power Equipment 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	

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
13.0 Perform power transfer system service and engine controls adjustments--The student will be able to:		
13.01 Inspect and measure drive belts and chains; determine necessary action.		
13.02 Install drive belts and chains.		
13.03 Identify power transfer system components.		
13.04 Replace drive components.		
13.05 Remove, repair, and reinstall clutches.		
13.06 Sharpen and balance blades.		
13.07 Remove and replace or install blades correctly.		
14.0 Service and repair lubrication systems--The student will be able to:		
14.01 Service seals and gaskets; determine necessary action.		
14.02 Identify lubrication systems.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
14.03 Service and repair lubrication systems.		
15.0 Diagnose, service, repair and adjust electrical systems--The student will be able to:		
15.01 Understand and demonstrate knowledge of basic electricity and electronics.		
15.02 Identify basic electricity and electronic symbols.		
15.03 Read, interpret, and identify circuit components using a schematic.		
15.04 Draw and interpret electrical/electronic schematics.		
15.05 Identify and demonstrate knowledge of a basic series, parallel, and combination circuits.		
15.06 Set up and properly use analog or digital multimeters, voltmeters, ammeters, and ohmmeters.		
15.07 Identify ignition systems and components.		
15.08 Replace electrical system components.		
15.09 Identify and test batteries.		
15.10 Service batteries according to manufacturer's specifications.		
15.11 Service, repair and adjust charging systems.		
15.12 Use proper troubleshooting techniques to measure, identify, and diagnose electrical problems.		
15.13 Use wiring diagrams during diagnosis of electrical circuit problems.		
15.14 Identify damaged wire and electrical harnesses; determine necessary action.		
15.15 Locate opens, shorts, grounds, and resistance problems; determine necessary action.		
16.0 Service and repair cooling and exhaust systems--The student will		
16.01 Service air cooling fins and screens.		
16.02 Service two-cycle exhaust systems.		
16.03 Service four-cycle exhaust systems.		
17.0 Service and repair starting systems--The student will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
17.01 Service and repair manual starting systems.		
17.02 Service and repair electrical starting systems.		
17.03 Test and service battery starting systems.		
18.0 Diagnose and repair ignition systems--The student will be able to:		
18.01 Identify and diagnose ignition systems and components.		
18.02 Diagnose and repair magneto ignition systems.		
18.03 Diagnose and repair solid-state ignition systems.		
18.04 Diagnose and repair battery ignition systems.		
18.05 Diagnose and repair impulse ignition systems.		
18.06 Diagnose and repair electronically controlled fuel injection systems.		
19.0 Service, repair and adjust engine controls--The student will be able to:		
19.01 Service, repair and adjust governor speed controls.		
19.02 Service, repair and adjust remote speed controls.		
19.03 Service, repair and adjust manual start-stop controls.		
19.04 Service, repair and adjust electrical start-stop controls.		
19.05 Service, repair and adjust zone systems.		
19.06 Service, repair and adjust blade clutch controls.		
19.07 Service, repair and adjust chain brake systems.		
19.08 Comply with the Consumer Protection Act (CPA) for three-second stops.		
19.09 Comply with the CPA for interlocks.		
19.10 Comply with the CPA for blade tip speed.		
19.11 Read and interpret CPA rules and regulations.		
20.0 Understand basic two-stroke and four-stroke engines--The student will be able to:		
20.01 Explain the basic principles of the operation of two-stroke cycle internal combustion engines.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
20.02 Identify types of two-stroke cycle engines.		
20.03 Explain the basic principles of the operation of four-stroke cycle internal combustion engines.		
20.04 Identify types of four-stroke cycle engines.		
20.05 Locate engine serial and model numbers.		
20.06 Identify engine assemblies and systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Power and Equipment Technology 3**
Course Number: **9504530**
Course Credit: **1**

Course Description:
The Power and Equipment Technology 3 course prepares students for entry into Power and Equipment Technology 4. Students will learn entry-level skills for entry into the outdoor power equipment and other small engine mechanical industries. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of two-stroke and four-stroke cycle engines.

Florida Standards			Correlation to CTE Program Standard #
21.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Power Equipment Technology.		
	21.01 Key Ideas and Details		
	21.01.1	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	
	21.01.2	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	
	21.01.3	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	
	21.02 Craft and Structure		
	21.02.1	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	
	21.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	21.02.3	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 #
21.03	Integration of Knowledge and Ideas		
	21.03.1	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	
	21.03.2	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	
	21.03.3	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	
21.04	Range of Reading and Level of Text Complexity		
	21.04.1	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.	
	21.04.2	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	
22.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Power Equipment Technology.		
22.01	Text Types and Purposes		
	22.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	22.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
22.02	Production and Distribution of Writing		
	22.02.1	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 #
	22.02.2	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	
	22.02.3	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	
	22.03	Research to Build and Present Knowledge	
	22.03.1	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	
	22.03.2	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	
	22.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	22.04	Range of Writing	
	22.04.1	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	
23.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Power Equipment Technology.		
	23.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	23.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	23.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
23.04 Model with mathematics. MAFS.K12.MP.4.1	
23.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
23.06 Attend to precision. MAFS.K12.MP.6.1	
23.07 Look for and make use of structure. MAFS.K12.MP.7.1	
23.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
24.0 Demonstrate proficiency in repairing and maintaining two-stroke cycle engines--The student will be able to:		
24.01 Explain the basic principles of the operation of two-stroke cycle internal combustion engines.		
24.02 Identify types of two-stroke cycle engines.		
24.03 Locate engine serial and model numbers.		
24.04 Identify engine assemblies and systems.		
24.05 Disassemble engines and inspect parts.		
24.06 Remove, clean and inspect heads for cracks, warpage and damaged spark plug threads.		
24.07 Diagnose powerhead problems by use of the visual inspection method.		
24.08 Diagnose powerhead problems by use of the compression tester method.		
24.09 Diagnose powerhead problems by use of the stethoscope method.		
24.10 Remove, clean and inspect piston and rod assemblies.		
24.11 Measure out-of-round of pistons and cylinders.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
24.12	Hone cylinders.		
24.13	Check the total bearing surface of connecting rod bearings.		
24.14	Measure piston skirts and ring grooves.		
24.15	Measure the piston ring gap in cylinder bores.		
24.16	Install piston pins according to manufacturer's specifications.		
24.17	Check rod and piston assembly alignment.		
24.18	Install rings on pistons.		
24.19	Install piston rod assemblies.		
24.20	Measure and check crankshafts with a micrometer.		
24.21	Check needle bearings.		
24.22	Inspect crankshafts and install seal.		
24.23	Inspect, clean and/or replace reed valves.		
24.24	Reassemble engines.		
25.0	Demonstrate proficiency in repairing and maintaining basic four-stroke cycle engines--The student will be able to:		
25.01	Explain the basic principles of the operation of four-stroke cycle internal combustion engines.		
25.02	Identify types of four-stroke cycle engines.		
25.03	Locate engine serial and model numbers.		
25.04	Identify engine assemblies and systems.		
25.05	Diagnose valve and head problems by use of the visual inspection method.		
25.06	Diagnose valve and head problems by use of the compression tester and Leak Down tester method.		
25.07	Disassemble engines and inspect parts.		
25.08	Clean and inspect heads for cracks, warpage and damaged spark plug threads.		
25.09	Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.		
25.10	Adjust valves.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
25.11 Remove and inspect camshafts and lifters.		
25.12 Clean and inspect lifters for wear.		
25.13 Time valve drive assemblies.		
25.14 Remove pistons from rod assemblies.		
25.15 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.		
25.16 Check piston pins and bosses for wear.		
25.17 Measure piston ring lands width, out-of-round and taper.		
25.18 Measure the piston ring gap in cylinder bores.		
25.19 Install and fit piston pins.		
25.20 Check rod and piston assembly alignment.		
25.21 Remove and replace rod bearings.		
25.22 Hone and clean cylinders.		
25.23 Install rings on pistons.		
25.24 Measure and check crankshafts with a micrometer.		
25.25 Check for end play.		
25.26 Check bearing bores with a telescoping gage.		
25.27 Reassemble engines.		
25.28 Install oil seals.		
25.29 Inspect/replace timing belt/chain.		
25.30 After rebuild, final Compression Test and Lead Down Test.		

Florida Department of Education
Student Performance Standards

Course Title: **Power and Equipment Technology 4**
Course Number: **9504540**
Course Credit: **1**

Course Description:
The Power and Equipment Technology 4 course prepares students for entry into the outdoor power equipment or other small engine equipment workforce or into post-secondary training. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of engine interior components; power transfer systems; industry-related power and equipment; employability skills; acceptable employee behavior; and entrepreneurship.

Florida Standards			Correlation to CTE Program Standard #
21.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Power Equipment Technology.		
	21.01 Key Ideas and Details		
	21.01.1	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	
	21.01.2	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	
	21.01.3	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	
	21.02 Craft and Structure		
	21.02.1	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	
	21.02.2	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 #
	21.02.3	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	
21.03	Integration of Knowledge and Ideas		
	21.03.1	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	
	21.03.2	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	
	21.03.3	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	
21.04	Range of Reading and Level of Text Complexity		
	21.04.1	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.	
	21.04.2	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	
22.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Power Equipment Technology.		
22.01	Text Types and Purposes		
	22.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	22.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
22.02	Production and Distribution of Writing		

Florida Standards			Correlation to CTE Program Standard #
	22.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.1112.WHST.2.4	
	22.02.2	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	
	22.02.3	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	
	22.03	Research to Build and Present Knowledge	
	22.03.1	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	
	22.03.2	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	
	22.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	22.04	Range of Writing	
	22.04.1	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	
23.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Power Equipment Technology.		
	23.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	23.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	

Florida Standards	Correlation to CTE Program Standard #
23.03 Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	
23.04 Model with mathematics. MAFS.K12.MP.4.1	
23.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
23.06 Attend to precision. MAFS.K12.MP.6.1	
23.07 Look for and make use of structure. MAFS.K12.MP.7.1	
23.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
26.0 Demonstrate proficiency in repairing engine interior components--The student will be able to:		
26.01 Service, repair and adjust valve systems.		
26.02 Service, repair and adjust rings, bores and pistons.		
26.03 Service, repair and adjust crankshafts and bearings.		
26.04 Service, repair and adjust rods.		
26.05 Service, repair and adjust lubrication systems.		
26.06 Service, repair and adjust internal governor.		
26.07 Service, repair and adjust internal components timing.		
26.08 Assemble complete engines to manufacturer's specifications.		
26.09 Diagnose causes of component failures to determine if they are due to friction, resulting from poor lubrication or contaminated fuel or to normal wear.		
27.0 Demonstrate proficiency in diagnosing and repairing power transfer systems--The student will be able to:		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	27.01 Diagnose and replace power transfer system components.		
	27.02 Diagnose and repair manual transmissions.		
	27.03 Diagnose and repair differentials.		
	27.04 Diagnose and replace drive components.		
	27.05 Remove and replace hydraulic pump systems.		
28.0	Demonstrate proficiency in servicing, repairing, and adjusting various types of industry-related power and equipment--The student will be able to:		
	28.01 Service, repair and adjust lawn and garden equipment.		
	28.02 Service, repair and adjust commercial golf course equipment.		
	28.03 Service, repair and adjust commercial industrial equipment.		
	28.04 Service, repair and adjust various industry-related power and equipment.		
29.0	Demonstrate employability skills--The student will be able to:		
	29.01 Conduct a job search using periodicals and the internet.		
	29.02 Secure information about a job.		
	29.03 Identify documents that may be required when applying for a job interview.		
	29.04 Complete a job application form correctly.		
	29.05 Demonstrate competence in job interview techniques.		
	29.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.		
	29.07 Identify acceptable work habits.		
	29.08 Demonstrate knowledge of how to make appropriate job changes.		
	29.09 Demonstrate acceptable employee health habits.		
	29.10 Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200).		
30.0	Demonstrate proficiency in acceptable employee behavior--The student will be able to:		
	30.01 Explain the effects of chemical/substance abuse.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
30.02	Identify principles of stress management.		
30.03	Identify and define career opportunities in the industry.		
30.04	Explain and identify acceptable work ethics.		
30.05	Explain acceptable dress standards.		
30.06	Identify and demonstrate proper customer relations skills.		
30.07	Identify principles of time management.		
30.08	Identify and define payroll deductions (taxes, insurance, and social security) and employee benefits.		
31.0	Demonstrate an understanding of entrepreneurship--The student will be able to:		
31.01	Define entrepreneurship.		
31.02	Describe the importance of entrepreneurship to the American economy.		
31.03	List the advantages and disadvantages of business ownership.		
31.04	Identify and explain the risks involved in ownership of a business.		
31.05	Identify and explain the necessary personal characteristics of a successful entrepreneur.		
31.06	Identify and explain the business skills needed to operate a small business efficiently and effectively.		
31.07	Identify and explain the various types of business structures, e.g. sole proprietor, S-Corporation, etc.		

Florida Department of Education
Student Performance Standards

Course Title: **Power and Equipment Technology 5**
Course Number: **9504550**
Course Credit: **1**

Course Description:
The Power and Equipment Technology 5 course prepares students for entry into the outdoor power equipment or other small engine equipment workforce or into post-secondary training. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of portable generators.

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, NGSSS-Sci.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
32.0	Diagnose, service, repair and adjust portable generators--The student will be able to:		
32.01	Identify generator components and system rotor assembly, stator, circuit breakers, transformers, relays, transistors, brush and brush holder, and voltage regulator.		
32.02	Diagnose and service generator systems using revolving field excitation methods, direct excitation, brushless excitation method, field boost assembly, power factor, and oil pressure switch on GN engines.		
32.03	Identify and diagnose typical automatic idle control system, troubleshooting idle control, and troubleshooting flow chart for direct excited (brush type generators)		
32.04	Troubleshoot brush type generators using industry recognized troubleshooting flowcharts.		
32.05	Troubleshoot brushless type generators using industry recognized troubleshooting flowcharts.		

Florida Department of Education
Student Performance Standards

Course Title: **Power and Equipment Technology 6**
Course Number: **9504560**
Course Credit: **1**

Course Description:
The Power and Equipment Technology 6 course prepares students for entry into the outdoor power equipment or other small engine equipment workforce or into post-secondary training. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of basic principles of electronic fuel management systems.

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
33.0 Demonstrate and identify basic principles of electronic fuel management (EFI) systems--The student will be able to:		
33.01 Diagnose and service fuel pump, module and left pump.		
33.02 Diagnose and service fuel filter, high pressure lines, and fuel pressure gauge.		
33.03 Diagnose and service (injector pop off tool) fuel injector.		
33.04 Diagnose and service electronic control unit (ECU).		
33.05 Diagnose and service engine oil temperature sensor.		
33.06 Diagnose and service throttle control sensor.		
33.07 Troubleshoot malfunction indicator light (MIL) air intake temperature sensor.		
33.08 Troubleshoot, read and interpret wiring harness EFT diagram 6 terminal connectors.		
33.09 Troubleshoot, diagnose, and service using EFI diagnostic flow diagram flowchart.		
33.10 Troubleshoot, diagnose, and service using industry recognized EFI system flowchart.		
33.11 Diagnose and service oxygen sensor.		

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

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the following postsecondary Power Equipment Technologies (T400300) courses:

Power Equipment Service Technician 1 - (300 hours)
Power Equipment Service Technician 2 - (300 hours)
Power Equipment Service Technician 3 - (300 hours)

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Avionics Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Avionics Systems (9504300)

Secondary – Career Preparatory	
Program Number	9540300
CIP Number	0647060902
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AVIONICS @7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2091 – Avionics 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students for employment as avionics installation and repair technicians.

The course content includes, but is not limited to, troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product 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 occupational completion points.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	9540310	Electronics Fundamentals 1	1 credit	49-2091	3	VO
B	9540320	Electronics Fundamentals 2	1 credit	49-2091	2	VO
C	9540330	Communications Systems Technician	1 credit	49-2091	2	VO
D	9540340	Electronic Navigation and Unmanned Aircraft Systems Technician	1 credit	49-2091	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
9540310	**	**	**	**	**	**	**	**	**	**	**
9540320	**	**	**	**	**	**	**	**	**	**	**
9540330	**	**	**	**	**	**	**	**	**	**	**
9540340	**	**	**	**	**	**	**	**	**	**	**

** *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
9540310	**	**	**	**	**	**	**
9540320	**	**	**	**	**	**	**
9540330	**	**	**	**	**	**	**
9540340	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Avionics Technology.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Avionics Technology.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Avionics Technology.
04.0 Demonstrate proficiency in soldering and basic laboratory practices.
05.0 Demonstrate proficiency in basic DC circuits.
06.0 Demonstrate employability skills.
07.0 Demonstrate an understanding of entrepreneurship.
08.0 Demonstrate proficiency in knowledge of basic computer usage.
09.0 Demonstrate proficiency in advanced DC circuits.
10.0 Demonstrate proficiency in AC circuits.
11.0 Demonstrate proficiency in analog circuits.
12.0 Demonstrate proficiency in solid state devices.
13.0 Demonstrate proficiency in digital circuits.
14.0 Demonstrate proficiency in fundamental micro-processors.
15.0 Demonstrate appropriate understanding of basic math skills.
16.0 Demonstrate an understanding of basic science skills.
17.0 Demonstrate skills in technical recording.
18.0 Demonstrate appropriate communication skills.
19.0 Demonstrate competency in adherence to Federal Aviation Regulations including FAA form 337 and FAR 43.13.
20.0 Demonstrate proficiency with Aircraft Drawings CAD and wiring diagrams.
21.0 Demonstrate proficiency in Aircraft fundamentals.
22.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Avionics Technology.
23.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Avionics Technology.
24.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Avionics Technology.
25.0 Demonstrate proficiency in aircraft electrical systems and ground safety.
26.0 Demonstrate proficiency in installing avionics systems, including, Comm, Nav, GPS, Traffic Avoidance, audio integrating etc.
27.0 Demonstrate proficiency in sheet metal applications.
28.0 Demonstrate proficiency in AM and FM transmitters.
29.0 Demonstrate proficiency in AM and FM receivers.
30.0 Demonstrate proficiency in AM and FM transceivers.
31.0 Demonstrate proficiency in electromagnetic wave emissions.
32.0 Demonstrate proficiency in line maintenance of airborne radio navigation systems and equipment.

33.0 Demonstrate proficiency in line maintenance of airborne communication systems.
34.0 Demonstrate proficiency in primary and secondary airborne radar systems.
35.0 Demonstrate proficiency with In-Flight Entertainment Systems.
36.0 Demonstrate proficiency with Engine Monitoring displays, purpose and function.
37.0 Pitot-Static Systems
38.0 Foundations
39.0 UAS Development
40.0 UAV Flight Operations
41.0 UAS Operations

Florida Department of Education
Student Performance Standards

Course Title: **Electronics Fundamentals 1**
Course Number: **9540310**
Course Credit: **1**

Course Description:
This course teaches basic DC an AC electricity and electronics fundamentals. It emphasizes troubleshooting techniques and it brings elements that help to develop fine motor skills. This course defines techniques, requirements and expectations for those seeking to enter the job market as employees or small business owners.

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 Avionics Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Avionics 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
02.03	Research to Build and Present Knowledge		
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
02.04	Range of Writing		
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Avionics 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		

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate proficiency in soldering basic laboratory practices--The student will be able to:		
04.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.		
04.02 Make electrical connections.		
04.03 Identify and use hand tools properly.		
04.04 Identify and use power tools properly.		
04.05 Demonstrate acceptable soldering techniques.		
04.06 Demonstrate acceptable desoldering techniques.		
04.07 Demonstrate electrostatic discharge (ESD) safety procedures.		
04.08 Describe the construction of printed circuit boards (PCB's).		
04.09 Explain the theoretical concepts of soldering.		
04.10 Demonstrate rework and repair techniques.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
05.0	Demonstrate proficiency in basic direct current (DC) circuits--The student will be able to:		
05.01	Demonstrate proficiency in basic DC circuits.		
05.02	Solve problems in electronic units utilizing metric prefixes.		
05.03	Identify sources of electricity.		
05.04	Define voltage, current, resistance, power and energy.		
05.05	Apply Ohm's law and power formulas.		
05.06	Read and interpret color codes and symbols to identify electrical components and values.		
05.07	Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.		
05.08	Compute conductance and compute and measure resistance of conductors and insulators.		
05.09	Apply Ohm's law to series circuits.		
05.10	Analyze and troubleshoot series circuits.		
05.11	Apply Ohm's law to parallel circuits.		
05.12	Analyze and troubleshoot parallel circuits.		
06.0	Demonstrate employability skills--The student will be able to:		
06.01	Discuss elements of a job search.		
06.02	Develop sources of information about a job.		
06.03	Identify documents that may be required when applying for a job.		
06.04	Complete a job application form correctly.		
06.05	Demonstrate competence in job interview techniques.		
06.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.		
06.07	Identify acceptable work habits.		
06.08	Demonstrate knowledge of how to make appropriate job changes.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
06.09	Demonstrate acceptable employee health habits.		
06.10	Demonstrate knowledge of the “Right-to-Know Law” as recorded in (29 CFR-1910.1200).		
06.11	Resume writing.		
07.0	Demonstrate an understanding of entrepreneurship--The student will be able to:		
07.01	Define entrepreneurship.		
07.02	Describe the importance of entrepreneurship to the American economy.		
07.03	List the advantages and disadvantages of business ownership.		
07.04	Identify the risks involved in ownership of a business.		
07.05	Identify the necessary personal characteristics of a successful entrepreneur.		
07.06	Identify the business skills needed to operate a small business efficiently and effectively.		
07.07	Corporate structure “S”,”C”, Sole Proprietor, “LLC”		
08.0	Demonstrate proficiency in knowledge of basic computer usage--The student will be able to:		
08.01	Demonstrate proficiency in the knowledge of basic computer use.		
08.02	Demonstrate the use of computer application programs (i.e., word processing, data base, Excel).		
09.0	Demonstrate proficiency in advanced DC circuits--The student will be able to:		
09.01	Solve algebraic problems to include exponentials to DC.		
09.02	Relate electricity to the nature of matter.		
09.03	Apply Ohm’s law to series-parallel and parallel-series circuits.		
09.04	Construct and verify the operation of series-parallel and parallel-series and bridge circuits.		
09.05	Troubleshoot series-parallel and parallel-series and bridge circuits.		
09.06	Identify and define voltage divider circuits (loaded and unloaded).		
09.07	Construct and verify the operation of voltage divider circuits (loaded and unloaded).		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
09.08	Analyze and troubleshoot voltage divider circuits (loaded and unloaded).		
09.09	Describe magnetic properties of circuits and devices.		
09.10	Determine the physical and electrical characteristics of capacitors and inductors.		
09.11	Define resistor-capacitor (R-C) and resistor-inductor (R-L) time constants.		
09.12	Set up and operate power supplies for DC circuits.		
10.0	Demonstrate proficiency in AC circuits--The student will be able to:		
10.01	Solve basic trigonometric problem as applicable to electronics.		
10.02	Define the characteristics of AC capacitive circuits.		
10.03	Analyze and troubleshoot AC capacitive circuits.		
10.04	Define the characteristics of AC inductive circuits.		
10.05	Analyze and troubleshoot AC inductive circuits.		
10.06	Define and apply the principles of transformers to AC circuits.		
10.07	Analyze and troubleshoot AC circuits utilizing transformers.		
10.08	Analyze and troubleshoot differentiator and integrator circuits.		
10.09	Define the characteristics of resistive, Inductive, and Capacitive (RLC) circuits (series, parallel and complex).		
10.10	Define the characteristics of series and parallel resonant circuits.		
10.11	Analyze and troubleshoot R-C, R-L, and RLC circuits.		
10.12	Define the characteristics of frequency selective filter circuits.		
10.13	Analyze and troubleshoot frequency selective filter circuits.		
10.14	Define the characteristics of polyphase circuits.		
10.15	Define basic motor theory and operation.		
10.16	Define basic generator theory and operation.		
10.17	Set up and operate power supplies for AC circuits.		
10.18	Analyze and measure power in AC circuits.		

Florida Department of Education
Student Performance Standards

Course Title: **Electronics Fundamentals 2**
Course Number: **9540320**
Course Credit: **1**

Course Description:
This course develops skills and understanding of advanced electronics, Analog, Digital, and Microprocessor functions. Students will learn or refresh practical and applied math and science skills. Demonstrate competencies with Federal Regulations, aircraft drawings, and aircraft fundamentals.

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 Avionics 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 the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Avionics 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 Avionics Technology.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
11.0 Demonstrate proficiency in analog circuits--The student will be able to:		
11.01 Identify and define operational characteristics and applications of multistage amplifiers.		
11.02 Analyze and troubleshoot multistage amplifiers.		
11.03 Identify and define operating characteristics and applications of linear integrated circuits.		
11.04 Identify and define operating characteristics and applications of basic power supplies and filters.		
11.05 Identify and define operating characteristics and applications of differential and operational amplifiers.		
11.06 Analyze and troubleshoot differential and operational amplifier circuits.		
11.07 Identify and define operating characteristics of audio power amplifiers.		
11.08 Analyze and troubleshoot audio power amplifiers.		
11.09 Identify and define operating characteristics and applications of power supply regulator circuits.		
11.10 Analyze and troubleshoot power supply regulator circuits.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
11.11	Identify and define operating characteristics and applications of active filters.		
11.12	Analyze and troubleshoot active filter circuits.		
11.13	Identify and define operating characteristics and applications of sinusoidal and non-sinusoidal oscillator circuits.		
11.14	Analyze and troubleshoot oscillator circuits.		
11.15	Identify and define operating characteristics and applications of cathode ray tubes.		
11.16	Identify and define operating characteristics and applications of optoelectronic devices.		
11.17	Set up and operate measuring instruments for analog circuits.		
12.0	Demonstrate proficiency in solid state devices--The student will be able to:		
12.01	Identify and define properties of semiconductor materials.		
12.02	Identify and define operating characteristics and applications of junction diodes.		
12.03	Identify and define operating characteristics and applications of special diodes.		
12.04	Analyze and troubleshoot diode circuits.		
12.05	Identify and define operating characteristics and applications of bipolar transistors,		
12.06	Identify and define operating characteristics and applications of field effect transistors.		
12.07	Identify and define operating characteristics and applications of single-stage amplifiers.		
12.08	Analyze and troubleshoot single-stage amplifiers.		
12.09	Analyze and troubleshoot thyristor circuitry.		
12.10	Set up and operate DVM for solid-state devices.		
12.11	Set up and operate power supplies for solid-state devices.		
12.12	Set up and operate oscilloscopes for solid-state devices.		
12.13	Set up and operate function generators for solid-state devices.		
12.14	Demonstrate transistor testing techniques.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
13.0 Demonstrate proficiency in digital circuits--The student will be able to:		
13.01 Define and apply numbering systems to codes and arithmetic operations.		
13.02 Analyze and minimize logic circuits using Boolean operations.		
13.03 Set up and operate logic probes for digital circuits.		
13.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.		
13.05 Set up and operate pulsers for digital circuits.		
13.06 Set up and operate oscilloscopes for digital circuits.		
13.07 Set up and operate logic analyzers for digital circuits.		
13.08 Set up and operate pulse generators for digital circuits.		
13.09 Identify types of logic gates and their truth tables.		
13.10 Construct combinational logic circuits using integrated circuits.		
13.11 Troubleshoot logic circuits.		
13.12 Analyze types of flip-flops and their truth tables.		
13.13 Troubleshoot flip-flops.		
13.14 Identify, define and measure characteristics of integrated circuit (IC) logic families.		
13.15 Identify types of registers and counters.		
13.16 Troubleshoot registers and counters.		
13.17 Analyze clock and timing circuits.		
13.18 Troubleshoot clock and timing circuits.		
13.19 Identify types of arithmetic-logic circuits.		
13.20 Troubleshoot arithmetic-logic circuits.		
13.21 Identify types of encoding and decoding devices.		
13.22 Troubleshoot encoders and decoders.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
13.23	Identify types of multiplexer and demultiplexer circuits.		
13.24	Troubleshoot multiplexer and demultiplexer circuits.		
13.25	Identify types of memory circuits.		
13.26	Relate the uses of digital-to-analog and analog-to-digital conversions.		
13.27	Troubleshoot digital-to-analog and analog-to-digital circuits.		
13.28	Identify types of digital displays.		
13.29	Troubleshoot digital display circuits.		
14.0	Demonstrate proficiency in fundamental microprocessors--The student will be able to:		
14.01	Identify central processing unit (CPU) building blocks and their uses (architecture).		
14.02	Analyze bus concepts.		
14.03	Analyze various memory schemes.		
14.04	Use memory devices in circuits.		
14.05	Set up and operate oscilloscopes for microprocessor systems.		
14.06	Identify types of input and output devices and peripherals.		
14.07	Interface input and output ports to peripherals.		
14.08	Analyze and troubleshoot input and output ports.		
15.0	Demonstrate appropriate understanding of basic math skills--The student will be able to:		
15.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares and cylinders.		
15.02	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.		
15.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.		
15.04	Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.		
15.05	Demonstrate and understanding of federal, state, and local taxes and their computation.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
16.0	Demonstrate an understanding of basic science skills--The student will be able to:		
16.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.		
16.02	Draw conclusions or make interferences from data.		
16.03	Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.		
16.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.		
17.0	Demonstrate skills in technical recording--The student will be able to:		
17.01	Draw and interpret electronic schematics.		
17.02	Write reports and make oral presentations.		
17.03	Maintain test logs.		
17.04	Make equipment failure reports.		
17.05	Specify and requisition simple electronic components.		
17.06	Compose technical letters and memoranda.		
17.07	Write formal reports of laboratory experiences.		
17.08	Draft preventive maintenance procedures.		
18.0	Demonstrate appropriate communication skills--The student will be able to:		
18.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.		
18.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.		
18.03	Read and follow written instructions.		
18.04	Answer and ask questions coherently and concisely.		
18.05	Read critically by recognizing assumptions and implications and by evaluating ideas.		
18.06	Demonstrate appropriate telephone/communication skills.		
19.0	Demonstrate competency in adherence to federal aviation regulations--The student will be able to:		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
19.01 Maintenance Technician-General Privileges and Limitations		
19.02 Maintenance Forms and Records including FAA Form 337		
19.03 Maintenance Publications		
19.04 Use and analysis of technical data		
20.0 Demonstrate proficiency with aircraft drawings--The student will be able to:		
20.01 Aircraft Drawings and Diagrams, Flowcharts, Symbols, and Lines		
20.02 Reading and interpreting Aircraft Drawings and Blueprints		
20.03 Preparation and sketches of repairs and alterations		
20.04 Use of charts and graphs		
20.05 Familiarization and usage of CAD Systems		
21.0 Demonstrate proficiency in aircraft fundamentals--The student will be able to:		
21.01 Aerodynamic Forces and Aircraft Structures and Components		
21.02 Aircraft Flight Controls and Aircraft Flight Operations.		

Florida Department of Education
Student Performance Standards

Course Title: **Communications Systems Technician**
Course Number: **9540330**
Course Credit: **1**

Course Description:
Students will understand the requirements of a successful avionics communication system installation. They will learn receiver/transceiver system theory and function as well as aspects of antenna and radio wave propagation.

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 Avionics Technology.		
	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 Avionics Technology.		
	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	

Florida Standards			Correlation to CTE Program Standard #
	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, 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 Avionics Technology.		
	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	

Florida Standards	Correlation to CTE Program Standard #
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	
24.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
25.0 Demonstrate proficiency in aircraft electrical systems and ground safety--The student will be able to:		
25.01 Circuit Protective Devices, Switches, Lamps, and Relays.		
25.02 Safety and Handling of Aircraft Electrical Wires and Cables.		
25.03 Cutting, Stripping, Splicing, Soldering, and Stamping/Identifying Wires and Cables for Installation in an Aircraft.		
25.04 Preparation, Use, Installation, and Inspection of General Purpose Connectors.		
25.05 AN-MS Connectors for Aircraft Electrical Systems		
25.06 Lead-Acid and Nickel Cadmium (NiCad) Aircraft Batteries-Identification, Construction, Installation and Service.		
25.07 Familiarization with Aircraft Alternator and Generator Systems.		
26.0 Demonstrate proficiency in installing avionics systems--The student will be able to:		
26.01 Installation Planning		
26.02 Design wiring interconnection for Comm, Nav, GPS, Traffic Avoidance, Audio Integrating etc.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
26.03 Fabricate Wiring Harnesses		
26.04 Corrosion Control in Avionics		
26.05 Mechanical Installation		
26.06 Electrical Installation		
26.07 Installation of Manufacturers Equipment		
26.08 Antenna Placement and Noise interference		
27.0 Demonstrate proficiency in sheet metal applications--The student will be able to:		
27.01 Selection, Installation, and Removal of Conventional Rivets		
27.02 Selection, Installation, and Removal of Special Rivets (Fasteners)		
27.03 Layout, Forming, and Bending Sheet Metal		
27.04 Inspecting and Repairing Sheet Metal Structures		
27.05 Aircraft Antenna Installations and Doubler plates.		
28.0 Demonstrate proficiency in AM and FM transmitters--The student will be able to:		
28.01 Define DSB, SSB and FM modulation.		
28.02 Analyze and troubleshoot AM and FM RF oscillator circuits.		
28.03 Analyze and troubleshoot buffer and multiplier circuits.		
28.04 Analyze and troubleshoot RF power amplifier circuits.		
28.05 Analyze and troubleshoot AM and FM modulation circuits.		
28.06 Analyze and troubleshoot microphone circuits.		
28.07 Analyze and troubleshoot balanced modulators and SSB filter circuits.		
28.08 Analyze and troubleshoot AM and FM power supply circuits.		
28.09 Make power, frequency and modulation measurements of AM and FM transmitters.		
28.10 Align and troubleshoot AM and FM transmitters.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
28.11 Describe FCC rules pertaining to AM and FM transmitter maintenance and operation.		
29.0 Demonstrate proficiency in AM and FM receivers--The student will be able to:		
29.01 Analyze and troubleshoot receiver audio voltage and power amplifiers and speaker/headphone circuits.		
29.02 Analyze and troubleshoot AM and FM detector circuits.		
29.03 Analyze and troubleshoot AM IF amplifier circuits.		
29.04 Analyze and troubleshoot FM IF amplifier and limited circuits.		
29.05 Analyze and troubleshoot receiver oscillator and AFC circuits.		
29.06 Analyze and troubleshoot RF mixer/heterodyne circuits.		
29.07 Analyze and troubleshoot receiver RF amplifier circuits.		
29.08 Analyze and troubleshoot AVC/AGC circuits.		
29.09 Analyze and troubleshoot receiver power supplies.		
29.10 Align and troubleshoot AM and FM receivers.		
30.0 Demonstrate proficiency in AM and FM transceivers--The student will be able to:		
30.01 Analyze and troubleshoot transceiver control, metering and switching circuits.		
30.02 Analyze and troubleshoot transceiver frequency synthesizers and phase locked loop circuits.		
30.03 Analyze and troubleshoot squelch circuits.		
30.04 Align and troubleshoot transceivers.		
31.0 Demonstrate proficiency in electromagnetic wave emissions--The student will be able to:		
31.01 Define the radio frequency spectrum.		
31.02 Define types and classification of RF emissions.		
31.03 Define the characteristics of radio waves.		
31.04 Define radio wave propagation method.		
31.05 Define the basic types of antennas.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
31.06 Draw the voltage and current relationships and radiation patterns for the basic types of antennas.		
31.07 Define methods for antenna tuning, gain and directivity.		
31.08 Define transmission lines in terms of electrical and physical properties.		
31.09 Define standing waves, cause and effect, and measure standing wave ratios.		
31.10 Define tuned transmission lines and describe applications.		
31.11 Construct transmission lines.		
31.12 Define waveguides, resonant cavities and their applications.		

Florida Department of Education
Student Performance Standards

Course Title: **Electronic Navigation and Unmanned Aircraft Systems Technician**
Course Number: **9540340**
Course Credit: **1**

Course Description:
This course is designed as an introduction to the rapidly advancing field of Unmanned Aerial Vehicles and systems. Students will be proficient in instrumentation, airframe fundamentals, various types of electronic navigation, and cabin entertainment systems.

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 Avionics Technology.		
	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 Avionics Technology.		
	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	

Florida Standards			Correlation to CTE Program Standard #
	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, 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 Avionics Technology.		
	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	

Florida Standards	Correlation to CTE Program Standard #
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	
24.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
32.0 Demonstrate proficiency in line maintenance of airborne radio navigation systems and equipment--The student will be proficient in theory and operating principles of:		
32.01 Global Position Satellite System		
32.02 Earth Coordinate System		
32.03 Great Circle Navigation		
32.04 Navigation Principles		
32.05 VHF Omni Range System		
32.06 Distance Measuring Equipment System		
32.07 Automatic Direction Finder System		
32.08 Instrument Landing System		
32.09 Microwave Landing Systems.		
32.10 Electrical integration including		
a. Airborne Instrument System		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	b. VHF Omni-directional range/instrument Landing System (ILS) and System Localizer (VOR/LOC) audio		
	c. Navigation Indicators (CDI ON/OFF flag, TO/FROM flag, OBS, etc.)		
	d. Radio Magnetic Indicator (RMI)		
	e. Flight Director (FD) System		
	f. Autopilot (AP) System		
32.11	Flight Management System		
33.0	Demonstrate proficiency in line maintenance of airborne communication systems--The student will be able to:		
33.01	History of the Radio		
33.02	Regulatory and non-Regulatory Agencies affecting aircraft electronic systems		
33.03	Aircraft Audio Integration Systems		
33.04	VHF Communication Systems		
33.05	HF Communication Systems		
33.06	Satellite Communication Systems		
33.07	Selective Calling		
33.08	Aircraft Communication Automatic Reporting System		
34.0	Demonstrate proficiency in primary and secondary radar systems--The student will be proficient in theory and operating principles of:		
34.01	Primary Radar Theory of Operation		
34.02	Block Level Primary Function		
34.03	Doppler Radar		
34.04	Secondary (ATC) Radar Transponder		
34.05	Altitude Encoding		
34.06	Lightning Detection		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	34.07 XM Weather System		
35.0	Demonstrate proficiency with in-flight entertainment systems--The student will be familiar with similarity and difference of various systems		
	35.01 System familiarization, purpose, function		
	35.02 Installation considerations		
36.0	Engine monitoring displays–The student will be able to identify and interpret data from various types of displays.		
	36.01 Display types		
	36.02 Purpose, function, interpretation of data		
37.0	Pitot-static systems--The students will be able to test and interpret results from practical run-ups.		
	37.01 Understand purpose and function of pitot-static systems		
	37.02 Ability to perform integrity run-up checks		
	37.03 Troubleshoot pitot-static system		
38.0	Foundations--The students will be able to explain the roles, requirements, and basic function of Unmanned Aerial Systems:		
	38.01 Introduction to Unmanned Aerial Systems		
	38.02 UAS Certifications and Requirements.		
	38.03 Aerodynamics		
39.0	UAS Development--The students will demonstrate a working knowledge of the airframes and powerplants utilized in Unmanned Aerial Systems:		
	39.01 Parts of an Airplane, Aircraft Performance.		
	39.02 Structures and Fabrication, and Aircraft Components.		
	39.03 Reliability, Availability, Maintainability.		
40.0	UAV Flight Operations--The students will demonstrate an understanding of the levels of autonomy currently in use as well as those under development, as well as function and purpose of Unmanned Aerial Vehicles. They will also be exposed to employment possibilities inherent to UAV operation:		
	40.01 UAV Guidance, Navigation and Control.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	40.02 UAV Payloads, Power, and Communications.		
	40.03 UAS Personnel, Operations, and Careers.		
41.0	UAS Operations--The students will be able to explain cost and risk factors associated with and alleviated by usage of Unmanned Aerial Systems:		
	41.01 UAS Missions		
	41.02 Ground Control Station Components, Flight Line Safety.		
	41.03 History of UAS, Systems Engineering, Engineering Design Process.		
	41.04 Understand and apply the regulatory requirements outlined by the FAA (Federal Aviation Administration) in the ownership, use, and operation of an Unmanned Aerial Vehicle.		

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

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Mobile Electronics Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9540400
CIP Number	0647010105
Grade Level	9-12, 30, 31
Standard Length	2 credits
Teacher Certification	AUTO MECH @7 7G COMP SVC 7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this program is to prepare students for employment or advanced training in a variety of occupations in the Mobile Electronics technology industry.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Mobile Electronics Industry; technical skills, underlying principles of technology , planning, management, finance, labor issues, community issues and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster. This program offers a broad foundation of knowledge and skills to prepare students for employment in network support services positions.

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.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	9540410	Mobile Electronics Technology 1	1 credit	49-2096	2	VO
B	9540420	Mobile Electronics Technology 2	1 credit	49-2096	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
9540410	**	**	**	**	**	**	**	**	**	**	**
9540420	**	**	**	**	**	**	**	**	**	**	**

** *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
9540410	**	**	**	**	**	**	**
9540420	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Mobile Electronics Technology.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Mobile Electronics Technology.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Mobile Electronics Technology.
04.0 Demonstrate proficiency in occupational safety.
05.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the mobile electronics industry.
06.0 Demonstrate proficiency in acceptable employee behavior in the automotive industry.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate proficiency in appropriate math skills as it relates to the mobile electronics industry.
09.0 Demonstrate proficiency in appropriate understanding of basic sciences.
10.0 Demonstrate proficiency in preparing a vehicle for pre/post customer requested installations or services.
11.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
12.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
13.0 Explain the importance of employability and entrepreneurship skills
14.0 Demonstrate proficiency in electrical basics.
15.0 Demonstrate proficiency in evaluating and assessing vehicle power sources.
16.0 Demonstrate proficiency in locating and repairing common installation and electrical problems in automobiles.
17.0 Demonstrate a working knowledge of direct current circuits (DC).
18.0 Demonstrate a working knowledge of alternating current (AC) circuits.
19.0 Demonstrate proficiency in locating and troubleshooting common installation and electrical problems in automobiles.
20.0 Demonstrate a working knowledge of vehicle electrical systems.
21.0 Demonstrate a working knowledge of OBD systems.
22.0 Demonstrate knowledge of basic mobile audio/video systems.
23.0 Demonstrate a working knowledge of security and convenience systems.
24.0 Demonstrate a working knowledge of advanced in-vehicle information and control systems.
25.0 Demonstrate knowledge of basic telematics systems using wireless communications.
26.0 Demonstrate proficiency in evaluating and assessing various circuits in a vehicle where aftermarket components will connect.
27.0 Demonstrate proficiency in the evaluation and installation of basic and advanced automotive audio system elements, enhancements or the replacement of audio system components.
28.0 Demonstrate proficiency in the evaluation and installation of basic and advanced automotive security and convenience elements and components.
29.0 Demonstrate knowledge of a Wireless Local Area Network (WLAN).
30.0 Demonstrate knowledge of lighting systems (i.e. H.I.D, LED, halogen lights).
31.0 Demonstrate a working knowledge of basic installation knowledge and techniques.

32.0 Demonstrate proficiency in the installation of Rear Seat Entertainment (RSE) Systems.

Florida Department of Education
Student Performance Standards

Course Title: **Mobile Electronics Technology 1**
Course Number: **9540410**
Course Credit: **1**

Course Description:
The Mobile Electronics Technology 1 course content includes, but is not limited to, installation, configuration, operation, and maintenance of Mobile Audio/Video Systems; Autosound, Wireless Communications, Security, Navigation, In-Vehicle Information Systems, Safety Systems, Satellite Antenna, and low voltage wiring systems. Other course content includes, but is not limited to, communication, leadership skills, human relations and employability skills; and safe, efficient work practices.

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 Mobile Electronics Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Mobile Electronics 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Mobile Electronics Technology.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	

Florida Standards	Correlation to CTE Program Standard #
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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate proficiency in occupational safety--The student will be able to:		
04.01 List the level of electricity (shock) considered lethal to humans.		
04.02 Describe safety considerations when working in and around motor vehicles.		
04.03 Apply shop safety rules, EPA and OSHA standards.		
04.04 Explain the measurement and safety concerns of sound pressure level and hearing damage.		
04.05 Identify and use appropriate emergency first aid procedures.		
04.06 Interpret the Florida “Workers Right-to-Know Law”.		
04.07 Utilize and demonstrate safe procedures for handling of tools and equipment.		
04.08 Identify and use proper placement of floor jacks and jack stands.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
04.09	Identify and use proper procedures for safe lift operation.		
04.10	Utilize proper ventilation procedures for working within the lab/shop area.		
04.11	Identify marked safety areas.		
04.12	Identify the location and the types of fire extinguishers and other fire safety equipment.		
04.13	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.		
04.14	Identify the location and use of eye wash stations.		
04.15	Identify the location of the posted evacuation routes.		
04.16	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.		
04.17	Identify and wear appropriate clothing for lab/shop activities.		
04.18	Secure hair and jewelry for lab/shop activities.		
04.19	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.		
04.20	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.		
04.21	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)		
04.22	Locate and demonstrate knowledge of safety data sheets (SDS).		
05.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the mobile electronics industry--The student will be able to:		
05.01	Identify tools and equipment and their appropriate usage in mobile electronics applications.		
05.02	Identify and use standard and metric measurement skills and designation.		
05.03	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.		
05.04	Demonstrate proper use of precision-measuring tools and torque methods.		
05.05	Identify, use and maintain hand and power tools properly.		
05.06	Identify and practice using appropriate precision measuring tools and torque methods.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
05.07	Identify and describe the proper tools to apply and remove automotive fasteners, to include thread repair.		
05.08	Identify and use metric and English measurement skills.		
06.0	Demonstrate proficiency in acceptable employee behavior in the automotive industry--The student will be able to:		
06.01	Explain the effects of chemical/substance abuse.		
06.02	Identify principles of stress management.		
06.03	Demonstrate acceptable industry dress code.		
06.04	Identify and demonstrate proper customer relation skills.		
06.05	Identify and define payroll deductions (taxes, insurance, and social security) employee benefits and pay systems.		
06.06	Identify principles of time management.		
06.07	Identify acceptable customer relations.		
07.0	Demonstrate appropriate communication skills--The student will be able to:		
07.01	Write logical and understandable statements, or phrases, to accurately fill out forms and invoices commonly used in business and industry.		
07.02	Read and use graphs, charts, diagrams, tables, parts manuals, and information sources commonly used in this industry/occupational area.		
07.03	Read and follow written and oral instructions.		
07.04	Answer and ask questions coherently and concisely.		
07.05	Read critically by recognizing assumptions and implications and by evaluating ideas.		
07.06	Demonstrate appropriate telephone/communication skills.		
08.0	Demonstrate proficiency in appropriate math skills as it relates to the mobile electronics industry--The student will be able to:		
08.01	Read and interpret measuring devices.		
08.02	Solve number word problems.		
08.03	Write percent add fractions and decimals.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
08.04	Solve percent problems.		
08.05	Find the percent of a number.		
08.06	Operate a calculator.		
08.07	Understand and use the metric system.		
08.08	Convert inches to millimeters and millimeters to inches.		
08.09	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.		
08.10	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.		
08.11	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.		
08.12	Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.		
09.0	Demonstrate proficiency in appropriate understanding of basic sciences--The student will be able to:		
09.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.		
09.02	Draw conclusions or make inferences from data.		
09.03	Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.		
09.04	Understand pressure measurement in terms of Pounds per Square Inch (P.S.I.), inches of mercury (InHg) and kilopascals (K.P.A.)		
10.0	Demonstrate proficiency in preparing a vehicle for pre/post customer requested installations or services-- The student will be able to:		
10.01	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.		
10.02	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.		
10.03	Determine the presence of a Tire Pressure Monitoring System (TPMS).		
10.04	Determine the presence of an air suspension system.		
10.05	Locate and use the Vehicle Identification Number (VIN).		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
10.06	Locate and use vehicle information placards, decals, tags, as required.		
10.07	Locate and use technical service bulletins (TSBs).		
10.08	Read and understand manufacturer's specification sheets, equipment installation instructions and equipment owner's manuals.		
10.09	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).		
10.10	Use computer and operate keyboard.		
10.11	Identify automobiles according to vehicle identification number (VIN)		
10.12	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.		
11.0	Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment--The students will be able to:		
11.01	Describe the nature and types of business organizations.		
11.02	Explain the effect of key organizational systems on performance and quality.		
11.03	List and describe quality control systems and/or practices common to the workplace.		
11.04	Explain the impact of the global economy on business organizations.		
12.0	Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives--The students will be able to:		
12.01	Employ leadership skills to accomplish organizational goals and objectives.		
12.02	Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.		
12.03	Conduct and participate in meetings to accomplish work tasks.		
12.04	Employ mentoring skills to inspire and teach others.		
13.0	Explain the importance of employability and entrepreneurship skills--The student will be able to:		
13.01	Identify and demonstrate positive work behaviors needed to be employable.		
13.02	Develop personal career plan that includes goals, objectives, and strategies.		
13.03	Examine licensing, certification, and industry credentialing requirements.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
13.04	Maintain a career portfolio to document knowledge, skills, and experience.		
13.05	Evaluate and compare employment opportunities that match career goals.		
13.06	Identify and exhibit traits for retaining employment.		
13.07	Identify opportunities and research requirements for career advancement.		
13.08	Research the benefits of ongoing professional development.		
13.09	Examine and describe entrepreneurship opportunities as a career planning option.		
14.0	Demonstrate proficiency in electrical basics--The student will be able to:		
14.01	Identify sources of electricity.		
14.02	Relate electricity to the nature of matter.		
14.03	Define voltage, current, resistance, power and energy.		
14.04	Apply Ohm's law and power formulas.		
14.05	Measure properties of a circuit using appropriate test equipment.		
14.06	Demonstrate electrostatic discharge (ESD) safety procedures.		
14.07	Read and interpret color codes and symbols to identify electrical/electronic components and values.		
14.08	Solve problems in electronic units utilizing metric prefixes.		
15.0	Demonstrate proficiency in evaluating and assessing vehicle power sources—The student will be able to:		
15.01	Charge battery as needed.		
15.02	Inspect and clean battery and battery cable clamp connections.		
15.03	Perform battery test using appropriate tester.		
15.04	Start vehicle using an auxiliary power supply.		
15.05	Maintain or restore electronic memory functions if required.		
15.06	Test and replace fuses, fusible links; confirm proper circuit operation.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
15.07	Identify battery by group, type and purpose.		
15.08	Determine the correct battery type to use in a variety of applications.		
15.09	Demonstrate knowledge of hybrid electrical power storage units.		
15.10	Demonstrate knowledge of safe battery handling and disposal procedures according to local, state and federal regulations.		
16.0	Demonstrate proficiency in locating and repairing common installation and electrical problems in automobiles--The student will be able to:		
16.01	Diagnose a voltage drop against a known good reference measurement.		
16.02	Evaluate short circuits and determine how they can originate.		
16.03	Locate and repair a short circuit between two points.		
16.04	Evaluate open circuits and determine how they can originate.		
16.05	Locate and repair an open circuit between two points.		
16.06	Measure and evaluate critical components for proper functioning.		
16.07	Describe the components used in soldering.		
16.08	Perform Soldered connections.		
16.09	Determine if soldering is appropriate for a particular installation situation.		
16.10	Use wiring diagrams to trace electrical/electronic circuits.		
16.11	Demonstrate the proper use of a digital multi-meter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.		
16.12	Check operation of electrical circuits with a test light.		
16.13	Check operation of electrical circuits using fused jumper wires.		
16.14	Measure key-off battery drain (parasitic draw).		
16.15	Describe the characteristics and functions of various automotive relays and some of their common applications.		
16.16	Describe the characteristics and functions of various diodes and some of their common applications.		
17.0	Demonstrate a working knowledge of direct current circuits (DC) --The student will be able to:		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	17.01 Measure properties of a DC circuit using DVOM meter and scopes.		
	17.02 Apply Ohm's law to series circuits.		
	17.03 Construct and verify operation of series circuits.		
	17.04 Analyze and troubleshoot series circuits.		
	17.05 Verify the operation of parallel circuits.		
	17.06 Analyze and troubleshoot parallel circuits.		
	17.07 Apply Ohm's law to parallel circuits.		
	17.08 Construct and verify the operation of series-parallel circuits.		
	17.09 Troubleshoot combination circuits.		
	17.10 Describe magnetic properties of circuits and devices.		
	17.11 Determine the physical and electrical characteristics of capacitors and inductors.		
	17.12 Define DC motor theory and operation.		
18.0	Demonstrate a working knowledge of alternating current (AC) circuits--The student will be able to:		
	18.01 Identify properties of an AC signal.		
	18.02 Identify AC sources.		
	18.03 Analyze and measure AC signals utilizing DMM and scopes.		
	18.04 Define the characteristics of AC capacitive circuits.		
	18.05 Define the characteristics of AC inductive circuits.		
	18.06 Define AC motor theory and operation.		
	18.07 Define basic generator theory and operation.		
	18.08 Apply OHM’s law to AC circuits		
19.0	Demonstrate proficiency in locating and troubleshooting common installation and electrical problems in automobiles--The student will be able to:		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
19.01	Describe the overall effect of voltage drops and determine the points at which they can originate.		
19.02	Measure voltage drops between two points.		
19.03	Troubleshoot a voltage drop against a known good reference measurement.		
19.04	Evaluate short circuits and determine how they can originate.		
19.05	Locate and repair a short circuit between two points.		
19.06	Evaluate open circuits and determine how they can originate.		
19.07	Locate and repair an open circuit between two points.		
19.08	Measure and evaluate critical components for proper functioning.		
20.0	Demonstrate a working knowledge of vehicle electrical systems--The student will be able to:		
20.01	Define basic transistor theory and operation.		
20.02	Define basic Operational amplifier theory and operation.		
20.03	Define basic Integrated Circuit theory and operation.		
20.04	Define basic Logic Gate theory and operation.		
20.05	Define basic Switching Power Supply theory and operation.		
20.06	Define basic Data Bus Systems and Serial Data theory.		
20.07	Define basic Electronic Control Units and Sensors theory and operation.		
20.08	Define basic Multimedia and Control Network theory and operation.		
20.09	Define basic Hybrid Gas-electric Vehicle theory and operation.		
20.10	Identify High-voltage systems.		
20.11	Define basic Integrated motor generator theory and operation.		
21.0	Demonstrate a working knowledge of On–Board Diagnostic systems (OBD) --The student will be able to:		
21.01	Describe OBD I system operation and limitations.		
21.02	Describe OBD II system operation and limitations.		

Florida Department of Education
Student Performance Standards

Course Title: **Mobile Electronics Technology 2**
Course Number: **9540420**
Course Credit: **1**

Course Description:
The Mobile Electronics Technology 2 course content includes, but is not limited to, installation, configuration, operation, and maintenance of Mobile Audio/Video Systems; Autosound, Wireless Communications, Security, Navigation, In-Vehicle Information Systems, Safety Systems, Satellite Antenna, and low voltage wiring systems. Other course content includes, but is not limited to, communication, leadership skills, human relations and employability skills; and safe, efficient work practices.

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 Mobile Electronics Technology.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Mobile Electronics 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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Mobile Electronics Technology.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	

Florida Standards	Correlation to CTE Program Standard #
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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Demonstrate proficiency in occupational safety--The student will be able to:		
04.01 List the level of electricity (shock) considered lethal to humans.		
04.02 Describe safety considerations when working in and around motor vehicles.		
04.03 Apply shop safety rules, EPA and OSHA standards.		
04.04 Explain the measurement and safety concerns of sound pressure level and hearing damage.		
04.05 Identify and use appropriate emergency first aid procedures.		
04.06 Interpret the Florida “Workers Right-to-Know Law”.		
04.07 Utilize and demonstrate safe procedures for handling of tools and equipment.		
04.08 Identify and use proper placement of floor jacks and jack stands.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
04.09	Identify and use proper procedures for safe lift operation.		
04.10	Utilize proper ventilation procedures for working within the lab/shop area.		
04.11	Identify marked safety areas.		
04.12	Identify the location and the types of fire extinguishers and other fire safety equipment.		
04.13	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.		
04.14	Identify the location and use of eye wash stations.		
04.15	Identify the location of the posted evacuation routes.		
04.16	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.		
04.17	Identify and wear appropriate clothing for lab/shop activities.		
04.18	Secure hair and jewelry for lab/shop activities.		
04.19	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.		
04.20	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.		
04.21	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)		
04.22	Locate and demonstrate knowledge of safety data sheets (SDS).		
05.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the mobile electronics industry--The student will be able to:		
05.01	Identify tools and equipment and their appropriate usage in mobile electronics applications.		
05.02	Identify and use standard and metric measurement skills and designation.		
05.03	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.		
05.04	Demonstrate proper use of precision-measuring tools and torque methods.		
05.05	Identify, use and maintain hand and power tools properly.		
05.06	Identify and practice using appropriate precision measuring tools and torque methods.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
05.07	Identify and describe the proper tools to apply and remove automotive fasteners, to include thread repair.		
05.08	Identify and use metric and English measurement skills.		
06.0	Demonstrate proficiency in acceptable employee behavior in the automotive industry--The student will be able to:		
06.01	Explain the effects of chemical/substance abuse.		
06.02	Identify principles of stress management.		
06.03	Demonstrate acceptable industry dress code.		
06.04	Identify and demonstrate proper customer relation skills.		
06.05	Identify and define payroll deductions (taxes, insurance, and social security) employee benefits and pay systems.		
06.06	Identify principles of time management.		
06.07	Identify acceptable customer relations.		
07.0	Demonstrate appropriate communication skills--The student will be able to:		
07.01	Write logical and understandable statements, or phrases, to accurately fill out forms and invoices commonly used in business and industry.		
07.02	Read and use graphs, charts, diagrams, tables, parts manuals, and information sources commonly used in this industry/occupational area.		
07.03	Read and follow written and oral instructions.		
07.04	Answer and ask questions coherently and concisely.		
07.05	Read critically by recognizing assumptions and implications and by evaluating ideas.		
07.06	Demonstrate appropriate telephone/communication skills.		
08.0	Demonstrate proficiency in appropriate math skills as it relates to the mobile electronics industry--The student will be able to:		
08.01	Read and interpret measuring devices.		
08.02	Solve number word problems.		
08.03	Write percent add fractions and decimals.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
08.04	Solve percent problems.		
08.05	Find the percent of a number.		
08.06	Operate a calculator.		
08.07	Understand and use the metric system.		
08.08	Convert inches to millimeters and millimeters to inches.		
08.09	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.		
08.10	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.		
08.11	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.		
08.12	Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.		
09.0	Demonstrate proficiency in appropriate understanding of basic sciences--The student will be able to:		
09.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.		
09.02	Draw conclusions or make inferences from data.		
09.03	Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.		
09.04	Understand pressure measurement in terms of Pounds per Square Inch (P.S.I.), inches of mercury (InHg) and kilopascals (K.P.A.)		
10.0	Demonstrate proficiency in preparing a vehicle for pre/post customer requested installations or services-- The student will be able to:		
10.01	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.		
10.02	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.		
10.03	Determine the presence of a Tire Pressure Monitoring System (TPMS).		
10.04	Determine the presence of an air suspension system.		
10.05	Locate and use the Vehicle Identification Number (VIN).		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
10.06	Locate and use vehicle information placards, decals, tags, as required.		
10.07	Locate and use technical service bulletins (TSBs).		
10.08	Read and understand manufacturer's specification sheets, equipment installation instructions and equipment owner's manuals.		
10.09	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).		
10.10	Use computer and operate keyboard.		
10.11	Identify automobiles according to vehicle identification number (VIN)		
10.12	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.		
11.0	Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment--The students will be able to:		
11.01	Describe the nature and types of business organizations.		
11.02	Explain the effect of key organizational systems on performance and quality.		
11.03	List and describe quality control systems and/or practices common to the workplace.		
11.04	Explain the impact of the global economy on business organizations.		
12.0	Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives--The students will be able to:		
12.01	Employ leadership skills to accomplish organizational goals and objectives.		
12.02	Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.		
12.03	Conduct and participate in meetings to accomplish work tasks.		
12.04	Employ mentoring skills to inspire and teach others.		
13.0	Explain the importance of employability and entrepreneurship skills--The student will be able to:		
13.01	Identify and demonstrate positive work behaviors needed to be employable.		
13.02	Develop personal career plan that includes goals, objectives, and strategies.		
13.03	Examine licensing, certification, and industry credentialing requirements.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
13.04	Maintain a career portfolio to document knowledge, skills, and experience.		
13.05	Evaluate and compare employment opportunities that match career goals.		
13.06	Identify and exhibit traits for retaining employment.		
13.07	Identify opportunities and research requirements for career advancement.		
13.08	Research the benefits of ongoing professional development.		
13.09	Examine and describe entrepreneurship opportunities as a career planning option.		
20.0	Demonstrate a working knowledge of vehicle electrical systems--The student will be able to:		
20.01	Define basic transistor theory and operation.		
20.02	Define basic Operational amplifier theory and operation.		
20.03	Define basic Integrated Circuit theory and operation.		
20.04	Define basic Logic Gate theory and operation.		
20.05	Define basic Switching Power Supply theory and operation.		
20.06	Define basic Data Bus Systems and Serial Data theory.		
20.07	Define basic Electronic Control Units and Sensors theory and operation.		
20.08	Define basic Multimedia and Control Network theory and operation.		
20.09	Define basic Hybrid Gas-electric Vehicle theory and operation.		
20.10	Identify High-voltage systems.		
20.11	Define basic Integrated motor generator theory and operation.		
21.0	Demonstrate a working knowledge of On–Board Diagnostic systems (OBD) --The student will be able to:		
21.01	Describe OBD I system operation and limitations.		
21.02	Describe OBD II system operation and limitations.		
22.0	Demonstrate knowledge of basic mobile audio/video systems--The student will be able to:		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
22.01	Demonstrate proper vehicle disassembly for audio system installations.		
22.02	Identify audio source formats.		
22.03	Identify Mobile audio source units.		
22.04	Identify head unit installation considerations.		
22.05	Demonstrate OEM Integration of audio inputs.		
22.06	Identify and explain proper operation of OEM interface devices.		
22.07	Define basic audio signal processing theory and operation.		
22.08	Define basic mobile audio amplifiers theory and operation.		
22.09	Define basic active and passive crossover networks theory and operation.		
22.10	Identify speaker types and enclosures.		
22.11	Define basic sound fundamentals.		
22.12	Demonstrate speaker installation		
22.13	Define basic digital and multi-channel sound theory and operation.		
22.14	Define basic video theory and operation.		
22.15	Identify video output formats.		
22.16	Demonstrate OEM audio integration with a video system installation.		
22.17	Identify troubleshooting steps for common video system installation problems.		
23.0	Demonstrate a working knowledge of security and convenience systems--The student will be able to:		
23.01	Demonstrate proper vehicle disassembly for security and convenience installations.		
23.02	Identify OEM anti-theft systems.		
23.03	Discuss advanced security topics.		
23.04	Demonstrate proper identification of vehicle circuits.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	23.05 Demonstrate proper security system placement and mounting.		
	23.06 Demonstrate troubleshooting common security system problems.		
	23.07 Identify security and convenience system accessories.		
	23.08 Demonstrate alternative security system applications.		
	23.09 Demonstrate remote start system installation.		
	23.10 Identify critical remote starter connections.		
	23.11 Demonstrate proper OEM security interface and bypass for remote starter installation.		
	23.12 Identify safety considerations required while installing and configuring a remote start system.		
	23.13 Identify troubleshooting steps for remote start systems.		
24.0	Demonstrate a working knowledge of advanced in-vehicle information and control systems--The student will be able to:		
	24.01 Identify relevant data presented to drivers.		
	24.02 Identify types of data available via satellite.		
	24.03 Identify methods for sending data from vehicles.		
	24.04 Identify subscription services.		
	24.05 Demonstrate installation of satellite radio systems.		
	24.06 Demonstrate installation of consumer telemetric systems.		
	24.07 Demonstrate installation of 2-way radio communication systems.		
	24.08 Demonstrate methods for integration and interfacing with on-board diagnostic systems.		
	24.09 Identify troubleshooting steps for in-vehicle information systems.		
25.0	Demonstrate knowledge of basic telematics systems using wireless communications--The student will be able to:		
	25.01 Explain basic procedures for pairing smart phone systems.		
	25.02 Explain basic function and operation of navigation systems.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
	25.03 Explain basic function and operation of intelligent warning and detection systems.		
	25.04 Explain the basic function and operation of satellite infotainment systems.		
26.0	Demonstrate proficiency in evaluating and assessing various circuits in a vehicle where aftermarket components will connect--The student will be able to:		
	26.01 Evaluate the vehicle's ability to support aftermarket equipment, in particular audio amplifiers.		
	26.02 Determine electrical upgrades according electrical demands.		
	26.03 Evaluate OEM ignition switch wiring and associated circuits.		
	26.04 Determine the polarity and function of wire connected to the ignition switch.		
	26.05 Determine the polarity and function of wires connected to the headlight switch.		
	26.06 Determine the polarity and function of each wire connected to the trunk release switch.		
	26.07 Determine the polarity and function of each wire connected to the foot brake switch.		
	26.08 Determine the polarity and function of each wire connected to the door lock/unlock switch.		
27.0	Demonstrate proficiency in the evaluation and installation of basic and advanced automotive audio system elements, enhancements or the replacement of audio system components--The student will be able to:		
	27.01 Determine the physical characteristics of an aftermarket head unit.		
	27.02 Determine what connections and installation accessories are required for a particular head unit replacement.		
	27.03 Install an aftermarket head unit.		
	27.04 Determine the physical characteristics of aftermarket speakers.		
	27.05 Determine what connections and installation accessories are required for a particular set of replacement speakers.		
	27.06 Install aftermarket speakers.		
	27.07 Determine the physical characteristics of aftermarket amplifier.		
	27.08 Determine what connections and installation accessories are required for a particular amplifier.		
	27.09 Install an aftermarket amplifier.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
27.10	Connect multiple speakers to a single channel.		
27.11	Perform both series and parallel wiring configurations noting the electrical characteristics of each.		
27.12	Perform amplifier bridging to one speaker.		
27.13	Perform amplifier bridging to two speakers.		
27.14	Install an aftermarket amplifier in an OEM system.		
27.15	Install and configure an aftermarket head unit in an OEM system.		
27.16	Install an aftermarket power antenna.		
27.17	Describe situations where resistors, relays and diodes need to be added to an automotive infotainment system.		
28.0	Demonstrate proficiency in the evaluation and installation of basic and advanced automotive security and convenience elements and components--The student will be able to:		
28.01	Determine the physical characteristics of an aftermarket security system.		
28.02	Determine what connections and installation accessories are required to interface a particular security system with the vehicle.		
28.03	Install, program and configure an aftermarket security system.		
28.04	Describe situations when relays and diodes need to be added to an automotive security system.		
28.05	Install relays, resistors and diodes in an automotive security system.		
28.06	Determine the physical characteristics of a remote starter system.		
28.07	Determine what connections are required to interface a particular remote starter system with the vehicle.		
28.08	Install, program and configure a remote starter system.		
29.0	Demonstrate knowledge of a Wireless Local Area Network (WLAN)—The student will be able to:		
29.01	Describe the standards associated with wireless media.		
29.02	Identify and describe the purpose of the components of a small WLAN.		
29.03	Describe small WLAN technologies and their applications in the mobile electronics industry.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
29.04	Demonstrate knowledge of how security features and capabilities of WI-FI Protected Access (WPA) operate.		
29.05	Describe common issues with implementing a WLAN and methods for addressing these issues.		
29.06	Describe common issues with implementing Blue-tooth communications and applications (APPS)		
30.0	Demonstrate knowledge of lighting systems (i.e. H.I.D, LED, halogen lights)—The student will be able to:		
30.01	Explain the safety concerns associated with the use of High-Intensity Discharge (H.I.D) lighting, halogen bulbs, and other lighting systems.		
30.02	Describe the operation of the primary and secondary voltage systems used in High-Intensity Discharge (H.I.D) lighting.		
30.03	Describe the testing procedures of the primary voltage systems used in High-Intensity Discharge (H.I.D) lighting.		
30.04	Describe the proper installation of Light-Emitting Diodes (LED) lighting.		
31.0	Demonstrate a working knowledge of basic installation knowledge and techniques--The student will be able to:		
31.01	Identify and use power and pneumatic tools properly.		
31.02	Demonstrate general vehicle disassembly.		
31.03	Demonstrate basic fabrication techniques and proper use of fabrication materials.		
31.04	Demonstrate acceptable electronic testing and proper use of test equipment.		
31.05	Define basic aftermarket amplifier installation and operation.		
31.06	Identify troubleshooting steps for aftermarket amplifier problems.		
32.0	Demonstrate proficiency in the installation of Rear Seat Entertainment (RSE) Systems--The student will be able to:		
32.01	Determine the physical characteristics of a standalone rear seat entertainment system.		
32.02	Determine what connections are required to interface a particular stand-alone rear seat entertainment system with the vehicle.		
32.03	Install, program and configure a standalone rear seat entertainment system.		
32.04	Integrate the sound from the video system through the OEM audio system.		

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)

SkillsUSA 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.

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: **Motorcycle Service Technologies**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9540500
CIP Number	0647061101
Grade Level	9-12, 30,31
Standard Length	8 credits
Teacher Certification	MOTORCYCLE @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3052 – Motorcycle Mechanics
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the motorcycle services technology industry, and demonstrates such elements of the industry as 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 occupational completion points.

The following table illustrates the **Secondary** program structure:

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	8766110	Motorcycle Service 1	1 credit	49-3052	2	VO
	8766120	Motorcycle Service 2	1 credit		2	VO
B	8766130	Motorcycle Service 3	1 credit	49-3052	2	VO
	8766140	Motorcycle Service 4	1 credit		2	VO
C	8766150	Motorcycle Service 5	1 credit	49-3052	2	VO
	8766160	Motorcycle Service 6	1 credit		2	VO
	8766170	Motorcycle Service 7	1 credit		2	VO
D	8766180	Motorcycle Service 8	1 credit	49-3052	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
8766110	**	**	**	**	**	**	**	**	**	**	**
8766120	**	**	**	**	**	**	**	**	**	**	**
8766130	**	**	**	**	**	**	**	**	**	**	**
8766140	**	**	**	**	**	**	**	**	**	**	**
8766150	**	**	**	**	**	**	**	**	**	**	**
8766160	**	**	**	**	**	**	**	**	**	**	**
8766170	**	**	**	**	**	**	**	**	**	**	**
8766180	**	**	**	**	**	**	**	**	**	**	**

** *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
8766110	**	**	**	**	**	**	**
8766120	**	**	**	**	**	**	**
8766130	**	**	**	**	**	**	**
8766140	**	**	**	**	**	**	**
8766150	**	**	**	**	**	**	**
8766160	**	**	**	**	**	**	**
8766170	**	**	**	**	**	**	**
8766180	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

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 Motorcycle Service Technologies.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Motorcycle Service Technologies.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technologies.
04.0 Recognize personal and industry safety requirements.
05.0 Verify the proper use and care of basic shop tools and equipment.
06.0 Outline the appropriate set-up procedures.
07.0 Show proficiency in performing routine preventative maintenance services.
08.0 Compare and contrast the differences in the measurement systems, fasteners and thread repair.
09.0 Illustrate industry-related math skills.
10.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Motorcycle Service Technologies.
11.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Motorcycle Service Technologies.
12.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technologies.
13.0 Show proficiency in parts inventory identification and repair order processing.
14.0 Perform basic services and minor repairs.
15.0 Perform basic frame and suspension service.
16.0 Perform basic electrical system service.
17.0 Diagnose, service and repair cooling systems.
18.0 Diagnose, repair and recondition basic engine components.
19.0 Apply industry-related science to motorcycle service.
20.0 Diagnose, service and repair frames and suspension components.
21.0 Diagnose, service and repair wheels, tires, and brakes.
22.0 Diagnose, service and repair drive trains.
23.0 Diagnose, service and repair fuel and exhaust systems.

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 1**
Course Number: **8766110**
Course Credit: **1**

Course Description:
The Motorcycle Service 1 course prepares students for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study safety requirements, tools and equipment, set-up procedures, and routine preventative maintenance.

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 Motorcycle Service Technologies.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Motorcycle Service Technologies.		
	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 Motorcycle Service Technologies.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
04.0 Recognize personal and industry safety requirements--The student will be able to:		
04.01 List the federal and state standards for health and safety, including OSHA and the "Right-to-Know" law.		
04.02 Outline the safety requirements for shop organization and management.		
04.03 Recognize the safety requirements for the use of industry tools and equipment.		
04.04 List the fire-safety precautions.		
04.05 Recognize electrical-safety precautions.		
05.0 Verify the proper use and care of basic shop tools and equipment--The student will be able to:		
05.01 Categorize general and specialized hand tools.		
05.02 Examine and use power tools.		
05.03 Classify and use fasteners.		
05.04 Document proper use of air tools.		
05.05 Utilize oxy-acetylene welding outfit for heating, welding, brazing and cutting.		

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
05.06	Use heating devices to perform service procedures.		
06.0	Outline the appropriate set-up procedures--The student will be able to:		
06.01	Inspect and interpret vehicle identification number information.		
06.02	Inspect tires; check and adjust air pressure.		
06.03	Check for proper fluid levels.		
06.04	Utilize electrical test equipment to isolate defective components and check lamp circuits.		
06.05	Inspect and fill battery.		
06.06	Clean engine.		
06.07	Install cables, hoses and electrical assemblies.		
06.08	Inspect cables, connectors, clamps and hold-downs; adjust as necessary.		
06.09	Read and interpret a wiring diagram.		
06.10	Troubleshoot and repair wiring harnesses.		
07.0	Show proficiency in performing routine preventative maintenance services--The student will be able to:		
07.01	Compare and contrast typical motorcycle lubricants and lubricant properties.		
07.02	Inspect and test head and tail lamp circuits; aim headlights and replace bulbs.		
07.03	Inspect battery terminals and the state-of-charge test; perform slow/fast battery charge.		
07.04	Inspect and clean battery cables, connectors, clamps and hold-downs; repair or replace as needed.		
07.05	Inspect and test fusible links, circuit breakers and fuses; replace as needed.		
07.06	Check radiator coolant level (if applicable), test and add coolant.		
07.07	Check fluid levels and change fluids and the tightness of the oil filters.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 2**
Course Number: **8766120**
Course Credit: **1**

Course Description:
The Motorcycle Service 2 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study measurement systems, fasteners, thread repair, and math.

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 Motorcycle Service Technologies.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
	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 Motorcycle Service Technologies.		
	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 Motorcycle Service Technologies.		
	03.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	03.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	03.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
03.04 Model with mathematics. MAFS.K12.MP.4.1	
03.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
03.06 Attend to precision. MAFS.K12.MP.6.1	
03.07 Look for and make use of structure. MAFS.K12.MP.7.1	
03.08 Look for and express regularity in repeated reasoning. MAFS.K12.MP.8.1	

Abbreviations:
FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
08.0 Compare and contrast the differences in the measurement systems, fasteners and thread repair--The student will be able to:		
08.01 Describe and distinguish the different types of measurement systems.		
08.02 Compare and contrast the different types of fasteners.		
08.03 Explain the steps of inspecting, cleaning and replacement of broken fasteners.		
08.04 Describe the sequence of tightening and torqueing fasteners to specs.		
08.05 Compare and contrast the different stress fractures of fasteners		
09.0 Illustrate industry-related math skills--The student will be able to:		
09.01 Measure tolerance(s) using millimeters and inches.		
09.02 Perform metric to SAE (and SAE to metric) conversions.		
09.03 Perform correct measurements using different precise metering tools. T handle measuring tool.		
09.04 Perform correct measures using Vernier Calipers.		
09.05 Perform correct measures using Micrometers.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 3**
Course Number: **8766130**
Course Credit: **1**

Course Description:
The Motorcycle Service 3 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1 & 2 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study parts inventory, repair ordering, basic services and minor repairs, basic frame, and suspension.

Florida Standards			Correlation to CTE Program Standard #
10.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Motorcycle Service Technologies.		
	10.01 Key Ideas and Details		
	10.01.1	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	
	10.01.2	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	
	10.01.3	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	
	10.02 Craft and Structure		
	10.02.1	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	
	10.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	10.02.3	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 #
10.03	Integration of Knowledge and Ideas		
	10.03.1	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	
	10.03.2	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	
	10.03.3	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	
10.04	Range of Reading and Level of Text Complexity		
	10.04.1	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.	
	10.04.2	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Motorcycle Service Technologies.		
11.01	Text Types and Purposes		
	11.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	11.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
11.02	Production and Distribution of Writing		
	11.02.1	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 #
	11.02.2	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	
	11.02.3	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	
	11.03	Research to Build and Present Knowledge	
	11.03.1	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	
	11.03.2	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	
	11.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	11.04	Range of Writing	
	11.04.1	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	
12.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technologies.		
	12.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	12.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	12.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
12.04 Model with mathematics. MAFS.K12.MP.4.1	
12.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
12.06 Attend to precision. MAFS.K12.MP.6.1	
12.07 Look for and make use of structure. MAFS.K12.MP.7.1	
12.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
13.0 Show proficiency in parts inventory identification and repair order processing--The student will be able to:		
13.01 Read and interpret information in parts and service manuals and other technical media.		
13.02 Read and understand graphs, charts, diagrams and tables commonly used in the industry.		
13.03 Write and process work orders.		
13.04 Prepare cost estimates for jobs using service and flat-rate standards.		
13.05 Perform basic parts inventory tracking with the latest computer updates.		
13.06 Interpret and verify complaint; determine needed repairs. If find more than first estimated ask customer if ok to do repairs.		
14.0 Perform basic services and minor repairs--The student will be able to:		
14.01 Identify, select and use appropriate replacement parts.		
14.02 Clean or replace after inspection of air filtration.		
14.03 Service and check batteries, if not charging then replace.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
14.04 Service lubrication systems.		
14.05 Name the components of air and liquid cooling systems by name and function.		
14.06 Remove, remount and balance tires.		
14.07 Diagnose, service and repair chain and belt final drive components.		
15.0 Perform basic frame and suspension service--The student will be able to:		
15.01 Categorize the different front- and rear-suspension systems and explain their operation.		
15.02 Compare the parts and functions of different frames and suspension systems.		
15.03 Explain how wheels, tires and suspension affect chassis performance and driveability.		
15.04 Replace and true a wheel assembly.		
15.05 Diagnose and service wheel bearings and seals.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 4**
Course Number: **8766140**
Course Credit: **1**

Course Description:
The Motorcycle Service 4 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2 & 3 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study electrical system services.

Florida Standards			Correlation to CTE Program Standard #
10.0	Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Motorcycle Service Technologies.		
	10.01 Key Ideas and Details		
	10.01.1	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	
	10.01.2	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	
	10.01.3	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	
	10.02 Craft and Structure		
	10.02.1	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	
	10.02.2	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. LAFS.1112.RST.2.5	
	10.02.3	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 #
	10.03	Integration of Knowledge and Ideas	
	10.03.1	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	
	10.03.2	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	
	10.03.3	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	
	10.04	Range of Reading and Level of Text Complexity	
	10.04.1	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.	
	10.04.2	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	
11.0	Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Motorcycle Service Technologies.		
	11.01	Text Types and Purposes	
	11.01.1	Write arguments focused on discipline-specific content. LAFS.1112.WHST.1.1	
	11.01.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. LAFS.1112.WHST.1.2	
	11.02	Production and Distribution of Writing	
	11.02.1	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 #
	11.02.2	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	
	11.02.3	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	
	11.03	Research to Build and Present Knowledge	
	11.03.1	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	
	11.03.2	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	
	11.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.1112.WHST.3.9	
	11.04	Range of Writing	
	11.04.1	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	
12.0	Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Motorcycle Service Technologies.		
	12.01	Make sense of problems and persevere in solving them. MAFS.K12.MP.1.1	
	12.02	Reason abstractly and quantitatively. MAFS.K12.MP.2.1	
	12.03	Construct viable arguments and critique the reasoning of others. MAFS.K12.MP.3.1	

Florida Standards	Correlation to CTE Program Standard #
12.04 Model with mathematics. MAFS.K12.MP.4.1	
12.05 Use appropriate tools strategically. MAFS.K12.MP.5.1	
12.06 Attend to precision. MAFS.K12.MP.6.1	
12.07 Look for and make use of structure. MAFS.K12.MP.7.1	
12.08 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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
16.0 Perform basic electrical system service--The student will be able to:		
16.01 Assess and use basic electrical system test equipment.		
16.02 Use basic DC electrical theory to select appropriate test procedures.		
16.03 Inspect and test fusible links, circuit breakers and fuses; replace as needed.		
16.04 Check electrical circuits with a test light; determine needed repairs.		
16.05 Troubleshoot and repair battery-operated electronic ignition systems.		
16.06 Troubleshoot and repair magneto-ignition systems.		
16.07 Troubleshoot and repair capacitive-discharge-ignition (CDI) systems.		
16.08 Troubleshoot and repair half-wave and full-wave charging systems.		
16.09 Troubleshoot and repair three-phase charging systems.		
16.10 Troubleshoot and repair electrical starter systems.		
16.11 Troubleshoot and repair Direct-Current (DC) Generators.		
16.12 Troubleshoot and repair Warning systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 5**
Course Number: **8766150**
Course Credit: **1**

Course Description:
The Motorcycle Service 5 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3 & 4 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study diagnostics, service, and repair of cooling systems, and engine components.

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
17.0 Diagnose, service, and repair cooling systems--The student will be able to:		
17.01 Categorize the components of air and liquid cooling systems by name and function.		
17.02 Diagnose service and repair air-cooling systems.		
17.03 Diagnose service and repair liquid cooling systems.		
18.0 Diagnose, repair and recondition basic engine components--The student will be able to:		
18.01 Explain the engine operating theory.		
18.02 Recondition a two-stroke engine top-end.		
18.03 Recondition a single-cylinder four-stroke engine top-end.		
18.04 Recondition a multi-cylinder four-stroke engine top-end.		
18.05 Rebuild a four-stroke head.		
18.06 Recondition a single-cylinder four-stroke engine bottom-end.		
18.07 Recondition a multi-cylinder four-stroke engine bottom-end.		

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
18.08 Recondition a two-stroke engine bottom-end.		
18.09 Service a plain-bearing crankshaft.		
18.10 Diagnose and repair oil-delivery systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 6**
Course Number: **8766160**
Course Credit: **1**

Course Description:
The Motorcycle Service 6 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, & 5 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study the science of motorcycles, frames, and suspension systems.

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, NGSSS-Sci.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
19.0	Apply industry-related science to motorcycle service--The student will be able to:		
19.01	Explain how temperature extremes, chemical reactions and moisture content affect motorcycle systems.		
19.02	Draw conclusions or make inferences from data.		
20.0	Diagnose, service, and repair frames and suspension components--The student will be able to:		
20.01	Service and repair front suspension.		
20.02	Service and repair rear suspension.		
20.03	Inspect, remove, and replace frames.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 7**
Course Number: **8766170**
Course Credit: **1**

Course Description:
The Motorcycle Service 7 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, 5, & 6 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study wheels, tires, and brakes.

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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci
21.0 Diagnose, service, and repair wheels, tires and brakes--The student will be able to:		
21.01 Diagnose and repair mechanical disc and drum brake systems and components.		
21.02 Diagnose and repair hydraulic disc and drum brake systems and components.		
21.03 Diagnose and repair ABS braking systems and other advanced stopping systems.		

Florida Department of Education
Student Performance Standards

Course Title: **Motorcycle Service 8**
Course Number: **8766180**
Course Credit: **1**

Course Description:
The Motorcycle Service 8 course is designed to build on the skills and knowledge students learned in Motorcycle Service 1, 2, 3, 4, 5, 6, & 7 for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study drive trains, fuel, and exhaust systems.

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, NGSSS-Sci.

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci
22.0	Diagnose, service, and repair drive trains--The student will be able to:		
22.01	Diagnose, service, and repair primary-drive systems.		
22.02	Diagnose, service, and repair clutch assemblies.		
22.03	Diagnose, service, and repair transmissions.		
22.04	Diagnose, service, and repair shaft drives.		
22.05	Diagnose and repair kickstart systems.		
23.0	Diagnose, service, and repair fuel and exhaust systems--The student will be able to:		
23.01	Identify components and operation of carburetion and fuel-injection systems.		
23.02	Diagnose service and repair slide-type carburetors.		
23.03	Diagnose service and repair constant-velocity-type (CV-type) carburetors.		
23.04	Diagnose service and repair fixed-venturi carburetors.		
23.05	Diagnose service and repair fuel-injection systems.		
23.06	Diagnose service and repair exhaust systems replace necessary components as needed.		
23.07	Diagnose service and repair other fuel-delivery-system components.		

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)

SkillsUSA 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.

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: **Aviation Maintenance General**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Career Preparatory	
Program Number	9540600
CIP Number	0647060702
Grade Level	9-12, 30,31
Standard Length	4 credits
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this program is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. This program prepares students for employment as an Aviation General Maintenance Technician Helper, and an Aviation Maintenance Technician with FAA Airframe Rating.

This program focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

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

Program Structure

This program is a planned sequence of instruction consisting of one occupational completion points.

The following table illustrates the **Secondary** program structure:

Aviation Maintenance General – 3 secondary credits (FAA required). These courses may be used as part of "Aviation Powerplant Mechanics" or "Aviation Airframe Mechanics".

The FAA required subject matter may be sequenced in Aviation Maintenance General 1 through 3 as necessary to meet program specific General requirements. The student will be provided with a transcript of the FAA completed requirements when he or she leaves/moves as proof of completion/competency. The total FAA approved General program may not extend beyond the number courses for the high school program.

OCP	Course Number	Course Title	Length	SOC Code	Level	Graduation Requirement
A	9540610	Private Pilot Ground School	1 credit	49-3011	3	VO
	8715110	Aviation Maintenance General 1	1 credit		3	VO
	8715120	Aviation Maintenance General 2	1 credit		3	VO
B	8715130	Aviation Maintenance General 3	1 credit	49-3011	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.

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
9540610	**	**	**	**	**	**	**	**	**	**	**
8715110	**	**	**	**	**	**	**	**	**	**	**
8715120	**	**	**	**	**	**	**	**	**	**	**
8715130	**	**	**	**	**	**	**	**	**	**	**

** *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
9540610	**	**	**	**	**	**	**

Courses	Algebra 1	Algebra 2	Geometry	English 1	English 2	English 3	English 4
8715110	**	**	**	**	**	**	**
8715120	**	**	**	**	**	**	**
8715130	**	**	**	**	**	**	**

** *Alignment pending review* # *Alignment attempted, but no correlation to academic course*

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

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

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

National Standards

Programs identified as having Industry or National Standards to the corresponding standards and/or benchmarks for the Aviation Maintenance General program can be found using the following link:

http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part147-appC.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 Aviation Maintenance General.
02.0 Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aviation Maintenance General.
03.0 Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aviation Maintenance General.
04.0 Demonstrate an understanding of safe and effective work practices.
05.0 Demonstrate an understanding of fundamentals of flight.
06.0 Understand and explain Federal Aviation Administration Regulations.
07.0 Demonstrate understanding of meteorology.
08.0 Demonstrate knowledge of aircraft communication equipment.
09.0 Demonstrate knowledge and understanding of aircraft propulsion and associated systems.
10.0 Demonstrate an understanding of navigation systems and procedures.
11.0 Demonstrate flight planning skills.
12.0 Demonstrate effective communication skills.
13.0 Demonstrate analytical skills.
14.0 Demonstrate understanding of applied sciences.
15.0 Describe human factors related to safe aircraft operation.
16.0 Describe the Flight Training process.
17.0 Describe Aircraft Safety of Flight Principles.
18.0 Describe the Airport Environment.
19.0 Perform basic aircraft drawing skills.
20.0 Demonstrate aircraft weight and balance skills.
21.0 Perform ground operations and servicing duties.
22.0 Demonstrate mathematical skills.
23.0 Maintain forms and records.
24.0 Apply principles of basic physics.
25.0 Demonstrate the use of maintenance publications.
26.0 Demonstrate appropriate communication skills.
27.0 Demonstrate employability skills as an Aviation Maintenance General Technician.
28.0 Methods and strategies for using Florida Standards for grades 11-12 reading in Technical Subjects for student success in Aviation Maintenance General.
29.0 Methods and strategies for using Florida Standards for grades 11-12 writing in Technical Subjects for student success in Aviation Maintenance General.
30.0 Methods and strategies for using Florida Standards for grades 11-12 Mathematical Practices in Technical Subjects for student success in Aviation Maintenance General.
31.0 Maintain aircraft fluid lines and fittings.
32.0 Perform aircraft materials and processes skills.

33.0 Perform cleaning and corrosion-control operations.
34.0 Perform basic electricity skills.
35.0 Interpret mechanic privileges and limitations.

Florida Department of Education
Student Performance Standards

Course Title: **Private Pilot Ground School**
Course Number: **9540610**
Course Credit: **1**

Course Description:
The Private Pilot Ground School course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation pilot/mechanic. Students study general shop safety, fundamentals of flight, FAA regulations, meteorology, aircraft communications, propulsion, and navigation systems, flight planning, communication and analytical skills, applied sciences, safe aircraft operation and principles, flight training processes, and airport environments.

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 Aviation Maintenance General.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aviation Maintenance General.		
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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aviation Maintenance General.		
	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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA
04.0 Demonstrate an understanding of safe and effective work practices--The student will be able to:			
04.01 Demonstrate an awareness and understanding of fueling operations.			
04.02 Demonstrate an understanding of situational awareness.			
04.03 Demonstrate an awareness and understanding of fire hazards, and how to control and extinguish fires.			
04.04 Demonstrate an awareness and understanding for the need of safety devices, controls, guards and equipment.			
05.0 Demonstrate an understanding of fundamentals of flight--The student will be able to:			
05.01 Name and compare the four forces of flight.			
05.02 Describe the structural components of an aircraft.			
05.03 Describe airfoil design factors, including aspect ratio, planform, and			
05.04 Explain how an airfoil produces lift using Bernoulli's principles and Newton's Laws of Force and Motion			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA
	05.05 Discuss how and why an airplane stalls and spins.			
	05.06 Describe the function of aircraft flight controls and their effect on aircraft pitch, roll, and yaw			
	05.07 Describe and explain the operation and use of pitot/static, vacuum/gyroscopic, pressure and engine instruments.			
	05.08 Explain factors affecting aircraft design, performance, and operation.			
06.0	Understand and explain Federal Aviation Administration Regulations--The student will be able to:			
	06.01 Explain major portion of Parts 1, 61, 91, 135, 141 and NTSB 830 of the Federal Aviation Regulations.			
07.0	Demonstrate understanding of meteorology--The student will be able to:			
	07.01 Describe the composition, circulation and stability of the atmosphere.			
	07.02 Demonstrate an understanding of air mass development, the movement of fronts and their effect on aviation.			
	07.03 Demonstrate an awareness of weather hazards to aviation and an understanding of how to avoid them.			
	07.04 Demonstrate the ability to access weather information prior to and during flights through a variety of media.			
	07.05 Interpret printed reports, forecasts and graphic weather products.			
08.0	Demonstrate knowledge of aircraft communication equipment--The student will be able to:			
	08.01 Use and explain aircraft voice communication equipment.			
	08.02 Explain function and use of ELT's, voice recorders, and other emergency communication systems.			
	08.03 Demonstrate use of proper phraseology in ATC communications.			
	08.04 Discuss uses and limitations of portable transceivers.			
	08.05 Demonstrate use of phonetic alphabet.			
09.0	Demonstrate knowledge and understanding of aircraft propulsion and associated systems--The student will be able to:			
	09.01 Describe and identify reciprocating and turbine engine components.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA
09.02	Compare the merits of fixed and variable pitch propellers.			
09.03	Describe a typical lubrication system.			
09.04	Describe a typical aircraft electrical system, including a magneto ignition systems and proper magneto checks.			
09.05	Describe the difference between a normally aspirated engine and one that is supercharged or turbocharged.			
09.06	Describe the difference between gravity fed and pump fed fuel systems.			
09.07	Demonstrate basic operation of an aircraft engine, including proper interpretation of instruments and use of appropriate engine controls.			
10.0	Demonstrate an understanding of navigation systems and procedures--The student will be able to:			
10.01	Distinguish between latitude and longitude.			
10.02	Define radio navigation.			
10.03	Explain the operation of the magnetic compass, including compass errors.			
10.04	Describe and demonstrate use of VOR equipment and navigation.			
10.05	Describe the operation of GPS navigation equipment.			
10.06	Explain DME principles.			
10.07	Explain sectional charts and their use.			
10.08	Explain lost communications emergency procedures under VFR.			
10.09	Plot and explain a route of flight.			
10.10	Differentiate different classes of airspace and usage within the FAA national airspace system.			
11.0	Demonstrate flight planning skills--The student will be able to:			
11.01	Explain major portions of Parts 1, 91 and NTSB 830 of the Federal Aviation Rules and Regulations.			
11.02	Define weight and balance.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA
11.03	Define center of gravity, moment, datum line, CG envelope, basic empty weight, and gross weight.			
11.04	Calculate, compute, and solve given weight and balance problems.			
11.05	Demonstrate acquisition of appropriate weather data.			
11.06	Demonstrate proper selection of destination/enroute/alternate airports.			
11.07	Explain fuel requirements.			
11.08	Read and interpret performance charts to predict aircraft performance.			
11.09	Demonstrate the use of a flight computer.			
11.10	Access and analyze NOTAMS.			
11.11	Define and describe the various phases of flight.			
11.12	Explain the function of a pilot logbook.			
11.13	Prepare a VFR flight plan.			
11.14	Demonstrate familiarity with various published sources of flight information (Airfield Directories, NOTAMS, Aeronautical Information Manual, Advisory Circulars).			
12.0	Demonstrate effective communication skills--The student will be able to:			
12.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.			
12.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.			
12.03	Read and follow written and oral English instructions.			
12.04	Answer and ask questions coherently and concisely.			
12.05	Demonstrate telephone/communication skills.			
12.06	Demonstrate knowledge and use of appropriate computer skills.			
12.07	Demonstrate interpersonal skills.			
13.0	Demonstrate analytical skills--The student will be able to:			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA
	13.01 Add, subtract, multiply and divide using fractions, decimals, whole numbers, percentages, and ratios.			
	13.02 Demonstrate understanding and use of the metric system.			
14.0	Demonstrate understanding of applied sciences--The student will be able to:			
	14.01 Draw conclusions or make inferences from data.			
	14.02 Understand pressure measurement in terms of P.S.I., inches of mercury, and metric.			
15.0	Describe human factors related to safe aircraft operation --The student will be able to:			
	15.01 Describe effects of the flight environment on human physiology			
	15.02 Describe the effects of alcohol and drugs on human performance.			
	15.03 Explain Crew Resource Management (CRM).			
	15.04 Describe situational awareness (SA).			
	15.05 Describe Aeronautical Decision Making (ADM) skills.			
16.0	Describe the Flight Training process. – The student will be able to:			
	16.01 Define various pilot certificates and ratings (private, instrument, multi-engine, commercial, certified flight instructor (CFI/CFII/MEI), and airline transport pilot (ATP).			
	16.02 List and describe both professional and non-professional aviation opportunities.			
17.0	Describe Aircraft Safety of Flight Principles. – The student will be able to:			
	17.01 Summarize techniques of collision avoidance, including proper visual scanning and right of way rules.			
	17.02 Describe minimum safe altitude (MSA) and preparation for flight over hazardous terrain.			
	17.03 Describe proper ground taxi techniques.			
	17.04 Summarize the airport traffic pattern (entry, altitudes, turns, legs, and departure).			
18.0	Describe the Airport Environment. – The student will be able to:			

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA
18.01 Describe the configuration of airports, including runways taxiways markings and signs.			
18.02 Describe airport lighting (runways, taxiways, beacons, and approach lighting systems).			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 1**
Course Number: **8715110**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 1 course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study general hangar and shop safety, environmental concerns, mathematics, physics, basic aerodynamics, federal aviation regulations, publications and records.

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 Aviation Maintenance General.		
	01.01 Key Ideas and Details		
	01.01.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. LAFS.910.RST.1.1	
	01.01.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. LAFS.910.RST.1.2	
	01.01.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. LAFS.910.RST.1.3	
	01.02 Craft and Structure		
	01.02.1	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. LAFS.910.RST.2.4	
	01.02.2	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). LAFS.910.RST.2.5	

Florida Standards			Correlation to CTE Program Standard #
	01.02.3	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. LAFS.910.RST.2.6	
01.03	Integration of Knowledge and Ideas		
	01.03.1	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. LAFS.910.RST.3.7	
	01.03.2	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. LAFS.910.RST.3.8	
	01.03.3	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. LAFS.910.RST.3.9	
01.04	Range of Reading and Level of Text Complexity		
	01.04.1	By the end of grade 9, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.	
	01.04.2	By the end of grade 10, read and comprehend literature [informational texts, history/social studies texts, science/technical texts] at the high end of the grades 9–10 text complexity band independently and proficiently. LAFS.910.RST.4.10	
02.0	Methods and strategies for using Florida Standards for grades 09-10 writing in Technical Subjects for student success in Aviation Maintenance General.		
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		

Florida Standards			Correlation to CTE Program Standard #
	02.02.1	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. LAFS.910.WHST.2.4	
	02.02.2	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. LAFS.910.WHST.2.5	
	02.02.3	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. LAFS.910.WHST.2.6	
	02.03	Research to Build and Present Knowledge	
	02.03.1	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. LAFS.910.WHST.3.7	
	02.03.2	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. LAFS.910.WHST.3.8	
	02.03.3	Draw evidence from informational texts to support analysis, reflection, and research. LAFS.910.WHST.3.9	
	02.04	Range of Writing	
	02.04.1	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. LAFS.910.WHST.4.10	
03.0	Methods and strategies for using Florida Standards for grades 09-10 Mathematical Practices in Technical Subjects for student success in Aviation Maintenance General.		
	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, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
19.0 Perform basic aircraft drawing skills --The student will be able to:			
19.01 Use aircraft drawings, symbols, and system schematics.			App. B, B, 7. Level 2
19.02 Draw sketches of repairs and alterations.			App. B, B, 8. Level 3
19.03 Use blueprint information.			App. B, B, 9. Level 3
19.04 Use graphs and charts.			App. B, B, 10. Level 3
20.0 Demonstrate aircraft weight and balance skills --The student will be able to:			
20.01 Weigh aircraft.			App. B, C, 11. Level 2
20.02 Perform complete weight-and-balance check and record data.			App. B, C, 12. Level 3
20.03 Properly configure aircraft for weighing and capable of setting up and using weighing equipment.			
21.0 Perform ground operations and servicing duties--The student will be able to:			
21.01 Start, ground-operate, move, service, and secure aircraft and identify typical ground-operations hazards.			App. B, G, 20. Level 2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
21.02	Identify and select fuels.			App. B, G, 21. Level 2
21.03	Comply with prescribed shop and personal safety procedures.			
22.0	Demonstrate mathematical skills--The student will be able to:			
22.01	Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.			App. B, H, 25. Level 3
22.02	Solve ratio, proportion, and percentage problems.			App. B, H, 26. Level 3
22.03	Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.			App. B, H, 27. Level 3
23.0	Maintain forms and records--The student will be able to:			
23.01	Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.			App. B, I, 28. Level 3
23.02	Complete required maintenance forms, records, and inspection reports.			App. B, I, 29. Level 3
24.0	Apply principles of basic physics--The student will be able to:			
24.01	Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.			App. B, J, 30. Level 2
24.02	Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.			
24.03	Understand pressure measurement in terms of PSI, inches of mercury, and KPA.			
25.0	Demonstrate the use of maintenance publications--The student will be able to:			
25.01	Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.			App. B, K, 31. Level 3
25.02	Read technical data.			App. B, K, 32. Level 3
26.0	Demonstrate appropriate communication skills--The student will be able to:			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
	26.01 Read and follow written and oral instructions.			
	26.02 Answer and ask questions coherently and concisely.			
27.0	Demonstrate employability skills as an Aviation General Maintenance Technician --The student will be able to:			
	27.01 Identify appropriate responses to criticism from employer, supervisor, or other employees.			
	27.02 Identify work habits for getting and keeping a job.			
	27.03 Explain the purpose of the Right-to-Know" law.			

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 2**
Course Number: **8715120**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 2 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study aircraft hardware and precision measuring instruments; blueprints and drawings; hand and power tools; and fluid lines and fittings.

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 Aviation Maintenance General.		
	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 issues that remain unresolved. LAFS.1112.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
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 Aviation Maintenance General.		
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	

Florida Standards			Correlation to CTE Program Standard #
	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. 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 Aviation Maintenance General.		
	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	

Florida Standards	Correlation to CTE Program Standard #
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. 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-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
22.0 Demonstrate mathematical skills--The student will be able to:			
22.04 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.			App. B, H, 25. Level 3
23.0 Maintain forms and records--The student will be able to:			
23.03 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.			App. B, I, 28. Level 3
23.04 Complete required maintenance forms, records, and inspection reports.			App. B, I, 29. Level 3
24.0 Apply principles of basic physics--The student will be able to:			
24.04 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.			App. B, J, 30. Level 2
24.05 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.			

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
	24.06 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.			
25.0	Demonstrate the use of maintenance publications--The student will be able to:			
	25.03 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.			App. B, K, 31. Level 3
	25.04 Use technical data to perform required tasks.			
26.0	Demonstrate appropriate communication skills--The student will be able to:			
	26.03 Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.			
	26.04 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.			
27.0	Demonstrate employability skills as an Aviation Maintenance General Technician--The student will be able to:			
	27.04 Identify documents that may be required when applying for a job position.			
	27.05 Identify appropriate responses to criticism from employer, supervisor, or other employees.			
31.0	Maintain aircraft fluid lines and fittings--The student will be able to:			
	31.01 Fabricate and install rigid and flexible fluid lines and fittings.			App. B, D, 13. Level 3
	31.02 Utilize proper personal safety procedures for fluid lines and fittings.			
32.0	Perform aircraft materials and processes skills--The student will be able to:			
	32.01 Identify and select appropriate nondestructive testing methods.			App. B, E, 14. Level 1
	32.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.			App. B, E, 15. Level 2
	32.03 Perform basic heat-testing processes.			App. B, E, 16. Level 1
	32.04 Identify and select aircraft hardware and materials.			App. B, E, 17. Level 3

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
	32.05 Inspect and check welds.			App. B, E, 18. Level 3
	32.06 Perform precision measurements.			App. B, E, 19. Level 3
	32.07 Perform safety-wiring techniques.			
33.0	Perform cleaning and corrosion-control operations--The student will be able to:			
	33.01 Identify and select cleaning materials.			App. B, G, 22. Level 3
	33.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. Understand metal strength limitations when removing corrosion.			App. B, G, 23. Level 3

Florida Department of Education
Student Performance Standards

Course Title: **Aviation Maintenance General 3**
Course Number: **8715130**
Course Credit: **1**

Course Description:
The Aviation Maintenance General 3 course is designed to build on the skills and knowledge students learned in Aviation Maintenance General 1 & 2 for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study basic electricity and DC electrical circuits; aircraft battery service and inspection; AC electrical circuits and solid-state circuits.

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 Aviation Maintenance General.		
	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 issues that remain unresolved. LAFS.1112.RST.2.6	

Florida Standards			Correlation to CTE Program Standard #
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 Aviation Maintenance General.		
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	

Florida Standards			Correlation to CTE Program Standard #
	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. 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 Aviation Maintenance General.		
	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	

Florida Standards	Correlation to CTE Program Standard #
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. 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-M/LA, NGSSS-Sci.

CTE Standards and Benchmarks	FS-M/LA	NGSSS-Sci	FAA FAR Part 147
22.0 Demonstrate mathematical skills--The student will be able to:			
22.05 Extract roots and raise numbers to a given power.			App. B, H, 24. Level 3
22.06 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.			App. B, H, 25. Level 3
22.07 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.			App. B, H, 27. Level 3
23.0 Maintain forms and records--The student will be able to:			
23.05 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.			App. B, I, 28. Level 3
23.06 Complete required maintenance forms, records, and inspection reports.			App. B, I, 29. Level 3
24.0 Apply principles of basic physics--The student will be able to:			
24.07 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.			App. B, J, 30. Level 2

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
	24.08 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.			
25.0	Demonstrate the use of maintenance publications--The student will be able to:			
	25.04 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.			App. B, K, 31. Level 3
	25.05 Use technical data to perform required tasks			
26.0	Demonstrate appropriate communication skills--The student will be able to:			
	26.05 Read critically by recognizing assumptions and implications and by evaluating ideas.			
27.0	Demonstrate employability skills as an Aviation Maintenance General Technician--The student will be able to:			
	27.05 Conduct a job search.			
	27.06 Secure information about a job.			
	27.07 Complete a job-application form correctly.			
	27.08 Demonstrate job-interview skills.			
	27.09 Explain how to make job changes.			
34.0	Perform basic electricity skills--The student will be able to:			
	34.01 Calculate and measure capacitance and inductance.			App. B, A, 1. Level 2
	34.02 Calculate and measure electrical power.			App. B, A, 2. Level 2
	34.03 Measure voltage, current, resistance, and continuity.			App. B, A, 3. Level 3
	34.04 Determine the relationship of voltage, current, and resistance in electrical circuits.			App. B, A, 4. Level 3
	34.05 Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.			App. B, A, 5. Level 3
	34.06 Inspect and service batteries.			App. B, A, 6. Level 3

CTE Standards and Benchmarks		FS-M/LA	NGSSS-Sci	FAA FAR Part 147
	34.07 Utilize proper electrical safety procedures.			
35.0	Interpret mechanic privileges and limitations--The student will be able to:			
	35.01 Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.			App. B, L, 33. Level 3
	35.02 Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.			
	35.03 Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.			

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.

Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

Special Notes

Required FAA exams include GENERAL written, oral, and practical. The only way a person can get authorization to take this examination is to: (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

> Common hand tools, portable tools, precision tools, machine tools, torqueing tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician School shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

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: **Automotive Service Management Technology**
Career Cluster: **Transportation, Distribution and Logistics**

AAS	
CIP Number	0615080300
Program Type	College Credit
Standard Length	68 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles 49-3093 – Tire Repairers and Changers 49-3023 – Automotive Service Technicians and Mechanics 49-9098 – Helpers--Installation, Maintenance, and Repair 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to instruction in diagnosis of malfunctions in the repair of engines, fuel, electrical, cooling and brake systems; drive train and suspension systems; radiators; transmissions and carburetors; basic management concepts; troubleshooting skills; and servicing, maintaining and repairing all mechanical systems or gasoline and diesel powered automobiles including fuel, electrical, cooling, brake, drive, suspension and related systems. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive Service industry; planning, management, finance, technical and product 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 68 credit hours.

Standards

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

01.0 Demonstrate an understanding of automotive mechanics.
02.0 Apply electrical and electronic skills in diagnosing/troubleshooting malfunctions of electrical/electronic components.
03.0 Demonstrate proficiency in servicing steering, suspension and wheel systems.
04.0 Demonstrate proficiency in servicing automotive brake systems.
05.0 Demonstrate proficiency in servicing cooling, air conditioning and heating services.
06.0 Demonstrate proficiency in engine performance service.
07.0 Demonstrate proficiency in automatic transmission/trans-axle service.
08.0 Demonstrate proficiency in servicing manual drive trains and axles.
09.0 Demonstrate proficiency in engine repair service.
10.0 Demonstrate proficiency in management skills.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Service Management Technology**
CIP Number: **0615080300**
Program Length: **68 credit hours**
SOC Code(s): **49-2096; 49-3093; 49-3023; 49-9098**

The AAS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of automotive mechanics--The student will be able to:
01.01	Identify general shop safety rules and procedures.
01.02	Utilize safe procedures for handling of both hand and power tools and equipment.
01.03	Identify and use proper placement of floor jacks and jack stands.
01.04	Identify and use proper procedures for safe lift operation.
01.05	Utilize proper ventilation procedures for working within the lab/shop area.
01.06	Identify marked safety areas.
01.07	Identify the location and the types of fire extinguishers and other fire safety equipment;
01.08	Demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
01.09	Identify the location and use of eye wash stations.
01.10	Identify the location of the posted evacuation routes.
01.11	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
01.12	Identify and wear appropriate clothing for lab/shop activities.
01.13	Secure hair and jewelry for lab/shop activities.
01.14	Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).
01.15	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
01.16	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).
01.17	Locate and demonstrate knowledge of Safety Data Sheets (SDS).
01.18	Locate and demonstrate knowledge of fasteners such as screws and bolts, screw extractors, thread repair inserts and thread cutting taps and dies.
01.19	Identify tools and their usage in automotive applications.

01.20	Apply basic math skills.
01.21	Identify, use and apply standard and metric measurement skills.
01.22	Demonstrate safe handling and use of appropriate tools.
01.23	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.
01.24	Identify information needed and the service requested on a repair order.
01.25	Identify purpose and demonstrate proper use of fender covers, mats.
01.26	Demonstrate use of the three C’s (concern, cause, and correction).
01.27	Review vehicle service history.
01.28	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
01.29	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).
01.30	Demonstrate an understanding of lubrication requirements.
01.31	Inspect and/or replace automatic belt tensioners if applicable.
01.32	Perform vehicle safety inspection.
01.33	Demonstrate use of technical manuals, specification handbooks, charts, and electronic service information (ESI).
01.34	Demonstrate a basic understanding of steering and suspension systems.
01.35	Demonstrate a basic understanding of manual and power steering system operation.
01.36	Demonstrate a basic understanding of drum brake system operation.
01.37	Demonstrate a basic understanding of disc brake system operation.
01.38	Demonstrate a basic understanding of heating and cooling systems.
01.39	Demonstrate a basic understanding of air conditioning systems.
01.40	Demonstrate knowledge of external and internal engine components.
01.41	Demonstrate a basic understanding of ignition and fuel systems.
01.42	Demonstrate a basic understanding of differential action.
01.43	Demonstrate a basic understanding of drive shaft operation.
01.44	Demonstrate a basic understanding of automatic transmission/transaxle operation.
01.45	Demonstrate a basic knowledge of manual clutch operation systems.
01.46	Demonstrate a basic understanding of manual transmission operation.
01.47	Demonstrate a basic understanding of overdrive operation.

	01.48	Demonstrate a basic understanding of electricity and electronic theory.
	01.49	Lubricate and/or adjust door hinges and striker plates as needed.
	01.50	Locate, identify, and/or correct rattles and noises.
	01.51	Demonstrate basic understanding of passenger restraint systems.
	01.52	Check and adjust specified fluid levels.
	01.53	Inspect and replace wheel studs.
	01.54	Check and refill diesel exhaust fluid (DEF).
02.0	Apply electrical and electronic skills in diagnosing/troubleshooting malfunctions of electrical/electronic components--The student will be able to:	
	02.01	Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance.
	02.02	Check operation of electrical circuits with a test light.
	02.03	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
	02.04	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
	02.05	Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
	02.06	Check operation of electrical circuits with fused jumper wires.
	02.07	Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems.
	02.08	Diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.
	02.09	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
	02.10	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.
	02.11	Replace electrical connectors and terminal ends.
	02.12	Repair wiring harness.
	02.13	Perform solder repair of electrical wiring.
	02.14	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.
	02.15	Repair CAN/BUS wiring harness.
	02.16	Perform starter current draw tests; determine necessary action.
	02.17	Perform starter circuit voltage drop tests; determine necessary action.
	02.18	Inspect and test starter relays and solenoids; determine necessary action.
	02.19	Remove and install starter in a vehicle.

02.20	Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
02.21	Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.
02.22	Perform battery state-of-charge test; determine necessary action.
02.23	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
02.24	Remove, inspect, and re-install generator (alternator).
02.25	Perform charging system output test; determine necessary action.
02.26	Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions.
02.27	Perform charging circuit voltage drop tests; determine necessary action.
02.28	Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action.
02.29	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
02.30	Aim headlights.
02.31	Identify system voltage and safety precautions associated with high-intensity discharge headlights.
02.32	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.
02.33	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.
02.34	Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action.
02.35	Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
02.36	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.
02.37	Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action.
02.38	Diagnose (troubleshoot) windshield washer problems; perform necessary action.
02.39	Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
02.40	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action.
02.41	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.
02.42	Describe the operation of keyless entry/remote-start systems.
02.43	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.
02.44	Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action.
02.45	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
02.46	Remove and reinstall door panel.

02.47	Check for module communication errors (including CAN/BUS systems) using a scan tool.
02.48	Verify windshield wiper and washer operation, replace wiper blades.
02.49	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.
02.50	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.
02.51	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.
02.52	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
02.53	Maintain or restore electronic memory functions.
02.54	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
02.55	Perform slow/fast battery charge according to manufacturer's recommendations.
02.56	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.
02.57	Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
02.58	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
02.59	Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.
03.0	Demonstrate proficiency in servicing steering, suspension and wheel systems--The student will be able to:
03.01	Diagnose suspension problems.
03.02	Diagnose wheel/tire vibrations, shimmy and tramp.
03.03	Diagnose steering problems.
03.04	Lubricate suspension, steering gear and linkage.
03.05	Inspect steering systems.
03.06	Inspect suspension systems.
03.07	Inspect and test shock absorbers and struts.
03.08	Check power steering fluid level and condition.
03.09	Inspect, repair and replace tires and wheels.
03.10	Rotate wheels and tires.
03.11	Balance wheels.
03.12	Service wheel bearings and grease seals on nondrive axles/spindles.
03.13	Remove and replace spindles and ball joints.
03.14	Remove and replace shock absorbers and strut assemblies.

03.15	Measure and adjust torsion bar height
03.16	Remove and replace coil springs/torsion bars
03.17	Remove and replace control arms and bushings
03.18	Remove and replace steering linkage components.
03.19	Remove and replace steering dampers
03.20	Remove and replace manual/power steering gear assemblies.
03.21	Check and perform two-wheel alignment.
03.22	Remove and replace power steering pumps.
03.23	Check and perform four-wheel alignment.
03.24	Disable and enable supplemental restraint system (SRS)
03.25	Remove and replace steering wheel; center /time supplemental restraint system clock spring
03.26	Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action
03.27	Identify and test tire pressure monitoring system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lamps.
03.28	Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.
03.29	Determine proper power steering fluid type; inspect fluid level and condition
03.30	Inspect for power steering fluid leakage; determine necessary action
03.31	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor
03.32	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment
03.33	Inspect rear suspension system leaf spring(s), bushings, center pins/bolts, and mounts
03.34	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action
03.35	Perform prealignment inspection and measure vehicle ride height; perform necessary action
03.36	Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and adjust air pressure; determine necessary action
03.37	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
03.38	Repair tire using internal patch
03.39	Reset steering angle sensor
03.40	Inspect electric power-assisted steering.
04.0	Demonstrate proficiency in servicing automotive brake systems--The student will be able to:

04.01	Diagnose brake system problems.
04.02	Diagnose combination valve malfunctions.
04.03	Perform operational inspections.
04.04	Inspect brake assemblies.
04.05	Remove and replace calipers and rotors
04.06	Refinish rotors
04.07	Refinish brake drums
04.08	Replace drum brake shoes and disc pads
04.09	Identify anti-locking braking systems (ABS) principle and components.
04.10	Inspect and replace brake lines and hoses
04.11	Adjust brake shoes
04.12	Adjust parking brakes.
04.13	Replace/repair wheel cylinders
04.14	Remove and replace wheel cylinders
04.15	Bleed hydraulic brakes
04.16	Repair or replace parking brake cables and linkage
04.17	Remove and replace master cylinders
04.18	Remove and replace hydraulic power boosters.
04.19	Flush brake systems
04.20	Service and repair power assist and brake control systems.
04.21	Service and repair front and rear disc brakes.
04.22	Replace vacuum brake boosters; perform necessary action.
04.23	Inspect, diagnose and repair anti-locking brake systems.
04.24	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer’s recommendations.
04.25	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types)
04.26	Identify components of brake warning light system
04.27	Inspect, test, and/or replace components of brake warning light system

	04.28	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).
	04.29	Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).
	04.30	Describe the operation of a regenerative braking system
	04.31	Identify and inspect electronic brake control system components; determine necessary action.
	04.32	Bleed the electronic brake control system hydraulic circuits.
05.0	Demonstrate proficiency in servicing cooling, air conditioning and heating systems--The student will be able to:	
	05.01	Diagnose overheating problems.
	05.02	Check radiator coolant level.
	05.03	Test and add coolant
	05.04	Pressure test cooling systems
	05.05	Test radiator caps
	05.06	Inspect, remove and replace radiator and heater hoses
	05.07	Remove, test and replace thermostats.
	05.08	Flush cooling systems and replace coolant.
	05.09	Remove and replace radiators
	05.10	Remove and replace water pumps.
	05.11	Diagnose basic air conditioning system problems.
	05.12	Inspect and performance test air conditioning systems.
	05.13	Identify, recover, evacuate and charge basic air conditioning systems; add refrigerant and oil as needed.
	05.14	Leak test basic air conditioning systems.
	05.15	Service air conditioning electrical circuits.
	05.16	Service vacuum circuits.
	05.17	Remove and replace components in basic air conditioning systems.
	05.18	Remove and replace engine fan clutches and electric cooling fan and controls.
	05.19	Remove and replace blower motors.
	05.20	Remove and replace heater cores, control units and cables.
	05.21	Diagnose and repair electronic air conditioning controls.

05.22	Determine procedure to remove and reinstall evaporator; determine required oil quantity.
05.23	Remove, inspect, and reinstall condenser; determine required oil quantity.
05.24	Determine procedure to remove, inspect and reinstall heater core.
05.25	Identify Hybrid vehicle A/C system electrical circuits and service/safety precautions.
05.26	Using a scan tool, observe and record related HVAC data and trouble codes
05.27	Determine need and procedure for flushing A/C system and determine need for an additional A/C system filter; perform necessary action.
05.28	Diagnose temperature control problems in the HVAC system. Determine PCM ability to interrupt system operation; determine necessary action
05.29	Inspect and test heater control valve perform necessary action
05.30	Inspect condition of refrigerant oil removed from A/C system; determine necessary action.
05.31	Determine recommended oil and oil capacity for system application
05.32	Inspect, test, service or replace A/C compressor clutch components and or assembly; check for clutch air gap; adjust as necessary
05.33	Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.
05.34	Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards.
05.35	Identify proper procedures to recycle, label, and store refrigerant.
06.0	Demonstrate proficiency in engine performance service--The student will be able to:
06.01	Analyze engine performance.
06.02	Perform running cylinder balance tests.
06.03	Perform cylinder compression tests.
06.04	Check the engine performance and drivability using industry recognized diagnostic techniques.
06.05	Remove and replace distributor.
06.06	Check the ignition advance in a vehicle.
06.07	Inspect and test primary circuits.
06.08	Remove and replace ignition coils.
06.09	Remove and replace ignition switches; perform necessary action.
06.10	Inspect, remove and replace ignition wires, distributor caps and rotors.
06.11	Remove, gap and replace spark plugs.
06.12	Service electronic ignition systems.
06.13	Service air cleaners.

06.14	Inspect, remove and replace fuel filters.
06.15	Measure fuel flow and pressure.
06.16	Remove and replace fuel lines.
06.17	Remove and replace fuel pumps.
06.18	Test and adjust Idle Speed (where applicable).
06.19	Remove and replace fuel injectors
06.20	Service throttle body fuel injection systems.
06.21	Service ported fuel injection systems.
06.22	Service positive crankcase ventilation (PCV) systems.
06.23	Service evaporative control systems.
06.24	Service air-injection systems.
06.25	Service exhaust gas recirculation (EGR) systems.
06.26	Inspect, remove and replace catalytic converter.
06.27	Diagnose mechanical, ignition and fuel emission problems.
06.28	Inspect, remove and replace exhaust system components.
06.29	Perform cylinder leakage tests.
06.30	Diagnose, test, and replace on-board computer controls.
06.31	Diagnose, service, and replace computerized sensors.
06.32	Remove and replace turbo chargers
06.33	Check and adjust turbo charger waste gates
06.34	Identify and demonstrate knowledge of basic diesel fuel systems.
06.35	Identify and demonstrate knowledge of diesel fuel injection pump timing systems.
06.36	Test and service diesel preheating systems.
06.37	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.
06.38	Access and use service information to perform step-by-step (troubleshooting) diagnosis.
06.39	Describe the importance of running all OBDII monitors for repair verification.
07.0	Demonstrate proficiency in automatic transmission/trans-axle service--The student will be able to:
07.01	Performance test automatic transmissions.

	07.02	Change transmission oil and filter
	07.03	Adjust shift linkage
	07.04	Adjust neutral safety switches.
	07.05	Remove and replace external gaskets and seals.
	07.06	Pressure flush transmission cooler assemblies.
	07.07	Diagnose malfunctions of automatic transmissions such as fluid leaks, fluid condition, slipping, lock up and shift problems.
	07.08	Diagnose, repair and replace trans-axles.
	07.09	Service valve bodies.
	07.10	Rebuild transmission assemblies.
	07.11	Rebuild automatic trans-axle.
	07.12	Remove and replace extension housings and bushings.
	07.13	Check fluid level in a trans. equipped with a dipstick inspect fluid condition and determine necessary action
	07.14	Identify and interpret transmission concern; differentiate between engine performance and trans. Concerns; determine necessary action
	07.15	Research applicable vehicle and service information fluid type, vehicle service history, service precautions and technical service bulletins
	07.16	Perform lock-up converter tests; determine necessary action
	07.17	Perform stall test; determine necessary action
	07.18	Check fluid level in a transmission or a transaxle not equipped with or without a dipstick.
	07.19	Perform pressure tests (including trans. equipped with electronic pressure control) determine necessary action
	07.20	Describe the operational characteristics of a Continuously Variable Trans.
	07.21	Describe the operational characteristics of a hybrid vehicle drive train
	07.22	Inspect, test, adjust, repair, or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses
	07.23	Remove and replace automatic transmission and transaxle mounts
	07.24	Diagnose and repair vehicle electronic speed sensors.
08.0	Demonstrate proficiency in servicing manual drive trains and axles--The student will be able to:	
	08.01	Diagnose drive line problems.
	08.02	Diagnose and performance test manual transmission problems.
	08.03	Check fluid condition; check for leaks; determine necessary action.

08.04	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions and technical service bulletins.
08.05	Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots and springs; perform necessary action.
08.06	Diagnose clutch noise, binding, slippage, pulsation and chatter; determine necessary action.
08.07	Drain and refill manual transmission and final drive unit.
08.08	Bleed clutch hydraulic system.
08.09	Check and adjust clutch master cylinder fluid level; check for leaks.
08.10	Diagnose noise concerns through the application of trans. powerflow principles.
08.11	Diagnose hard shifting and jumping out of gear concerns; determine necessary action.
08.12	Diagnose trans. final drive assembly noise and vibration concerns; determine necessary action.
08.13	Describe the operational characteristics of an electronically-controlled manual trans.
08.14	Inspect drive shafts, universal joints and center bearings.
08.15	Diagnose universal joint noise and vibration concerns; perform necessary action.
08.16	Diagnose constant velocity (cv) joint noise and vibration concerns; determine necessary action.
08.17	Lubricate universal joints.
08.18	Remove and replace transmission mounts.
08.19	Remove and replace transmissions.
08.20	Adjust shift linkage.
08.21	Adjust clutches.
08.22	Remove and replace extension housing seals and bushings.
08.23	Remove and replace clutches, release bearings, linkage and pilot bearings.
08.24	Rebuild or replace clutch master and slave cylinders.
08.25	Remove and replace universal joints.
08.26	Diagnose and repair vehicle electronic speed sensors.
08.27	Remove and replace drive axle bearings and seals.
08.28	Inspect, remove and replace FWD bearings, hubs and seals
08.29	Clean and inspect diff. housing; check for leaks; inspect housing vent.
08.30	Check and adjust differential housing fluid level.
08.31	Drain and refill differential housing.

08.32	Diagnose noise and vibration concerns; determine necessary action.
08.33	Inspect and replace companion flange and pinion seal; measure companion flange run-out.
08.34	Service and repair differentials.
08.35	Remove and replace trans-axle assemblies.
08.36	Adjust trans-axle shifting controls.
08.37	Inspect, remove and replace constant-velocity axle assembly.
08.38	Service manual transmissions.
08.39	Rebuild manual transmission and/or transaxle assemblies.
08.40	Disassemble, service, and reassemble transfer case and components.
08.41	Diagnose, test, adjust, and replace electrical/electronic components of four-wheel drive systems.
09.0	Demonstrate proficiency in engine repair service--The student will be able to:
09.01	Clean engines.
09.02	Remove and replace motor mounts.
09.03	Check valve guides for wear.
09.04	Perform cylinder balance tests.
09.05	Perform cylinder compression tests.
09.06	Perform cylinder leakage tests.
09.07	Determine source(s) of oil/coolant loss.
09.08	Determine source(s) of excess noise.
09.09	Determine cause(s) of overheating.
09.10	Check the engine oil pressure.
09.11	Remove and replace core plugs.
09.12	Inspect, remove and replace flywheels and ring gears.
09.13	Remove and replace engine assemblies.
09.14	Remove and replace oil pans.
09.15	Remove and replace oil pumps.
09.16	Clean cylinder blocks, oil passages and pistons.
09.17	Inspect blocks for warpage.

09.18	Measure and inspect engine components for proper tolerances.
09.19	Remove and replace crankshafts, mains and rod bearings.
09.20	Remove and replace camshafts and bushings.
09.21	Remove and replace pistons and rings.
09.22	Remove ridges and deglaze cylinder walls.
09.23	Remove and replace front and rear oil seals.
09.24	Remove and replace intake and exhaust manifolds.
09.25	Remove, clean, inspect and replace cylinder heads; and inspect heads for cracks and warpage.
09.26	Test and replace hydraulic lifters.
09.27	Remove and replace timing chains, belts and gears.
09.28	Test valve springs.
09.29	Adjust valve lifters.
09.30	Replace rocker arm assemblies.
09.31	Change oil and oil filters.
09.32	Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and galley plugs; determine necessary action.
10.0	Demonstrate proficiency in management skills--The student will be able to:
10.01	Write and process work orders.
10.02	Process parts warranties and labor claims.
10.03	Process merchandise returns.
10.04	Accept and return cores/cards for rebuilt and exchange items.
10.05	Select and care for shop materials.
10.06	Use supervisory techniques for hiring and firing.
10.07	Prepare technical reports.
10.08	Perform business and technical computations.
10.09	Evaluate productivity.
10.10	Develop a customer relations plan.
10.11	Plan service facilities.
10.12	Schedule production.

	10.13 Plan, organize, activate and control a service operation.
	10.14 Perform auto safety inspections.
11.0	Demonstrate appropriate communication skills--The student will be able to:
	11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
	11.03 Read and follow written and oral instructions.
	11.04 Answer and ask questions coherently and concisely.
	11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
	11.06 Demonstrate appropriate telephone and computer communication skills.
12.0	Demonstrate appropriate math skills--The student will be able to:
	12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
	12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
	12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	12.04 Determine the correct purchase price, to include sales tax for a materials list
	12.05 Demonstrate an understanding of federal, state and local taxes and their computation.
13.0	Demonstrate appropriate understanding of basic science--The student will be able to:
	13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	13.02 Draw conclusions or make inferences from data.
	13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
14.0	Demonstrate employability skills--The student will be able to:
	14.01 Conduct a job search.
	14.02 Secure information about a job.
	14.03 Identify documents which may be required when applying for job interview.
	14.04 Complete a job application form correctly.
	14.05 Demonstrate competence in job interview techniques.
	14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

	14.07 Identify and adopt acceptable work habits.
	14.08 Demonstrate knowledge of how to make appropriate job changes.
	14.09 Demonstrate acceptable employee health habits.
	14.10 Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200).
15.0	Demonstrate an understanding of entrepreneurship--The student will be able to:
	15.01 Define entrepreneurship.
	15.02 Describe the importance of entrepreneurship to the American economy.
	15.03 List the advantages and disadvantages of business ownership.
	15.04 List advantages and disadvantages of business ownership.
	15.05 Identify the necessary personal characteristics of a successful entrepreneur.
	15.06 Identify the business skills needed to operate a small business efficiently and effectively.

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)

SkillsUSA 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.

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.

Articulation

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

Program Length

The AAS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS. The standard length of this program is 68 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

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

Automotive Service Technician (0615080301) – 24 Credit Hours

General Automotive Technician (0615080302) – 44 Credit Hours

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

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: **Automotive Service Technician**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0615080301
Program Type	College Credit Certificate (CCC)
Standard Length	24 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles 49-3093 – Tire Repairers and Changers 49-3023 – Automotive Service Technicians and Mechanics 49-9098 – Helpers--Installation, Maintenance, and Repair Workers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Automotive Service Management Technology AAS degree program (0615080300).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to instruction in diagnosis of malfunctions in the repair of electrical, brake systems, steering and suspension systems; air conditioning system; troubleshooting skills; and servicing, maintaining and repairing all mechanical systems on gasoline automobiles including electrical, cooling, brake, suspension and related systems. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive Service industry; planning, management, finance, technical and product 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.

Standards

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

01.0 Demonstrate an understanding of automotive mechanics.
02.0 Apply electrical and electronic skills in diagnosing/troubleshooting malfunctions of electrical/electronic components.
03.0 Demonstrate proficiency in servicing steering, suspension and wheel systems.
04.0 Demonstrate proficiency in servicing automotive brake systems.
05.0 Demonstrate proficiency in servicing cooling, air conditioning and heating services.
06.0 Demonstrate appropriate communication skills.
07.0 Demonstrate appropriate math skills.
08.0 Demonstrate appropriate understanding of basic science.
09.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Service Technician**
CIP Number: **0615080301**
Program Length: **24 credit hours**
SOC Code(s): **49-2096; 49-3093; 49-3023; 49-9098**

This certificate program is part of the Automotive Service Management Technology AAS degree program (0615080300). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of automotive mechanics--The student will be able to:
01.01	Identify general shop safety rules and procedures.
01.02	Utilize safe procedures for handling of both hand and power tools and equipment.
01.03	Identify and use proper placement of floor jacks and jack stands.
01.04	Identify and use proper procedures for safe lift operation.
01.05	Utilize proper ventilation procedures for working within the lab/shop area.
01.06	Identify marked safety areas.
01.07	Identify the location and the types of fire extinguishers and other fire safety equipment;
01.08	Demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
01.09	Identify the location and use of eye wash stations.
01.10	Identify the location of the posted evacuation routes.
01.11	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
01.12	Identify and wear appropriate clothing for lab/shop activities.
01.13	Secure hair and jewelry for lab/shop activities.
01.14	Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).
01.15	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
01.16	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).
01.17	Locate and demonstrate knowledge of Safety Data Sheets (SDS).
01.18	Locate and demonstrate knowledge of fasteners such as screws and bolts, screw extractors, thread repair inserts and thread cutting taps and dies.
01.19	Identify tools and their usage in automotive applications.

01.20	Apply basic math skills.
01.21	Identify, use and apply standard and metric measurement skills.
01.22	Demonstrate safe handling and use of appropriate tools.
01.23	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.
01.24	Identify information needed and the service requested on a repair order.
01.25	Identify purpose and demonstrate proper use of fender covers, mats.
01.26	Demonstrate use of the three C’s (concern, cause, and correction).
01.27	Review vehicle service history.
01.28	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
01.29	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).
01.30	Demonstrate an understanding of lubrication requirements.
01.31	Inspect and/or replace automatic belt tensioners if applicable.
01.32	Perform vehicle safety inspection.
01.33	Demonstrate use of technical manuals, specification handbooks, charts, and electronic service information (ESI).
01.34	Demonstrate a basic understanding of steering and suspension systems.
01.35	Demonstrate a basic understanding of manual and power steering system operation.
01.36	Demonstrate a basic understanding of drum brake system operation.
01.37	Demonstrate a basic understanding of disc brake system operation.
01.38	Demonstrate a basic understanding of heating and cooling systems.
01.39	Demonstrate a basic understanding of air conditioning systems.
01.40	Demonstrate knowledge of external and internal engine components.
01.41	Demonstrate a basic understanding of ignition and fuel systems.
01.42	Demonstrate a basic understanding of differential action.
01.43	Demonstrate a basic understanding of drive shaft operation.
01.44	Demonstrate a basic understanding of automatic transmission/transaxle operation.
01.45	Demonstrate a basic knowledge of manual clutch operation systems.
01.46	Demonstrate a basic understanding of manual transmission operation.
01.47	Demonstrate a basic understanding of overdrive operation.

	01.48	Demonstrate a basic understanding of electricity and electronic theory.
	01.49	Lubricate and/or adjust door hinges and striker plates as needed.
	01.50	Locate, identify, and/or correct rattles and noises.
	01.51	Demonstrate basic understanding of passenger restraint systems.
	01.52	Check and adjust specified fluid levels.
	01.53	Inspect and replace wheel studs.
	01.54	Check and refill diesel exhaust fluid (DEF).
02.0	Apply electrical and electronic skills in diagnosing/troubleshooting malfunctions of electrical/electronic components--The student will be able to:	
	02.01	Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance.
	02.02	Check operation of electrical circuits with a test light.
	02.03	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
	02.04	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
	02.05	Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
	02.06	Check operation of electrical circuits with fused jumper wires.
	02.07	Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems.
	02.08	Diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.
	02.09	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
	02.10	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.
	02.11	Replace electrical connectors and terminal ends.
	02.12	Repair wiring harness.
	02.13	Perform solder repair of electrical wiring.
	02.14	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.
	02.15	Repair CAN/BUS wiring harness.
	02.16	Perform starter current draw tests; determine necessary action.
	02.17	Perform starter circuit voltage drop tests; determine necessary action.
	02.18	Inspect and test starter relays and solenoids; determine necessary action.
	02.19	Remove and install starter in a vehicle.

02.20	Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
02.21	Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.
02.22	Perform battery state-of-charge test; determine necessary action.
02.23	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
02.24	Remove, inspect, and re-install generator (alternator).
02.25	Perform charging system output test; determine necessary action.
02.26	Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions.
02.27	Perform charging circuit voltage drop tests; determine necessary action.
02.28	Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action.
02.29	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
02.30	Aim headlights.
02.31	Identify system voltage and safety precautions associated with high-intensity discharge headlights.
02.32	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.
02.33	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.
02.34	Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action.
02.35	Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
02.36	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.
02.37	Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action.
02.38	Diagnose (troubleshoot) windshield washer problems; perform necessary action.
02.39	Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
02.40	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action.
02.41	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.
02.42	Describe the operation of keyless entry/remote-start systems.
02.43	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.
02.44	Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action.
02.45	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
02.46	Remove and reinstall door panel.

02.47	Check for module communication errors (including CAN/BUS systems) using a scan tool.
02.48	Verify windshield wiper and washer operation, replace wiper blades.
02.49	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.
02.50	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.
02.51	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.
02.52	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
02.53	Maintain or restore electronic memory functions.
02.54	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
02.55	Perform slow/fast battery charge according to manufacturer's recommendations.
02.56	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.
02.57	Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
02.58	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
02.59	Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.
03.0	Demonstrate proficiency in servicing steering, suspension and wheel systems--The student will be able to:
03.01	Diagnose suspension problems.
03.02	Diagnose wheel/tire vibrations, shimmy and tramp.
03.03	Diagnose steering problems.
03.04	Lubricate suspension, steering gear and linkage.
03.05	Inspect steering systems.
03.06	Inspect suspension systems.
03.07	Inspect and test shock absorbers and struts.
03.08	Check power steering fluid level and condition.
03.09	Inspect, repair and replace tires and wheels.
03.10	Rotate wheels and tires.
03.11	Balance wheels.
03.12	Service wheel bearings and grease seals on nondrive axles/spindles.
03.13	Remove and replace spindles and ball joints.
03.14	Remove and replace shock absorbers and strut assemblies.

03.15	Measure and adjust torsion bar height
03.16	Remove and replace coil springs/torsion bars
03.17	Remove and replace control arms and bushings
03.18	Remove and replace steering linkage components.
03.19	Remove and replace steering dampers
03.20	Remove and replace manual/power steering gear assemblies.
03.21	Check and perform two-wheel alignment.
03.22	Remove and replace power steering pumps.
03.23	Check and perform four-wheel alignment.
03.24	Disable and enable supplemental restraint system (SRS)
03.25	Remove and replace steering wheel; center /time supplemental restraint system clock spring
03.26	Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action
03.27	Identify and test tire pressure monitoring system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lamps.
03.28	Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.
03.29	Determine proper power steering fluid type; inspect fluid level and condition
03.30	Inspect for power steering fluid leakage; determine necessary action
03.31	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor
03.32	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment
03.33	Inspect rear suspension system leaf spring(s), bushings, center pins/bolts, and mounts
03.34	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action
03.35	Perform prealignment inspection and measure vehicle ride height; perform necessary action
03.36	Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and adjust air pressure; determine necessary action
03.37	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
03.38	Repair tire using internal patch
03.39	Reset steering angle sensor
03.40	Inspect electric power-assisted steering.
04.0	Demonstrate proficiency in servicing automotive brake systems--The student will be able to:

04.01	Diagnose brake system problems.
04.02	Diagnose combination valve malfunctions.
04.03	Perform operational inspections.
04.04	Inspect brake assemblies.
04.05	Remove and replace calipers and rotors
04.06	Refinish rotors
04.07	Refinish brake drums
04.08	Replace drum brake shoes and disc pads
04.09	Identify anti-locking braking systems (ABS) principle and components.
04.10	Inspect and replace brake lines and hoses
04.11	Adjust brake shoes
04.12	Adjust parking brakes.
04.13	Replace/repair wheel cylinders
04.14	Remove and replace wheel cylinders
04.15	Bleed hydraulic brakes
04.16	Repair or replace parking brake cables and linkage
04.17	Remove and replace master cylinders
04.18	Remove and replace hydraulic power boosters.
04.19	Flush brake systems
04.20	Service and repair power assist and brake control systems.
04.21	Service and repair front and rear disc brakes.
04.22	Replace vacuum brake boosters; perform necessary action.
04.23	Inspect, diagnose and repair anti-locking brake systems.
04.24	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer’s recommendations.
04.25	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types)
04.26	Identify components of brake warning light system
04.27	Inspect, test, and/or replace components of brake warning light system
04.28	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to

		voltage/ground, and frequency data).
	04.29	Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).
	04.30	Describe the operation of a regenerative braking system
	04.31	Identify and inspect electronic brake control system components; determine necessary action.
	04.32	Bleed the electronic brake control system hydraulic circuits.
05.0	Demonstrate proficiency in servicing cooling, air conditioning and heating systems--The student will be able to:	
	05.01	Diagnose overheating problems.
	05.02	Check radiator coolant level.
	05.03	Test and add coolant
	05.04	Pressure test cooling systems
	05.05	Test radiator caps
	05.06	Inspect, remove and replace radiator and heater hoses
	05.07	Remove, test and replace thermostats.
	05.08	Flush cooling systems and replace coolant.
	05.09	Remove and replace radiators
	05.10	Remove and replace water pumps.
	05.11	Diagnose basic air conditioning system problems.
	05.12	Inspect and performance test air conditioning systems.
	05.13	Identify, recover, evacuate and charge basic air conditioning systems; add refrigerant and oil as needed.
	05.14	Leak test basic air conditioning systems.
	05.15	Service air conditioning electrical circuits.
	05.16	Service vacuum circuits.
	05.17	Remove and replace components in basic air conditioning systems.
	05.18	Remove and replace engine fan clutches and electric cooling fan and controls.
	05.19	Remove and replace blower motors.
	05.20	Remove and replace heater cores, control units and cables.
	05.21	Diagnose and repair electronic air conditioning controls.
	05.22	Determine procedure to remove and reinstall evaporator; determine required oil quantity.

	05.23	Remove, inspect, and reinstall condenser; determine required oil quantity.
	05.24	Determine procedure to remove, inspect and reinstall heater core.
	05.25	Identify Hybrid vehicle A/C system electrical circuits and service/safety precautions.
	05.26	Using a scan tool, observe and record related HVAC data and trouble codes
	05.27	Determine need and procedure for flushing A/C system and determine need for an additional A/C system filter; perform necessary action.
	05.28	Diagnose temperature control problems in the HVAC system. Determine PCM ability to interrupt system operation; determine necessary action
	05.29	Inspect and test heater control valve perform necessary action
	05.30	Inspect condition of refrigerant oil removed from A/C system; determine necessary action.
	05.31	Determine recommended oil and oil capacity for system application
	05.32	Inspect, test, service or replace A/C compressor clutch components and or assembly; check for clutch air gap; adjust as necessary
	05.33	Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.
	05.34	Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards.
	05.35	Identify proper procedures to recycle, label, and store refrigerant.
06.0	Demonstrate appropriate communication skills--The student will be able to:	
	06.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	06.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
	06.03	Read and follow written and oral instructions.
	06.04	Answer and ask questions coherently and concisely.
	06.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
	06.06	Demonstrate appropriate telephone and computer communication skills.
07.0	Demonstrate appropriate math skills--The student will be able to:	
	07.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
	07.02	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
	07.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	07.04	Determine the correct purchase price, to include sales tax for a materials list
	07.05	Demonstrate an understanding of federal, state and local taxes and their computation.
08.0	Demonstrate appropriate understanding of basic science--The student will be able to:	

	08.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	08.02	Draw conclusions or make inferences from data.
	08.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	08.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
09.0	Demonstrate employability skills--The student will be able to:	
	09.01	Conduct a job search.
	09.02	Secure information about a job.
	09.03	Identify documents which may be required when applying for job interview.
	09.04	Complete a job application form correctly.
	09.05	Demonstrate competence in job interview techniques.
	09.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	09.07	Identify and adopt acceptable work habits.
	09.08	Demonstrate knowledge of how to make appropriate job changes.
	09.09	Demonstrate acceptable employee health habits.
	09.10	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200).

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)

SkillsUSA 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.

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.

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: **General Automotive Technician**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0615080302
Program Type	College Credit Certificate (CCC)
Standard Length	44 Credits
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles 49-3093 – Tire Repairers and Changers 49-3023 – Automotive Service Technicians and Mechanics 49-9098 – Helpers--Installation, Maintenance, and Repair Workers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Automotive Service Management Technology AAS degree program 0615080300.

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to instruction in diagnosis of malfunctions in the repair of electrical, brake systems, steering and suspension systems; air conditioning system; diagnostics, automatic and manual transmissions, troubleshooting skills; and servicing, maintaining and repairing all mechanical systems on gasoline automobiles including electrical, cooling, brake, suspension and related systems. The course content may include training in communication, leadership, human relations and employability skills; and safe, efficient work practices. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive Service industry; planning, management, finance, technical and product 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.

Standards

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

01.0 Demonstrate an understanding of automotive mechanics.
02.0 Apply electrical and electronic skills in diagnosing/troubleshooting malfunctions of electrical/electronic components.
03.0 Demonstrate proficiency in servicing steering, suspension and wheel systems.
04.0 Demonstrate proficiency in servicing automotive brake systems.
05.0 Demonstrate proficiency in servicing cooling, air conditioning and heating services.
06.0 Demonstrate proficiency in engine performance service.
07.0 Demonstrate proficiency in automatic transmission/trans-axle service.
08.0 Demonstrate proficiency in servicing manual drive trains and axles.
09.0 Demonstrate proficiency in engine repair service.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **General Automotive Technician**
CIP Number: **0615080302**
Program Length: **44 Credit Hours**
SOC Code(s): **49-2096; 49-3093; 49-3023; 49-9098**

This certificate program is part of the Automotive Service Management Technology AAS degree program 0615080300. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of automotive mechanics--The student will be able to:
01.01	Identify general shop safety rules and procedures.
01.02	Utilize safe procedures for handling of both hand and power tools and equipment.
01.03	Identify and use proper placement of floor jacks and jack stands.
01.04	Identify and use proper procedures for safe lift operation.
01.05	Utilize proper ventilation procedures for working within the lab/shop area.
01.06	Identify marked safety areas.
01.07	Identify the location and the types of fire extinguishers and other fire safety equipment;
01.08	Demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
01.09	Identify the location and use of eye wash stations.
01.10	Identify the location of the posted evacuation routes.
01.11	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
01.12	Identify and wear appropriate clothing for lab/shop activities.
01.13	Secure hair and jewelry for lab/shop activities.
01.14	Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).
01.15	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
01.16	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).
01.17	Locate and demonstrate knowledge of Safety Data Sheets (SDS).
01.18	Locate and demonstrate knowledge of fasteners such as screws and bolts, screw extractors, thread repair inserts and thread cutting taps and dies.
01.19	Identify tools and their usage in automotive applications.

01.20	Apply basic math skills.
01.21	Identify, use and apply standard and metric measurement skills.
01.22	Demonstrate safe handling and use of appropriate tools.
01.23	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.
01.24	Identify information needed and the service requested on a repair order.
01.25	Identify purpose and demonstrate proper use of fender covers, mats.
01.26	Demonstrate use of the three C’s (concern, cause, and correction).
01.27	Review vehicle service history.
01.28	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
01.29	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).
01.30	Demonstrate an understanding of lubrication requirements.
01.31	Inspect and/or replace automatic belt tensioners if applicable.
01.32	Perform vehicle safety inspection.
01.33	Demonstrate use of technical manuals, specification handbooks, charts, and electronic service information (ESI).
01.34	Demonstrate a basic understanding of steering and suspension systems.
01.35	Demonstrate a basic understanding of manual and power steering system operation.
01.36	Demonstrate a basic understanding of drum brake system operation.
01.37	Demonstrate a basic understanding of disc brake system operation.
01.38	Demonstrate a basic understanding of heating and cooling systems.
01.39	Demonstrate a basic understanding of air conditioning systems.
01.40	Demonstrate knowledge of external and internal engine components.
01.41	Demonstrate a basic understanding of ignition and fuel systems.
01.42	Demonstrate a basic understanding of differential action.
01.43	Demonstrate a basic understanding of drive shaft operation.
01.44	Demonstrate a basic understanding of automatic transmission/transaxle operation.
01.45	Demonstrate a basic knowledge of manual clutch operation systems.
01.46	Demonstrate a basic understanding of manual transmission operation.
01.47	Demonstrate a basic understanding of overdrive operation.

	01.48	Demonstrate a basic understanding of electricity and electronic theory.
	01.49	Lubricate and/or adjust door hinges and striker plates as needed.
	01.50	Locate, identify, and/or correct rattles and noises.
	01.51	Demonstrate basic understanding of passenger restraint systems.
	01.52	Check and adjust specified fluid levels.
	01.53	Inspect and replace wheel studs.
	01.54	Check and refill diesel exhaust fluid (DEF).
02.0	Apply electrical and electronic skills in diagnosing/troubleshooting malfunctions of electrical/electronic components--The student will be able to:	
	02.01	Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance.
	02.02	Check operation of electrical circuits with a test light.
	02.03	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
	02.04	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
	02.05	Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
	02.06	Check operation of electrical circuits with fused jumper wires.
	02.07	Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems.
	02.08	Diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.
	02.09	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
	02.10	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.
	02.11	Replace electrical connectors and terminal ends.
	02.12	Repair wiring harness.
	02.13	Perform solder repair of electrical wiring.
	02.14	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.
	02.15	Repair CAN/BUS wiring harness.
	02.16	Perform starter current draw tests; determine necessary action.
	02.17	Perform starter circuit voltage drop tests; determine necessary action.
	02.18	Inspect and test starter relays and solenoids; determine necessary action.
	02.19	Remove and install starter in a vehicle.

02.20	Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
02.21	Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.
02.22	Perform battery state-of-charge test; determine necessary action.
02.23	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
02.24	Remove, inspect, and re-install generator (alternator).
02.25	Perform charging system output test; determine necessary action.
02.26	Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions.
02.27	Perform charging circuit voltage drop tests; determine necessary action.
02.28	Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action.
02.29	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
02.30	Aim headlights.
02.31	Identify system voltage and safety precautions associated with high-intensity discharge headlights.
02.32	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.
02.33	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.
02.34	Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action.
02.35	Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
02.36	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.
02.37	Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action.
02.38	Diagnose (troubleshoot) windshield washer problems; perform necessary action.
02.39	Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
02.40	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action.
02.41	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.
02.42	Describe the operation of keyless entry/remote-start systems.
02.43	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.
02.44	Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action.
02.45	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
02.46	Remove and reinstall door panel.

02.47	Check for module communication errors (including CAN/BUS systems) using a scan tool.
02.48	Verify windshield wiper and washer operation, replace wiper blades.
02.49	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.
02.50	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.
02.51	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.
02.52	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
02.53	Maintain or restore electronic memory functions.
02.54	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
02.55	Perform slow/fast battery charge according to manufacturer's recommendations.
02.56	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.
02.57	Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
02.58	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
02.59	Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.
03.0	Demonstrate proficiency in servicing steering, suspension and wheel systems--The student will be able to:
03.01	Diagnose suspension problems.
03.02	Diagnose wheel/tire vibrations, shimmy and tramp.
03.03	Diagnose steering problems.
03.04	Lubricate suspension, steering gear and linkage.
03.05	Inspect steering systems.
03.06	Inspect suspension systems.
03.07	Inspect and test shock absorbers and struts.
03.08	Check power steering fluid level and condition.
03.09	Inspect, repair and replace tires and wheels.
03.10	Rotate wheels and tires.
03.11	Balance wheels.
03.12	Service wheel bearings and grease seals on nondrive axles/spindles.
03.13	Remove and replace spindles and ball joints.
03.14	Remove and replace shock absorbers and strut assemblies.

03.15	Measure and adjust torsion bar height
03.16	Remove and replace coil springs/torsion bars
03.17	Remove and replace control arms and bushings
03.18	Remove and replace steering linkage components.
03.19	Remove and replace steering dampers
03.20	Remove and replace manual/power steering gear assemblies.
03.21	Check and perform two-wheel alignment.
03.22	Remove and replace power steering pumps.
03.23	Check and perform four-wheel alignment.
03.24	Disable and enable supplemental restraint system (SRS)
03.25	Remove and replace steering wheel; center /time supplemental restraint system clock spring
03.26	Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action
03.27	Identify and test tire pressure monitoring system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lamps.
03.28	Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.
03.29	Determine proper power steering fluid type; inspect fluid level and condition
03.30	Inspect for power steering fluid leakage; determine necessary action
03.31	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor
03.32	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment
03.33	Inspect rear suspension system leaf spring(s), bushings, center pins/bolts, and mounts
03.34	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action
03.35	Perform prealignment inspection and measure vehicle ride height; perform necessary action
03.36	Inspect tire condition; identify tire wear patterns; check for correct tire size and application (load and speed ratings) and adjust air pressure; determine necessary action
03.37	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
03.38	Repair tire using internal patch
03.39	Reset steering angle sensor
03.40	Inspect electric power-assisted steering.
04.0	Demonstrate proficiency in servicing automotive brake systems--The student will be able to:

04.01	Diagnose brake system problems.
04.02	Diagnose combination valve malfunctions.
04.03	Perform operational inspections.
04.04	Inspect brake assemblies.
04.05	Remove and replace calipers and rotors
04.06	Refinish rotors
04.07	Refinish brake drums
04.08	Replace drum brake shoes and disc pads
04.09	Identify anti-locking braking systems (ABS) principle and components.
04.10	Inspect and replace brake lines and hoses
04.11	Adjust brake shoes
04.12	Adjust parking brakes.
04.13	Replace/repair wheel cylinders
04.14	Remove and replace wheel cylinders
04.15	Bleed hydraulic brakes
04.16	Repair or replace parking brake cables and linkage
04.17	Remove and replace master cylinders
04.18	Remove and replace hydraulic power boosters.
04.19	Flush brake systems
04.20	Service and repair power assist and brake control systems.
04.21	Service and repair front and rear disc brakes.
04.22	Replace vacuum brake boosters; perform necessary action.
04.23	Inspect, diagnose and repair anti-locking brake systems.
04.24	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer’s recommendations.
04.25	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types)
04.26	Identify components of brake warning light system
04.27	Inspect, test, and/or replace components of brake warning light system

	04.28	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).
	04.29	Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).
	04.30	Describe the operation of a regenerative braking system
	04.31	Identify and inspect electronic brake control system components; determine necessary action.
	04.32	Bleed the electronic brake control system hydraulic circuits.
05.0	Demonstrate proficiency in servicing cooling, air conditioning and heating systems--The student will be able to:	
	05.01	Diagnose overheating problems.
	05.02	Check radiator coolant level.
	05.03	Test and add coolant
	05.04	Pressure test cooling systems
	05.05	Test radiator caps
	05.06	Inspect, remove and replace radiator and heater hoses
	05.07	Remove, test and replace thermostats.
	05.08	Flush cooling systems and replace coolant.
	05.09	Remove and replace radiators
	05.10	Remove and replace water pumps.
	05.11	Diagnose basic air conditioning system problems.
	05.12	Inspect and performance test air conditioning systems.
	05.13	Identify, recover, evacuate and charge basic air conditioning systems; add refrigerant and oil as needed.
	05.14	Leak test basic air conditioning systems.
	05.15	Service air conditioning electrical circuits.
	05.16	Service vacuum circuits.
	05.17	Remove and replace components in basic air conditioning systems.
	05.18	Remove and replace engine fan clutches and electric cooling fan and controls.
	05.19	Remove and replace blower motors.
	05.20	Remove and replace heater cores, control units and cables.
	05.21	Diagnose and repair electronic air conditioning controls.

05.22	Determine procedure to remove and reinstall evaporator; determine required oil quantity.
05.23	Remove, inspect, and reinstall condenser; determine required oil quantity.
05.24	Determine procedure to remove, inspect and reinstall heater core.
05.25	Identify Hybrid vehicle A/C system electrical circuits and service/safety precautions.
05.26	Using a scan tool, observe and record related HVAC data and trouble codes
05.27	Determine need and procedure for flushing A/C system and determine need for an additional A/C system filter; perform necessary action.
05.28	Diagnose temperature control problems in the HVAC system. Determine PCM ability to interrupt system operation; determine necessary action
05.29	Inspect and test heater control valve perform necessary action
05.30	Inspect condition of refrigerant oil removed from A/C system; determine necessary action.
05.31	Determine recommended oil and oil capacity for system application
05.32	Inspect, test, service or replace A/C compressor clutch components and or assembly; check for clutch air gap; adjust as necessary
05.33	Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.
05.34	Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards.
05.35	Identify proper procedures to recycle, label, and store refrigerant.
06.0	Demonstrate proficiency in engine performance service--The student will be able to:
06.01	Analyze engine performance.
06.02	Perform running cylinder balance tests.
06.03	Perform cylinder compression tests.
06.04	Check the engine performance and drivability using industry recognized diagnostic techniques.
06.05	Remove and replace distributor.
06.06	Check the ignition advance in a vehicle.
06.07	Inspect and test primary circuits.
06.08	Remove and replace ignition coils.
06.09	Remove and replace ignition switches; perform necessary action.
06.10	Inspect, remove and replace ignition wires, distributor caps and rotors.
06.11	Remove, gap and replace spark plugs.
06.12	Service electronic ignition systems.
06.13	Service air cleaners.

06.14	Inspect, remove and replace fuel filters.
06.15	Measure fuel flow and pressure.
06.16	Remove and replace fuel lines.
06.17	Remove and replace fuel pumps.
06.18	Test and adjust Idle Speed (where applicable).
06.19	Remove and replace fuel injectors
06.20	Service throttle body fuel injection systems.
06.21	Service ported fuel injection systems.
06.22	Service positive crankcase ventilation (PCV) systems.
06.23	Service evaporative control systems.
06.24	Service air-injection systems.
06.25	Service exhaust gas recirculation (EGR) systems.
06.26	Inspect, remove and replace catalytic converter.
06.27	Diagnose mechanical, ignition and fuel emission problems.
06.28	Inspect, remove and replace exhaust system components.
06.29	Perform cylinder leakage tests.
06.30	Diagnose, test, and replace on-board computer controls.
06.31	Diagnose, service, and replace computerized sensors.
06.32	Remove and replace turbo chargers
06.33	Check and adjust turbo charger waste gates
06.34	Identify and demonstrate knowledge of basic diesel fuel systems.
06.35	Identify and demonstrate knowledge of diesel fuel injection pump timing systems.
06.36	Test and service diesel preheating systems.
06.37	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.
06.38	Access and use service information to perform step-by-step (troubleshooting) diagnosis.
06.39	Describe the importance of running all OBDII monitors for repair verification.
07.0	Demonstrate proficiency in automatic transmission/trans-axle service--The student will be able to:
07.01	Performance test automatic transmissions.

	07.02	Change transmission oil and filter
	07.03	Adjust shift linkage
	07.04	Adjust neutral safety switches.
	07.05	Remove and replace external gaskets and seals.
	07.06	Pressure flush transmission cooler assemblies.
	07.07	Diagnose malfunctions of automatic transmissions such as fluid leaks, fluid condition, slipping, lock up and shift problems.
	07.08	Diagnose, repair and replace trans-axles.
	07.09	Service valve bodies.
	07.10	Rebuild transmission assemblies.
	07.11	Rebuild automatic trans-axle.
	07.12	Remove and replace extension housings and bushings.
	07.13	Check fluid level in a trans. equipped with a dipstick inspect fluid condition and determine necessary action
	07.14	Identify and interpret transmission concern; differentiate between engine performance and trans. Concerns; determine necessary action
	07.15	Research applicable vehicle and service information fluid type, vehicle service history, service precautions and technical service bulletins
	07.16	Perform lock-up converter tests; determine necessary action
	07.17	Perform stall test; determine necessary action
	07.18	Check fluid level in a transmission or a transaxle not equipped with or without a dipstick.
	07.19	Perform pressure tests (including trans. equipped with electronic pressure control) determine necessary action
	07.20	Describe the operational characteristics of a Continuously Variable Trans.
	07.21	Describe the operational characteristics of a hybrid vehicle drive train
	07.22	Inspect, test, adjust, repair, or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses
	07.23	Remove and replace automatic transmission and transaxle mounts
	07.24	Diagnose and repair vehicle electronic speed sensors.
08.0	Demonstrate proficiency in servicing manual drive trains and axles--The student will be able to:	
	08.01	Diagnose drive line problems.
	08.02	Diagnose and performance test manual transmission problems.
	08.03	Check fluid condition; check for leaks; determine necessary action.

08.04	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions and technical service bulletins.
08.05	Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots and springs; perform necessary action.
08.06	Diagnose clutch noise, binding, slippage, pulsation and chatter; determine necessary action.
08.07	Drain and refill manual transmission and final drive unit.
08.08	Bleed clutch hydraulic system.
08.09	Check and adjust clutch master cylinder fluid level; check for leaks.
08.10	Diagnose noise concerns through the application of trans. powerflow principles.
08.11	Diagnose hard shifting and jumping out of gear concerns; determine necessary action.
08.12	Diagnose trans. final drive assembly noise and vibration concerns; determine necessary action.
08.13	Describe the operational characteristics of an electronically-controlled manual trans.
08.14	Inspect drive shafts, universal joints and center bearings.
08.15	Diagnose universal joint noise and vibration concerns; perform necessary action.
08.16	Diagnose constant velocity (cv) joint noise and vibration concerns; determine necessary action.
08.17	Lubricate universal joints.
08.18	Remove and replace transmission mounts.
08.19	Remove and replace transmissions.
08.20	Adjust shift linkage.
08.21	Adjust clutches.
08.22	Remove and replace extension housing seals and bushings.
08.23	Remove and replace clutches, release bearings, linkage and pilot bearings.
08.24	Rebuild or replace clutch master and slave cylinders.
08.25	Remove and replace universal joints.
08.26	Diagnose and repair vehicle electronic speed sensors.
08.27	Remove and replace drive axle bearings and seals.
08.28	Inspect, remove and replace FWD bearings, hubs and seals
08.29	Clean and inspect diff. housing; check for leaks; inspect housing vent.
08.30	Check and adjust differential housing fluid level.
08.31	Drain and refill differential housing.

08.32	Diagnose noise and vibration concerns; determine necessary action.
08.33	Inspect and replace companion flange and pinion seal; measure companion flange run-out.
08.34	Service and repair differentials.
08.35	Remove and replace trans-axle assemblies.
08.36	Adjust trans-axle shifting controls.
08.37	Inspect, remove and replace constant-velocity axle assembly.
08.38	Service manual transmissions.
08.39	Rebuild manual transmission and/or transaxle assemblies.
08.40	Disassemble, service, and reassemble transfer case and components.
08.41	Diagnose, test, adjust, and replace electrical/electronic components of four-wheel drive systems.
09.0	Demonstrate proficiency in engine repair service--The student will be able to:
09.01	Clean engines.
09.02	Remove and replace motor mounts.
09.03	Check valve guides for wear.
09.04	Perform cylinder balance tests.
09.05	Perform cylinder compression tests.
09.06	Perform cylinder leakage tests.
09.07	Determine source(s) of oil/coolant loss.
09.08	Determine source(s) of excess noise.
09.09	Determine cause(s) of overheating.
09.10	Check the engine oil pressure.
09.11	Remove and replace core plugs.
09.12	Inspect, remove and replace flywheels and ring gears.
09.13	Remove and replace engine assemblies.
09.14	Remove and replace oil pans.
09.15	Remove and replace oil pumps.
09.16	Clean cylinder blocks, oil passages and pistons.
09.17	Inspect blocks for warpage.

09.18	Measure and inspect engine components for proper tolerances.
09.19	Remove and replace crankshafts, mains and rod bearings.
09.20	Remove and replace camshafts and bushings.
09.21	Remove and replace pistons and rings.
09.22	Remove ridges and deglaze cylinder walls.
09.23	Remove and replace front and rear oil seals.
09.24	Remove and replace intake and exhaust manifolds.
09.25	Remove, clean, inspect and replace cylinder heads; and inspect heads for cracks and warpage.
09.26	Test and replace hydraulic lifters.
09.27	Remove and replace timing chains, belts and gears.
09.28	Test valve springs.
09.29	Adjust valve lifters.
09.30	Replace rocker arm assemblies.
09.31	Change oil and oil filters.
09.32	Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and galley plugs; determine necessary action.
10.0	Demonstrate appropriate communication skills--The student will be able to:
10.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03	Read and follow written and oral instructions.
10.04	Answer and ask questions coherently and concisely.
10.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06	Demonstrate appropriate telephone and computer communication skills.
11.0	Demonstrate appropriate math skills--The student will be able to:
11.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04	Determine the correct purchase price, to include sales tax for a materials list

	11.05 Demonstrate an understanding of federal, state and local taxes and their computation.
12.0	Demonstrate appropriate understanding of basic science--The student will be able to:
	12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	12.02 Draw conclusions or make inferences from data.
	12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
13.0	Demonstrate employability skills--The student will be able to:
	13.01 Conduct a job search.
	13.02 Secure information about a job.
	13.03 Identify documents which may be required when applying for job interview.
	13.04 Complete a job application form correctly.
	13.05 Demonstrate competence in job interview techniques.
	13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	13.07 Identify and adopt acceptable work habits.
	13.08 Demonstrate knowledge of how to make appropriate job changes.
	13.09 Demonstrate acceptable employee health habits.
	13.10 Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200).

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)

SkillsUSA 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.

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.

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: **Dealer-Specific Automotive Technology**
Career Cluster: **Transportation, Distribution and Logistics**

AAS	
CIP Number	0647060407
Program Type	College Credit
Standard Length	74 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to a written business plan that establishes a partnership agreement between the educational institution and the automotive 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 74 credit hours.

Standards

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

01.0 Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry.
02.0 Demonstrate proficiency in appropriate math skills.
03.0 Demonstrate proficiency in appropriate understanding of basic sciences.
04.0 Demonstrate proficiency in employability skills.
05.0 Demonstrate proficiency in appropriate communication skills.
06.0 Demonstrate proficiency in understanding of entrepreneurship.
07.0 Demonstrate proficiency in acceptable employee behavior in the automotive industry.
08.0 Demonstrate proficiency in routine maintenance and consumer services.
09.0 Demonstrate proficiency in engine theory and repairs.
10.0 Demonstrate proficiency in the operation and servicing of automatic transmission/trans-axle.
11.0 Demonstrate proficiency in the operation and servicing of manual drive trains and axles.
12.0 Demonstrate proficiency in the operation of steering and suspension systems.
13.0 Demonstrate proficiency in the operation and servicing of automotive brake systems.
14.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components as related to power train.
15.0 Demonstrate proficiency in heating, air conditioning and engine cooling systems.
16.0 Demonstrate proficiency in engine performance service.

Florida Department of Education
Student Performance Standards

Program Title: **Dealer-Specific Automotive Technology**
CIP Numbers: **0647060407**
Program Length: **74 credit hours**
SOC Code(s): **49-3023**

The AAS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS. At the completion of this program, the student will be able to:	
01.0	Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry--The student will be able to:
01.01	Apply shop safety rules, EPA and OSHA standards.
01.02	Identify and initiate appropriate emergency response procedures.
01.03	Identify, use and maintain hand and power tools properly.
01.04	Identify and practice using appropriate precision measuring tools and torque methods.
01.05	Identify and describe the proper procedure to apply and remove automotive fasteners, to include thread repair.
01.06	Identify and use metric and English measurement skills.
01.07	Use computer and operate keyboard.
01.08	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.
01.09	Identify and describe typical automotive lubricants and lubricant properties.
01.10	Interpret the Florida 'Workers Right To Know Law'.
01.11	Identify and describe typical automotive seals and gaskets.
01.12	Identify and use the proper procedures required for cutting tubing and double and ISO flaring.
01.13	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.
01.14	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.
01.15	Describe and identify supplemental restraint systems (SRS).
01.16	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.
02.0	Demonstrate proficiency in appropriate math skills--The student will be able to:
02.01	Read and interpret measuring devices.
02.02	Solve number word problems.
02.03	Solve percentage problems.

	02.04	Operate a calculator.
	02.05	Use metric units related to auto industry.
	02.06	Convert inches to millimeters and millimeters to inches.
	02.07	Solve problems of length, area, volume and weight to include the circumference of a circle, the area of a rectangle, and the volume of a cylinder.
	02.08	Measure size within a specified tolerance.
	02.09	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	02.10	Identify various types of gears and interpret the meaning of a gear ratio number.
03.0	Demonstrate proficiency in appropriate understanding of basic sciences--The student will be able to:	
	03.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	03.02	Draw conclusions or make inferences from data.
	03.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	03.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
04.0	Demonstrate proficiency in employability skills--The student will be able to:	
	04.01	Identify employment requirements for an automotive career.
	04.02	Identify documents, which may be required when applying for a job.
	04.03	Complete a job application form correctly.
	04.04	Identify and adopt acceptable work habits.
	04.05	Identify acceptable employee health habits; including infection control of blood borne pathogens.
	04.06	Demonstrate appropriate telephone/communication skills.
	04.07	Conduct a job search.
	04.08	Demonstrate competence in job interview techniques.
	04.09	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	04.10	Demonstrate knowledge of how to make job changes appropriately.
	04.11	Identify and define payroll deductions (taxes, insurance, social security) employee benefits and pay systems.
05.0	Demonstrate proficiency in appropriate communication skills--The student will be able to:	
	05.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	05.02	Read and follow written and oral instructions.

	05.03 Answer and ask questions coherently and concisely.
	05.04 Identify and use critical thinking methodologies and techniques.
06.0	Demonstrate proficiency in understanding of entrepreneurship--The student will be able to:
	06.01 Define entrepreneurship.
	06.02 Describe the importance of entrepreneurship to the American economy.
	06.03 List the advantages and disadvantages of business ownership.
	06.04 Identify the risks involved in ownership of business.
	06.05 Identify the necessary personal characteristics of a successful entrepreneur.
	06.06 Identify the business skills needed to operate a small business efficiently and effectively.
	06.07 Identify and apply communication skills used in automotive careers.
07.0	Demonstrate proficiency in acceptable employee behavior in the automotive industry--The student will be able to:
	07.01 Explain the effects of chemical/substance abuse.
	07.02 Identify principles of stress management.
	07.03 Identify and define career opportunities in the automotive service industry.
	07.04 Demonstrate acceptable industry dress code.
	07.05 Identify and demonstrate proper customer relations skills.
	07.06 Identify principles of time management.
	07.07 Identify acceptable customer relations.
08.0	Demonstrate proficiency in routine maintenance and consumer services--The student will be able to:
	08.01 Inspect, test head lamps, tail lamps and stop lamps. Aim headlights.
	08.02 Observe dash warning lamps during bulb check.
	08.03 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
	08.04 Perform product specific service procedures.
	08.05 Demonstrate retrieving stored diagnostic trouble codes.
	08.06 Reset product specific service indicator.
	08.07 Demonstrate knowledge of manufacturer policies and procedures.
	08.08 Identify and maintain product specific engine systems.
	08.09 Identify and maintain product specific automatic transmission systems.

08.10	Identify and maintain product specific manual transmission systems.
08.11	Identify and maintain product specific electrical and electronic systems.
08.12	Identify and maintain product specific heating and A/C systems.
08.13	Identify and maintain product specific steering and suspension systems.
08.14	Identify and maintain product specific brake systems.
08.15	Identify and maintain product specific audio systems.
08.16	Identify and maintain product specific safety systems.
08.17	Identify and maintain product specific accessories.
08.18	Perform charging system test.
08.19	Inspect passenger restraint system, repair if needed.
09.0	Demonstrate proficiency in engine theory and repair--The student will be able to:
09.01	Service product specific engine systems.
09.02	Interpret and verify complaint; determine necessary action.
09.03	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
09.04	Listen to engine noises; determine necessary action.
09.05	Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine necessary action.
09.06	Perform engine vacuum tests; determine necessary action.
09.07	Perform cylinder power balance tests; determine necessary action.
09.08	Perform cylinder compression tests; determine necessary action.
09.09	Perform cylinder leakage tests; determine necessary action.
09.10	Remove engine (front-wheel drive); prepare for disassembly.
09.11	Reinstall engine (front-wheel drive).
09.12	Remove engine (rear-wheel drive); prepare for disassembly.
09.13	Reinstall engine (rear-wheel drive).
09.14	Identify hybrid vehicle internal combustion engine service precautions.
Cylinder Head and Valve Train Diagnosis and Repair	
09.15	Remove cylinder head(s); inspect cylinder head(s) for cracks; check gasket surface areas for warpage and leakage; check passage condition.
09.16	Install cylinder heads and gaskets; tighten according to manufacturer’s specifications and procedures.

09.17	Inspect and test valve springs for squareness, pressure, and free height comparison; replace as needed.
09.18	Inspect valve spring retainers, locks, and valve grooves.
09.19	Replace valve stem seals.
09.20	Inspect valve guides for wear; check valve guide height and stem- to-guide clearance; determine necessary action.
09.21	Inspect valves; determine necessary action.
09.22	Inspect valve seats; determine necessary action.
09.23	Check valve face-to-seat contact and valve seat concentricity (run out); determine necessary action.
09.24	Check valve spring assembled height and valve stem height; service valve and spring assemblies as needed.
09.25	Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); repair or replace.
09.26	Inspect hydraulic or mechanical lifters; replace as needed.
09.27	Adjust valves (mechanical or hydraulic lifters).
09.28	Inspect and replace camshaft drives (including gear wear and backlash, sprocket and chain wear, overhead cam drive sprockets, drive belts, belt tension, and tensioners).
09.29	Inspect camshaft for run out; measure journals and lobes for wear.
09.30	Inspect and measure camshaft bearings for wear, damage, out-of round, and alignment; determine necessary action.
09.31	Verify camshaft(s) timing according to manufacturer’s specifications and procedure.
09.32	Service product specific cam drive systems.
09.33	Perform product specific valve adjustments.
09.34	Remove and replace valve cover gaskets.
Engine Block Diagnosis and Repair	
09.35	Inspect and replace pans, covers, gaskets, and seals.
09.36	Inspect engine block for cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed repairs.
09.37	Inspect internal and external threads; repair as needed.
09.38	Remove cylinder wall ridges.
09.39	Inspect and measure cylinder walls for damage and wear; determine necessary action.
09.40	Deglaze and clean cylinder walls.
09.41	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.
09.42	Inspect crankshaft for surface cracks and journal damage; check oil passage condition; measure journal wear; determine necessary action.

09.43	Inspect and measure main and connecting rod bearings for damage, clearance, and end play; determine necessary action (includes the proper selections of bearings).
09.44	Identify position and bearing wear patterns that include connecting rod alignment and main bearing bore problems; inspect rod alignment and bearing bore condition.
09.45	Inspect, measure, service or replace pistons.
09.46	Inspect, measure, and install piston rings.
09.47	Inspect, repair or replace crankshaft vibration damper (harmonic balancer).
09.48	Inspect flywheel or flexplate and ring gear for cracks and wear; measure run out; determine necessary action.
09.49	Inspect, remove, and replace crankshaft pilot bearing or bushing (as applicable).
09.50	Reassemble engine components using correct gaskets and sealants.
09.51	Inspect auxiliary (balance, intermediate, idler, counterbalance or silencer) shaft(s); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.
Lubrication and Cooling Systems Diagnosis and Repairs	
09.52	Prime engine lubrication system.
09.53	Perform oil pressure tests; determine necessary action.
09.54	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; replace as needed.
09.55	Perform cooling system tests (pressure, combustion leakage, and temperature); determine necessary action.
09.56	Inspect, replace, and adjust drive belts and pulleys.
09.57	Inspect and replace engine cooling and heater system hoses.
09.58	Inspect, test, and replace thermostat and housing.
09.59	Inspect coolant; drain, flush, and refill cooling system with recommended coolant and bleed air as required.
09.60	Inspect, test, remove, and replace water pump.
09.61	Inspect and test radiator, pressure cap, and coolant recovery system; remove and replace radiator.
09.62	Clean, inspect, and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.
09.63	Inspect and test electrical fan control system and circuits.
09.64	Inspect auxiliary oil coolers; replace as needed.
09.65	Inspect, test, and replace oil temperature and pressure switches and sensors.
09.66	Perform oil and filter change.
09.67	Service product specific water pumps.
09.68	Service product specific belt drive and tensioner systems.

10.0	Demonstrate proficiency in the operation and servicing of automatic transmission/transaxle--The student will be able to:
10.01	Interpret and verify driver's complaint; verify proper engine operation; determine necessary action.
10.02	Diagnose unusual fluid usage, level, and condition problems; determine necessary action.
10.03	Perform pressure tests; determine necessary action.
10.04	Perform stall tests; determine necessary action.
10.05	Perform lock-up converter system tests; determine necessary action.
10.06	Diagnose electronic, mechanical, and vacuum control systems; determine necessary action.
10.07	Diagnose noise and vibration problems; determine necessary action.
Transmission and Transaxle Maintenance and Adjustment	
10.08	Inspect, adjust or replace manual shift valve and throttle (TV) linkages or cables and check gear select indicator (as applicable).
10.09	Service transmission; perform visual inspection; replace fluids and filters.
In-Vehicle Transmission and Transaxle Repair	
10.10	Inspect, adjust or replace (as applicable) vacuum modulator; inspect and repair or replace lines and hoses.
10.11	Inspect, repair, and replace governor assembly.
10.12	Inspect and replace external seals and gaskets.
10.13	Inspect extension housing; replace bushing and seals.
10.14	Inspect, leak test, flush, and replace cooler, lines, and fittings.
10.15	Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.
10.16	Inspect, measure, clean, and replace valve body (includes surfaces and bores, springs, valves, sleeves, retainers, brackets, check-balls, screens, spacers, and gaskets); check/adjust valve body bolt torque.
10.17	Inspect servo bore, piston, seals, pin, spring, and retainers; repair or replace as needed.
10.18	Inspect accumulator bore, piston, seals, spring, and retainer; repair or replace as needed.
10.19	Inspect, test, adjust, repair or replace transmission related electrical and electronic components (includes computers, solenoids, sensors, relays, switches, and harnesses).
10.20	Inspect, replace, and align power train mounts.
10.21	Inspect and replace parking pawl, shaft, spring, and retainer.
Off-Vehicle Transmission and Transaxle Repair (Removal, Disassembly, and Reinstallation)	
10.22	Remove and reinstall transmission/transaxle and torque converter.
10.23	Disassemble, clean, and inspect transmission/transaxle.
10.24	Assemble transmission/transaxle.

Oil Pump and Converter	
10.25	Inspect converter flex plate, attaching parts, pilot and pump drive, and seal areas.
10.26	Measure torque converter end play and check for interference check stator clutch.
10.27	Inspect, measure, and replace oil pump housings, shafts, vanes, rotors, gears, valves, seals, and bushings.
10.28	Check torque converter and transmission cooling system for contamination.
Gear Train, Shafts, Bushings and Case	
10.29	Check end play or preload; determine needed service.
10.30	Inspect, measure, and replace thrust washers and bearings.
10.31	Inspect oil delivery seal rings, ring grooves, and sealing surface areas.
10.32	Inspect bushings; replace as needed.
10.33	Inspect and measure planetary gear assembly (includes sun, ring gear, thrust washers, planetary gears, and carrier assembly); replace as needed.
10.34	Inspect cases, bores, passages, bushings, vents, and mating surfaces; replace as needed.
10.35	Inspect transaxle drive, link chains, sprockets, gears, bearings and bushings; replace as needed.
10.36	Inspect, measure, repair, adjust or replace transaxle final drive components.
10.37	Inspect and reinstall parking pawl, shaft, spring, and retainer; replace as needed.
Friction and Reaction Units	
10.38	Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; replace as needed.
10.39	Measure clutch pack clearance; adjust as needed.
10.40	Air test operation of clutch and servo assemblies.
10.41	Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; replace as needed.
10.42	Inspect bands and drums; replace as needed.
10.43	Service product specific automatic transmission/transaxle systems.
11.0	Demonstrate proficiency in the operation and assembly of manual drive transmission/transaxle--The student will be able to:
11.01	Diagnose clutch noise, binding, slippage, pulsation, and chatter problems; determine necessary action.
11.02	Inspect, adjust or replace clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs.
11.03	Inspect, adjust, repair or replace hydraulic clutch slave master-cylinders, lines, and hoses.
11.04	Inspect, adjust or replace release (throw-out) bearing, lever, and pivot.
11.05	Inspect and replace clutch pressure plate assembly and clutch disc.

11.06	Inspect, remove or replace crankshaft pilot bearing or bushing (as applicable).
11.07	Inspect, repair, and service or replace flywheel and ring gear.
11.08	Inspect engine block, clutch (bell) housing, and transmission case mating surface; determine necessary action.
11.09	Measure flywheel-to-block run out and crankshaft end play; determine necessary action.
11.10	Measure clutch (bell) housing bore-to-crankshaft run out and face squareness; determine needed service.
Transmission Diagnosis and Repair	
11.11	Diagnose transmission noise, hard shifting, jumping out of gear, and fluid leakage problems; determine necessary action.
11.12	Inspect, adjust, and replace transmission shift linkages, brackets, bearings, cables, pivots, and levers.
11.13	Inspect, replace, and align power train mounts.
11.14	Inspect and replace transmission gaskets, seals, and sealants; Inspect sealing surfaces.
11.15	Remove and reinstall transmission.
11.16	Disassemble, clean, and reassemble transmission components.
11.17	Inspect, adjust, and reinstall transmission shift cover, forks, grommets, levers, shafts, sleeves, detent mechanisms, interlocks, and springs.
11.18	Inspect and reinstall input (clutch) shaft and bearings.
11.19	Inspect and reinstall main shaft, gears, thrust washers, bearings, and retainers.
11.20	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.
11.21	Inspect and reinstall counter (cluster) gear, shaft, bearings, thrust washers, and retainers; check end play; adjust as needed.
11.22	Inspect and reinstall reverse idler gear, shaft, bearings, thrust washers, and retainers; check end play; adjust as needed.
11.23	Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.
11.24	Inspect, repair, and replace extension housing and transmission case mating surfaces, bores, bushings, and vents.
11.25	Inspect lubrication devices (oil pump or slingers).
11.26	Service product specific manual transmission systems.
Transaxle Diagnosis and Repair	
11.27	Diagnose transaxle noise, hard shifting, jumping out of gear, and fluid leakage problem; determine necessary action.
11.28	Inspect, adjust, and reinstall transaxle shift linkages, brackets, bushings, cables, pivots, and levers.
11.29	Inspect and reinstall power train mounts.
11.30	Remove and reinstall transaxle.
11.31	Inspect and replace transaxle gaskets, seals, and sealants; inspect sealing surfaces.

11.32	Remove and replace transaxle final drive.
11.33	Disassemble and clean transaxle final drive.
11.34	Inspect, adjust, and reinstall transaxle shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.
11.35	Inspect and reinstall input (clutch) shaft and bearings.
11.36	Inspect and reinstall output shaft, gears, thrust washers, bearings, and retainers.
11.37	Measure end play or preload (shim or spacer selection procedure) on transaxle shafts; adjust as needed.
11.38	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.
11.39	Inspect and reinstall reverse idler gear, shaft, bearings, thrust washers, and retainers.
11.40	Inspect transaxle case, mating surfaces, bores, bushings, and vents.
11.41	Inspect and reinstall speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.
11.42	Diagnose differential assembly noise and vibration problems; determine necessary action.
11.43	Remove, inspect, measure, adjust, and reinstall differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.
11.44	Inspect lubrication devices (oil pump or slingers).
11.45	Service product specific manual transaxle systems.
Drive and Half Shaft Universal and Constant-Velocity (CV) Joint Diagnosis and Repair	
11.46	Diagnose constant-velocity (CV) joint noise and vibration problems; determine necessary action.
11.47	Diagnose universal joint noise and vibration problems; determine necessary action.
11.48	Diagnose front wheel drive (FWD) front wheel bearing noise and vibration problems; determine necessary action.
11.49	Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.
11.50	Inspect, service, and replace shaft center support bearings.
11.51	Check and correct shaft balance; measure shaft run out; measure and adjust driveline angles.
Rear Axle Diagnosis and Repair; Ring and Pinion Gears and Differential Case Assembly	
11.52	Diagnose noise and vibration problems; determine necessary action.
11.53	Diagnose fluid leakage problems; determine necessary action.
11.54	Inspect and replace companion flange and pinion seal; measure companion flange run out.
11.55	Inspect ring gear and measure run out; determine necessary action.
11.56	Remove and inspect drive pinion gear, spacers, sleeves, and bearings.

11.57	Measure and adjust drive pinion depth.
11.58	Measure and adjust drive pinion bearing preload.
11.59	Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup and shim types).
11.60	Check ring and pinion tooth contact patterns; adjust as needed.
11.61	Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.
11.62	Reassemble and reinstall differential case assembly; measure run out; determine necessary action.
11.63	Service product specific differentials.
Limited Slip Differential	
11.64	Diagnose noise, slippage, and chatter problems; determine necessary action.
11.65	Inspect and flush differential housing; refill with correct lubricant.
11.66	Inspect and reinstall clutch (cone or plate) components.
11.67	Measure rotating torque; determine necessary action.
11.68	Verify matching tires & tolerances.
Axle Shaft	
11.69	Diagnose rear axle shafts, bearings, and seals for noise, vibration, and fluid leakage problems; determine necessary action.
11.70	Inspect and replace rear axle shaft wheel studs.
11.71	Remove and replace rear axle shafts.
11.72	Inspect and replace rear axle shaft seals, bearings, and retainers.
11.73	Measure rear axle flange run out and shaft end play; determine necessary action.
Four-Wheel Drive/All-Wheel Drive Component Diagnosis and Repair	
11.74	Diagnose noise, vibration, and unusual steering problems; determine necessary action.
11.75	Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.
11.76	Remove and reinstall transfer case.
11.77	Disassemble, service, and reassemble transfer case and components.
11.78	Inspect, service, and replace front-wheel bearings and locking hubs.
11.79	Check drive assembly seals and vents; check lube level.
11.80	Inspect viscous coupling assembly.
11.81	Verify matching tires & tolerances.

11.82	Service product specific all-wheel drive systems.
12.0	Demonstrate proficiency in the operation of steering and suspension systems--The student will be able to:
12.01	Disable supplemental restraint system (SRS) in accordance with manufacturer's procedures.
12.02	Diagnose steering column noises, looseness, and binding problems (including tilt mechanisms); determine necessary action.
12.03	Diagnose power non-rack and pinion steering gear binding, uneven turning effort, looseness, hard steering, and fluid leakage problems; determine necessary action.
12.04	Diagnose power rack and pinion steering gear vibration, looseness, and hard steering problems; determine necessary action.
12.05	Inspect and replace steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel.
12.06	Adjust manual or power non-rack and pinion worm bearing preload and sector lash.
12.07	Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.
12.08	Adjust manual or power rack and pinion steering gear.
12.09	Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
12.10	Inspect manual and power steering fluid levels and condition.
12.11	Flush, fill, and bleed power steering system.
12.12	Diagnose power steering fluid leakage; determine necessary action.
12.13	Inspect, replace, and adjust power steering pump belt.
12.14	Remove, inspect, and replace power steering pump, pump mounts, pump seals, and gaskets.
12.15	Remove, inspect, and replace power steering pump pulley; check alignment.
12.16	Perform power steering system pressure test; determine needed repairs.
12.17	Inspect and replace power steering hoses and fittings.
12.18	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.
12.19	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.
12.20	Diagnose, inspect, adjust, repair or replace components of electronically-controlled steering systems.
12.21	Diagnose, inspect, repair or replace components of variable-assist steering systems.
12.22	Service product specific power assisted steering systems.
12.23	Service product specific variable assisted steering systems.
Suspension Systems Diagnosis and Repair; Front Suspensions	
12.24	Diagnose short and long arm suspension system noises, body sway, and uneven riding height problems; determine necessary action.

12.25	Diagnose MacPherson strut suspension system noises body sway, and uneven riding height problems; determine necessary action.
12.26	Remove, inspect, and replace upper and lower control arms, bushings, shafts, and rebound bumpers.
12.27	Remove, inspect, replace, and adjust strut (compression/tension) rods and bushings.
12.28	Remove, inspect, and replace upper and lower ball joints on short and long arm suspension systems.
12.29	Remove, inspect, and replace steering knuckle assemblies.
12.30	Remove, inspect, and replace short and long arm suspension system coil springs and spring insulators.
12.31	Remove, inspect, replace, and adjust suspension system torsion bars; inspect mounts.
12.32	Remove, inspect and replace stabilizer bar bushings, brackets, and links.
12.33	Remove, inspect, and replace ball joints on MacPherson strut suspension systems.
12.34	Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, insulators, and upper strut bearing mount.
12.35	Lubricate suspension and steering systems.
12.36	Service product specific suspension systems.
Rear Suspensions	
12.37	Remove, inspect, and replace coil springs and spring insulators.
12.38	Remove, inspect, and replace transverse links, control arms, bushings, and mounts.
12.39	Remove, inspect, and replace leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts.
12.40	Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, and insulators (silencers).
12.41	Service product specific suspension systems.
Miscellaneous Service	
12.42	Inspect, remove, and replace shock absorbers.
12.43	Remove, inspect, and service or replace front and rear wheel bearings.
12.44	Diagnose, inspect, adjust, repair or replace components of electronically-controlled suspension systems.
12.45	Service product specific ride height control systems.
Wheel Alignment Diagnosis, Adjustment, and Repair	
12.46	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return problems; determine necessary action.
12.47	Measure vehicle riding height; determine necessary action.
12.48	Check and adjust front and rear wheel camber; determine needed repairs.
12.49	Check and adjust caster; determine necessary action.

12.50	Check and adjust front wheel toe; adjust as needed.
12.51	Center steering wheel.
12.52	Check toe-out-on-turns (turning radius); determine needed repairs.
12.53	Check SAI (steering axis inclination) and included angle; determine necessary action.
12.54	Check and adjust rear wheel toe.
12.55	Check rear wheel thrust angle; determine necessary action.
12.56	Check for front wheel setback; determine necessary action.
12.57	Check front cradle (subframe) alignment; determine needed repairs.
Wheel and Tire Diagnosis and Repair	
12.58	Diagnose tire wear patterns; determine necessary action.
12.59	Inspect tires, diagnose tire wear patterns; check and adjust air pressure.
12.60	Diagnose wheel/tire vibration, shimmy, and noise problems; determine necessary action.
12.61	Rotate tires according to manufacturer's recommendations.
12.62	Measure wheel, tire, axle, and hub run out; determine needed repairs.
12.63	Diagnose tire pull (lead) problem; determine corrective actions.
12.64	Balance wheel and tire assembly (static and dynamic).
12.65	Dismount, inspect, repair, and remount tire on wheel.
12.66	Reinstall wheel; torque lug nuts.
13.0	Demonstrate proficiency in the operation and servicing of automotive brake system--The student will be able to:
13.01	Measure and adjust pedal pushrod length and pedal height.
13.02	Check master cylinder for internal and external leaks and proper operation; determine necessary action.
13.03	Remove, bench bleed, and replace master cylinder.
13.04	Diagnose poor stopping, pulling or dragging caused by problems in the hydraulic system; determine necessary action.
13.05	Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports.
13.06	Inspect flexible brake hoses for leaks, kinks, cracks, bulging or wear; tighten loose fittings and supports.
13.07	Fabricate and install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed.
13.08	Select, handle, store, and install brake fluids to proper level.
13.09	Inspect, test, and replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.

13.10	Inspect, test, replace, and adjust height (load) sensing proportioning valve.
13.11	Inspect, test, and replace components of brake warning light system.
13.12	Bleed (manual, pressure, vacuum or surge) brake system; flush hydraulic system.
Drum Brake Diagnosis and Repair	
13.13	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation problems; determine necessary action.
13.14	Remove, clean (using proper safety procedures), inspect, and measure brake drums; service or replace as needed.
13.15	Mount brake drum on lathe machine braking surface.
13.16	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
13.17	Remove and reinstall wheel cylinders.
13.18	Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.
13.19	Reinstall wheel, torque lug nuts, and make final checks and adjustments.
Disc Brake Diagnosis and Repair	
13.20	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation caused problems; determine necessary action.
13.21	Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing.
13.22	Clean and inspect caliper mounting and slides for wear and damage.
13.23	Remove, clean, and inspect pads and retaining hardware; determine needed service.
13.24	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.
13.25	Reassemble, lubricate, and reinstall caliper, pads, and related hardware.
13.26	Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer’s recommendations in determining need to machine or replace.
13.27	Refinish rotor according to manufacturer’s recommendations.
13.28	Adjust calipers with integrated parking brake system.
13.29	Fill master cylinder with recommended fluid and seat pads; inspect caliper for leaks.
13.30	Reinstall wheel, torque lug nuts, and make final checks and adjustments.
13.31	Remove and replace rotor.
Power Assist Units Diagnosis and Repair	
13.32	Test pedal free travel with and without engine running; check power assist operation.
13.33	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.

13.34	Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; repair or replace parts as needed.
Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair	
13.35	Diagnose wheel bearing noises, wheel shimmy, and vibration problems; determine necessary action.
13.36	Remove, clean, inspect, repack, and reinstall wheel bearings and replace seals; reinstall hub and adjust wheel bearings.
13.37	Check parking brake cables and components for wear, rusting, binding, and corrosion; clean, lubricate, and replace as needed.
13.38	Check parking brake operation; adjust as needed.
13.39	Check operation of parking brake indicator light system.
13.40	Check operation of brake stop light system; adjust and service as needed.
13.41	Replace wheel bearing and race.
Anti-Lock Brake System	
13.42	Inspect, test, and service anti-lock brake system (ABS) hydraulic, electrical, and mechanical components.
13.43	Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise problems caused by the anti-lock brake system (ABS); determine necessary action.
13.44	Observe anti-lock brake system (ABS) warning light(s) at startup; determine if further diagnosis is needed.
13.45	Diagnose anti-lock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment; determine necessary action.
13.46	Depressurize high pressure components of the anti-lock brake system (ABS) following manufacturer's recommended safety procedures.
13.47	Fill the anti-lock brake system (ABS) master cylinder with recommended fluid following manufacturer's procedures; inspect system for leaks.
13.48	Bleed the anti-lock brake system's (ABS) front and rear hydraulic circuits following manufacturer's procedures.
13.49	Perform a fluid pressure (hydraulic boost) diagnosis on the high pressure anti-lock brake system (ABS); determine necessary action.
13.50	Remove and install anti-lock brake system (ABS) electrical/electronic/hydraulic components following manufacturer's procedures and specifications.
13.51	Service, test, and adjust anti-lock brake system (ABS) speed sensors following manufacturer's recommended procedures.
13.52	Diagnose anti-lock brake system (ABS) braking problems caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).
13.53	Identify and inspect electronic brake control systems; determine necessary action.
13.54	Service product specific anti-lock brake systems.
13.55	Service product specific traction control systems.
14.0	Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic related components--The student will be able to:

14.01	Use wiring diagrams during diagnosis of electrical circuit problems.
14.02	Check electrical circuits with a test light; determine necessary action.
14.03	Check voltage and voltage drop in electrical/electronic circuits using a digital multimeter (DMM); determine needed repairs.
14.04	Check current flow in electrical/electronic circuits and components using an ammeter; determine necessary action.
14.05	Check electrical circuits using jumper wires; determine necessary action.
14.06	Find shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
14.07	Measure and diagnose the cause(s) of abnormal key-off battery drain; determine necessary action.
14.08	Inspect and test fusible links, circuit breakers, and fuses; replace as needed.
14.09	Inspect and test switches, connectors, relays, and wires of electrical/electronic circuits; repair or replace as needed.
Battery Diagnosis and Service	
14.10	Perform battery state-of-charge test; determine needed service.
14.11	Perform battery capacity (load, high-rate discharge) test; determine needed service.
14.12	Maintain or restore electronic memory functions.
14.13	Inspect, clean, and replace battery.
14.14	Perform slow/fast battery charge.
14.15	Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
14.16	Start a vehicle using jumper cables using a battery auxiliary power supply.
14.17	Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
14.18	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
Starting System Diagnosis and Repair	
14.19	Perform starter current draw and circuit voltage drop test; determine necessary action.
14.20	Inspect and test starter relays and solenoids; replace as needed.
14.21	Remove and replace/reinstall starter.
14.22	Perform starter bench tests; determine necessary action.
14.23	Inspect, test, and repair or replace switches, connectors, and wires of starter control circuits.
14.24	Disassemble, clean, inspect, and test starter components; replace as needed.
14.25	Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.
Charging System Diagnosis and Repair	

14.26	Diagnose charging system problems that cause an undercharge, a no-charge or an overcharge condition.
14.27	Inspect and adjust alternator drive belts; replace as needed.
14.28	Inspect and test voltage regulator; replace as needed.
14.29	Remove, inspect, and replace/reinstall alternator.
14.30	Perform charging circuit voltage drop tests; determine needed repairs.
Lighting Systems Diagnosis and Repair	
14.31	Diagnose brighter than normal, intermittent, dim or no light operation.
14.32	Inspect, replace, and aim headlights and bulbs.
14.33	Inspect and diagnose incorrect turn signal or hazard light operation; repair or replace as needed.
14.34	Identify system voltage and safety precautions associated with high-intensity discharge headlights.
Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair	
14.35	Diagnose intermediate, high, low or no gauge readings.
14.36	Test gauge circuit voltage regulators (limiters); replace as needed.
14.37	Inspect and test gauges and gauge sending units; replace as needed.
14.38	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; repair or replace as needed.
14.39	Diagnose incorrect operation of warning devices and other driver information systems.
14.40	Diagnose intermediate, high, low or no readings on electronic instrument clusters.
14.41	Inspect and test sensors, sending units, connectors, and wires of electronic instrument circuits; repair or replace as needed.
Horn and Wiper/Washer Diagnosis and Repair	
14.42	Diagnose incorrect horn operation; repair as needed.
14.43	Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; repair as needed.
14.44	Diagnose incorrect windshield washer operation; repair as needed.
Accessories Diagnosis and Repair	
14.45	Diagnose incorrect operation of motor-driven accessory circuits; repair as needed.
14.46	Diagnose incorrect heated glass operation; repair as needed.
14.47	Diagnose incorrect electric door and hatch/trunk lock operation; repair as needed.
14.48	Diagnose incorrect operation of cruise control systems; repair as needed.
14.49	Diagnose supplemental restraint system (SRS) problems; repair as needed. (NOTE: Follow manufacturer's safety procedures to prevent accidental deployment.)

14.50	Diagnose radio static and weak, intermittent, or no radio reception.
14.51	Service product specific electrical/electronic systems.
14.52	Perform product specific diagnostic procedures.
14.53	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
14.54	Remove and reinstall door panel.
15.0	Demonstrate proficiency in heating, air conditioning and engine cooling systems--The student will be able to:
15.01	Diagnose unusual operating noises in the A/C system; determine necessary action.
15.02	Conduct a performance test of the A/C system; determine needed repairs.
15.03	Leak test a/c system; determine necessary action.
15.04	Inspect the condition of discharged oil.
15.05	Select oil type; measure and add oil to the A/C system as needed.
Refrigeration System Component Diagnosis and Repair Compressor and Clutch	
15.06	Diagnose A/C system problems that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.
15.07	Inspect A/C compressor drive belts; replace and adjust as needed.
15.08	Inspect, test, and replace A/C compressor clutch components or assembly.
15.09	Remove and replace A/C compressor and mountings.
15.10	Inspect and replace A/C compressor shaft seal assembly(ies).
15.11	Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.
Evaporator, Receiver/Drier, Condenser, Etc.	
15.12	Diagnose A/C system problems caused by too much moisture in the refrigerant; determine necessary action.
15.13	Install A/C system filter.
15.14	Remove and inspect A/C system mufflers, hoses, lines, fittings, o-rings, seals, and service valves; replace as needed.
15.15	Inspect A/C condenser for air flow restrictions; service as required.
15.16	Inspect receiver/drier or accumulator/drier; replace as needed.
15.17	Inspect and test expansion valve or orifice (expansion) tube; replace as needed.
15.18	Inspect evaporator housing water drain; repair as needed.
Heating and Engine Cooling Systems Diagnosis and Repair	
15.19	Diagnose temperature control problems in the heater/ventilation system; determine necessary action.

15.20	Perform cooling system, cap, and recovery system tests (pressure, combustion leakage, and temperature); determine necessary action.
15.21	Inspect engine cooling and heater system hoses and belts; replace as needed.
15.22	Inspect, test, and replace thermostat and housing.
15.23	Determine coolant condition; drain and recover.
15.24	Flush system and refill with recommended coolant; bleed system.
15.25	Clean, inspect, and test fan, fan clutch (electrical and mechanical), fan shroud, and air dams; replace as needed.
15.26	Inspect and test heater control valve(s); replace as needed.
Operating Systems and Related Controls Diagnosis and Repairs	
15.27	Diagnose failures in the electrical controls of heating and A/C systems; determine necessary action.
15.28	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; repair as needed.
15.29	Test A/C compressor load cut-off systems; determine needed repairs.
15.30	Using a scan tool, observe and record related HVAC data and trouble codes.
Vacuum/Mechanical	
15.31	Diagnose failure in the vacuum and mechanical controls of the heating and A/C system; determine necessary action.
15.32	Inspect and test A/C-heater control panel assembly; replace as needed.
15.33	Inspect and test A/C-heater control cables and linkages adjust or replace as needed.
15.34	Inspect and test A/C-heater vacuum control switches, hoses, diaphragms (motor), vacuum reservoir, check valve, and restrictors; replace as needed.
15.35	Inspect and test A/C-heater ducts, doors, hoses, and outlets; replace as needed.
Automatic and Semi-Automatic Temperature Controls	
15.36	Check operation of automatic and semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.
Refrigerant Recovery, Recycling, and Handling	
15.37	Verify correct operation and maintenance of refrigerant handling equipment.
15.38	Identify and recover A/C system refrigerant.
15.39	Recycle refrigerant.
15.40	Label and store refrigerant.
15.41	Test recycled refrigerant for non-condensable gases.
15.42	Evaluate and charge A/C system.

15.43	Service product specific climate control systems.
16.0	Demonstrate proficiency in engine performance services--The student will be able to:
16.01	Interpret and verify complaint; determine necessary action.
16.02	Demonstrate proficiency in use of computer-based information systems.
16.03	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
16.04	Diagnose unusual engine noise or vibration problems; determine necessary action.
16.05	Diagnose unusual exhaust color, odor, and sound; determine needed action.
16.06	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
16.07	Perform cylinder power balance test; determine needed action.
16.08	Perform cylinder compression test; determine needed action.
16.09	Perform cylinder leakage test; determine needed action.
16.10	Diagnose engine mechanical, electrical, electronic, fuel and ignition problems with an oscilloscope and engine diagnostic equipment; determine needed action.
16.11	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test and obtain exhaust readings; interpret readings and determine needed action.
Computerized Engine Controls Diagnosis and Repair	
16.12	Diagnose emissions or driveability problems resulting from of computerized engine controls with no diagnostic trouble codes stored; determine necessary action.
16.13	Retrieve and record stored diagnostic trouble codes.
16.14	Diagnose the causes of emissions or driveability problems resulting from failure of computerized engine controls with stored diagnostic trouble codes.
16.15	Inspect, test, adjust, and replace computerized engine control system sensors, powertrain control module (PCM), actuators, and circuits.
16.16	Obtain and interpret digital multimeter (DMM) readings.
16.17	Access and use electronic service information (ESI).
16.18	Locate and interpret vehicle and major component identification number (VIN, vehicle certification labels and calibration decals).
16.19	Inspect and test power and ground circuits and connections; service or replace as needed.
16.20	Practice recommended precautions when handling static sensitive devices.
16.21	Diagnose driveability and emissions problems resulting from failures of interrelated systems (cruise control, security alarms, torque controls, suspension controls, traction controls, torque management, A/C, automatic transmissions, and similar systems); determine necessary action.
16.22	Service product specific diagnostic scanner.

16.23	Service product specific PROM reprogramming systems.
16.24	Perform product specific OBD II drive cycle diagnostic tests.
Ignition System Diagnosis and Repair	
16.25	Diagnose no-starting, driveability, and emissions problems on vehicles with electronic ignition (distributorless) systems; determine necessary action.
16.26	Diagnose no-starting, driveability, and emissions problems on vehicles with distributor ignition (DI) systems; determine needed repairs.
16.27	Inspect and test ignition primary circuit wiring and components; repair or replace as needed.
16.28	Inspect and test distributor; service as needed.
16.29	Inspect and test ignition system secondary circuit wiring and components; replace as needed.
16.30	Inspect and test ignition coil(s); replace as needed.
16.31	Check and adjust (where applicable) ignition system timing and timing advance/retard.
16.32	Inspect and test ignition wiring harness and connectors; replace as needed.
16.33	Inspect and test ignition system pick-up sensors or triggering devices including crankshaft and camshaft sensors; replace as needed.
16.34	Inspect, test, and/or replace ignition control module and powertrain/engine control module; reprogram as needed.
16.35	Service product specific ignition systems.
16.36	Remove and replace spark plugs; inspect secondary ignition components for wear and damage.
Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair	
16.37	Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems on vehicles with injection-type fuel system; determine needed action.
16.38	Inspect fuel tank and fuel cap; inspect and replace fuel lines, fittings, and hoses.
16.39	Check fuel for contaminants and quality.
16.40	Inspect and test mechanical and electrical fuel pumps and pump control systems; replace as needed.
16.41	Replace fuel filters.
16.42	Inspect and test fuel pressure regulation system and components.
16.43	Inspect and test cold enrichment system components; adjust or replace as needed.
16.44	Remove, clean, and reinstall throttle body; adjust related linkages
16.45	Inspect and test fuel injectors; clean and replace.
16.46	Inspect throttle body mounting plates, air induction and filtration system, intake manifold, and gaskets; clean or replace as needed.
16.47	Check/adjust idle speed and fuel mixture where applicable.

16.48	Remove, inspect, and test vacuum and electrical components and connections of fuel system; repair or replace as needed.
16.49	Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.
16.50	Perform exhaust system back-pressure test; determine needed action.
16.51	Test the operation of turbocharger/supercharger systems; determine needed action.
16.52	Remove, clean, inspect, and repair or replace turbocharger/supercharger system components.
16.53	Identify the causes of turbocharger/supercharger failure; determine needed action.
16.54	Service product specific fuel injection systems.
16.55	Inspect and test catalytic converter efficiency.
16.56	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.
Emissions Control Systems Diagnosis and Repair Positive Crankcase Ventilation	
16.57	Diagnose oil leaks, emissions, and driveability problems resulting from failure of the positive crankcase ventilation (PCV) system.
16.58	Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.
Exhaust Gas Recirculation	
16.59	Diagnose emissions and driveability problems caused by failure of the exhaust gas recirculation (EGR) system.
16.60	Inspect and test valve, valve manifold, and exhaust passages of exhaust gas recirculation (EGR) systems; service or replace as needed.
16.61	Inspect and test vacuum/pressure controls, filters, and hoses of exhaust gas recirculation (EGR) systems; service or replace as needed.
16.62	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; repair or replace as needed.
Exhaust Gas Treatment	
16.63	Diagnose emissions and driveability problems resulting from failure of the secondary air injection and catalytic converter systems.
16.64	Inspect and test mechanical components of secondary air injection systems; service or replace as needed.
16.65	Inspect and test electrical/electronically-operated components and circuits of air injection systems; replace as needed.
16.66	Inspect and test components of catalytic converter systems; replace as needed.
Intake Air Temperature Controls	
16.67	Diagnose emissions and driveability problems resulting from failure of the intake air temperature control systems.
16.68	Inspect and test components of intake air temperature control systems; replace as needed.
Early Fuel Evaporation (Intake Manifold Temperature) Controls	
16.69	Diagnose emissions and driveability problems resulting from failure of early fuel evaporation control systems.

16.70	Inspect and test components of early fuel evaporation control systems; service or replace as needed.
Evaporative Emissions Controls	
16.71	Diagnose emissions and driveability problems resulting from failure of evaporative emissions control system.
16.72	Inspect and test components and hoses of evaporative emissions control system; replace as needed.
Engine Related Service	
16.73	Adjust valves on engines with mechanical or hydraulic lifters.
16.74	Verify correct camshaft timing; determine needed action.
16.75	Verify engine operating temperature; determine needed action.
16.76	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; service or replace as needed.
16.77	Inspect and test thermostat, by-pass, and housing; replace as needed.
16.78	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; service or replace as needed.

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

The purpose of this program is to prepare students for employment and/or specialized training in the automotive industry. The program provides specialized corporate/association job preparatory training.

Automotive Technology Programs sponsored by automobile manufacturers require an internship at a dealership.

The program must be NATEF Master Certified and have a business plan approved by the appropriate industry affiliated organization. Instructors must be ASE Certified in all areas that they teach in addition to being certified in Engine Performance and Electrical/Electronic Systems. ASE Master Technician and Advanced Engine Performance (L1) ASE Certification is preferred. Instructors must meet the specific product certification as specified in the business plan.

Program must meet the equipment and specialty tool requirement as specified in the business plan. Must offer Federally recognized refrigerant-recycling certification training.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

Program Length

The AAS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS. The standard length of this program is 74 credit hours according to Rule 6A-14.030, F.A.C.

Certificate Programs

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

Dealer Service Technician (0647060419) – 27 credit hours
Dealer Line Technician (0647060418) – 53 credit hours

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

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: **Dealer Line Technician**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0647060418
Program Type	College Credit
Standard Length	53 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Dealer-Specific Automotive Technology AAS degree program (0647060407).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to instruction in diagnosis of malfunctions in the repair of electrical, brake systems, steering and suspension systems; troubleshooting skills; and servicing, maintaining and repairing all mechanical systems on gasoline automobiles including electrical, brake, suspension and related systems. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive Service industry; technical and product skills, underlying principles of technology, and health, safety, and environmental issues.

The content includes but is not limited to a written business plan that establishes a partnership agreement between the educational institution and the automotive industry.

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

Standards

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

01.0 Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry.
02.0 Demonstrate proficiency in appropriate math skills.
03.0 Demonstrate proficiency in appropriate understanding of basic sciences.
04.0 Demonstrate proficiency in employability skills.
05.0 Demonstrate proficiency in appropriate communication skills.
06.0 Demonstrate proficiency in acceptable employee behavior in the automotive industry.
07.0 Demonstrate proficiency in routine maintenance and consumer services.
08.0 Demonstrate proficiency in engine theory and repairs.
09.0 Demonstrate proficiency in the operation and servicing of automatic transmission/trans-axle.
10.0 Demonstrate proficiency in the operation and servicing of manual drive trains and axles.
11.0 Demonstrate proficiency in the operation of steering and suspension systems.
12.0 Demonstrate proficiency in the operation and servicing of automotive brake systems.
13.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components as related to power train.
14.0 Demonstrate proficiency in heating, air conditioning and engine cooling systems.
15.0 Demonstrate proficiency in engine performance service.

Florida Department of Education
Student Performance Standards

Program Title: **Dealer Line Technician**
CIP Numbers: **0647060418**
Program Length: **53 credit hours**
SOC Code(s): **49-3023**

This certificate program is part of the Dealer-Specific Automotive Technology AAS degree program (0647060407). At the completion of this program, the student will be able to:	
01.0	Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry--The student will be able to:
01.01	Apply shop safety rules, EPA and OSHA standards.
01.02	Identify and initiate appropriate emergency response procedures.
01.03	Identify, use and maintain hand and power tools properly.
01.04	Identify and practice using appropriate precision measuring tools and torque methods.
01.05	Identify and describe the proper procedure to apply and remove automotive fasteners, to include thread repair.
01.06	Identify and use metric and English measurement skills.
01.07	Use computer and operate keyboard.
01.08	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.
01.09	Identify and describe typical automotive lubricants and lubricant properties.
01.10	Interpret the Florida 'Workers Right To Know Law'.
01.11	Identify and describe typical automotive seals and gaskets.
01.12	Identify and use the proper procedures required for cutting tubing and double and ISO flaring.
01.13	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.
01.14	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.
01.15	Describe and identify supplemental restraint systems (SRS).
01.16	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.
02.0	Demonstrate proficiency in appropriate math skills--The student will be able to:
02.01	Read and interpret measuring devices.
02.02	Solve number word problems.
02.03	Solve percentage problems.

	02.04	Operate a calculator.
	02.05	Use metric units related to auto industry.
	02.06	Convert inches to millimeters and millimeters to inches.
	02.07	Solve problems of length, area, volume and weight to include the circumference of a circle, the area of a rectangle, and the volume of a cylinder.
	02.08	Measure size within a specified tolerance.
	02.09	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	02.10	Identify various types of gears and interpret the meaning of a gear ratio number.
03.0	Demonstrate proficiency in appropriate understanding of basic sciences--The student will be able to:	
	03.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	03.02	Draw conclusions or make inferences from data.
	03.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	03.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
04.0	Demonstrate proficiency in employability skills--The student will be able to:	
	04.01	Identify employment requirements for an automotive career.
	04.02	Identify documents, which may be required when applying for a job.
	04.03	Complete a job application form correctly.
	04.04	Identify and adopt acceptable work habits.
	04.05	Identify acceptable employee health habits; including infection control of blood borne pathogens.
	04.06	Demonstrate appropriate telephone/communication skills.
	04.07	Conduct a job search.
	04.08	Demonstrate competence in job interview techniques.
	04.09	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	04.10	Demonstrate knowledge of how to make job changes appropriately.
	04.11	Identify and define payroll deductions (taxes, insurance, social security) employee benefits and pay systems.
05.0	Demonstrate proficiency in appropriate communication skills--The student will be able to:	
	05.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	05.02	Read and follow written and oral instructions.

	05.03 Answer and ask questions coherently and concisely.
	05.04 Identify and use critical thinking methodologies and techniques.
06.0	Demonstrate proficiency in acceptable employee behavior in the automotive industry--The student will be able to:
	06.01 Explain the effects of chemical/substance abuse.
	06.02 Identify principles of stress management.
	06.03 Identify and define career opportunities in the automotive service industry.
	06.04 Demonstrate acceptable industry dress code.
	06.05 Identify and demonstrate proper customer relations skills.
	06.06 Identify principles of time management.
	06.07 Identify acceptable customer relations.
07.0	Demonstrate proficiency in routine maintenance and consumer services--The student will be able to:
	07.01 Inspect, test head lamps, tail lamps and stop lamps. Aim headlights.
	07.02 Observe dash warning lamps during bulb check.
	07.03 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
	07.04 Perform product specific service procedures.
	07.05 Demonstrate retrieving stored diagnostic trouble codes.
	07.06 Reset product specific service indicator.
	07.07 Demonstrate knowledge of manufacturer policies and procedures.
	07.08 Identify and maintain product specific engine systems.
	07.09 Identify and maintain product specific automatic transmission systems.
	07.10 Identify and maintain product specific manual transmission systems.
	07.11 Identify and maintain product specific electrical and electronic systems.
	07.12 Identify and maintain product specific heating and A/C systems.
	07.13 Identify and maintain product specific steering and suspension systems.
	07.14 Identify and maintain product specific brake systems.
	07.15 Identify and maintain product specific audio systems.
	07.16 Identify and maintain product specific safety systems.
	07.17 Identify and maintain product specific accessories.
	07.18 Perform charging system test.

07.19	Inspect passenger restraint system, repair if needed.
08.0	Demonstrate proficiency in engine theory and repair--The student will be able to:
08.01	Service product specific engine systems.
08.02	Interpret and verify complaint; determine necessary action.
08.03	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
08.04	Listen to engine noises; determine necessary action.
08.05	Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine necessary action.
08.06	Perform engine vacuum tests; determine necessary action.
08.07	Perform cylinder power balance tests; determine necessary action.
08.08	Perform cylinder compression tests; determine necessary action.
08.09	Perform cylinder leakage tests; determine necessary action.
08.10	Remove engine (front-wheel drive); prepare for disassembly.
08.11	Reinstall engine (front-wheel drive).
08.12	Remove engine (rear-wheel drive); prepare for disassembly.
08.13	Reinstall engine (rear-wheel drive).
08.14	Identify hybrid vehicle internal combustion engine service precautions.
Cylinder Head and Valve Train Diagnosis and Repair	
08.15	Remove cylinder head(s); inspect cylinder head(s) for cracks; check gasket surface areas for warpage and leakage; check passage condition.
08.16	Install cylinder heads and gaskets; tighten according to manufacturer’s specifications and procedures.
08.17	Inspect and test valve springs for squareness, pressure, and free height comparison; replace as needed.
08.18	Inspect valve spring retainers, locks, and valve grooves.
08.19	Replace valve stem seals.
08.20	Inspect valve guides for wear; check valve guide height and stem- to-guide clearance; determine necessary action.
08.21	Inspect valves; determine necessary action.
08.22	Inspect valve seats; determine necessary action.
08.23	Check valve face-to-seat contact and valve seat concentricity (run out); determine necessary action.
08.24	Check valve spring assembled height and valve stem height; service valve and spring assemblies as needed.
08.25	Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); repair or replace.

08.26	Inspect hydraulic or mechanical lifters; replace as needed.
08.27	Adjust valves (mechanical or hydraulic lifters).
08.28	Inspect and replace camshaft drives (including gear wear and backlash, sprocket and chain wear, overhead cam drive sprockets, drive belts, belt tension, and tensioners).
08.29	Inspect camshaft for run out; measure journals and lobes for wear.
08.30	Inspect and measure camshaft bearings for wear, damage, out-of round, and alignment; determine necessary action.
08.31	Verify camshaft(s) timing according to manufacturer's specifications and procedure.
08.32	Service product specific cam drive systems.
08.33	Perform product specific valve adjustments.
08.34	Remove and replace valve cover gaskets.
Engine Block Diagnosis and Repair	
08.35	Inspect and replace pans, covers, gaskets, and seals.
08.36	Inspect engine block for cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed repairs.
08.37	Inspect internal and external threads; repair as needed.
08.38	Remove cylinder wall ridges.
08.39	Inspect and measure cylinder walls for damage and wear; determine necessary action.
08.40	Deglaze and clean cylinder walls.
08.41	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.
08.42	Inspect crankshaft for surface cracks and journal damage; check oil passage condition; measure journal wear; determine necessary action.
08.43	Inspect and measure main and connecting rod bearings for damage, clearance, and end play; determine necessary action (includes the proper selections of bearings).
08.44	Identify position and bearing wear patterns that include connecting rod alignment and main bearing bore problems; inspect rod alignment and bearing bore condition.
08.45	Inspect, measure, service or replace pistons.
08.46	Inspect, measure, and install piston rings.
08.47	Inspect, repair or replace crankshaft vibration damper (harmonic balancer).
08.48	Inspect flywheel or flexplate and ring gear for cracks and wear; measure run out; determine necessary action.
08.49	Inspect, remove, and replace crankshaft pilot bearing or bushing (as applicable).
08.50	Reassemble engine components using correct gaskets and sealants.

08.51	Inspect auxiliary (balance, intermediate, idler, counterbalance or silencer) shaft(s); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.
Lubrication and Cooling Systems Diagnosis and Repairs	
08.52	Prime engine lubrication system.
08.53	Perform oil pressure tests; determine necessary action.
08.54	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; replace as needed.
08.55	Perform cooling system tests (pressure, combustion leakage, and temperature); determine necessary action.
08.56	Inspect, replace, and adjust drive belts and pulleys.
08.57	Inspect and replace engine cooling and heater system hoses.
08.58	Inspect, test, and replace thermostat and housing.
08.59	Inspect coolant; drain, flush, and refill cooling system with recommended coolant and bleed air as required.
08.60	Inspect, test, remove, and replace water pump.
08.61	Inspect and test radiator, pressure cap, and coolant recovery system; remove and replace radiator.
08.62	Clean, inspect, and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.
08.63	Inspect and test electrical fan control system and circuits.
08.64	Inspect auxiliary oil coolers; replace as needed.
08.65	Inspect, test, and replace oil temperature and pressure switches and sensors.
08.66	Perform oil and filter change.
08.67	Service product specific water pumps.
08.68	Service product specific belt drive and tensioner systems.
09.0	Demonstrate proficiency in the operation and servicing of automatic transmission/transaxle--The student will be able to:
09.01	Interpret and verify driver’s complaint; verify proper engine operation; determine necessary action.
09.02	Diagnose unusual fluid usage, level, and condition problems; determine necessary action.
09.03	Perform pressure tests; determine necessary action.
09.04	Perform stall tests; determine necessary action.
09.05	Perform lock-up converter system tests; determine necessary action.
09.06	Diagnose electronic, mechanical, and vacuum control systems; determine necessary action.
09.07	Diagnose noise and vibration problems; determine necessary action.
Transmission and Transaxle Maintenance and Adjustment	

09.08	Inspect, adjust or replace manual shift valve and throttle (TV) linkages or cables and check gear select indicator (as applicable).
09.09	Service transmission; perform visual inspection; replace fluids and filters.
In-Vehicle Transmission and Transaxle Repair	
09.10	Inspect, adjust or replace (as applicable) vacuum modulator; inspect and repair or replace lines and hoses.
09.11	Inspect, repair, and replace governor assembly.
09.12	Inspect and replace external seals and gaskets.
09.13	Inspect extension housing; replace bushing and seals.
09.14	Inspect, leak test, flush, and replace cooler, lines, and fittings.
09.15	Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.
09.16	Inspect, measure, clean, and replace valve body (includes surfaces and bores, springs, valves, sleeves, retainers, brackets, check-balls, screens, spacers, and gaskets); check/adjust valve body bolt torque.
09.17	Inspect servo bore, piston, seals, pin, spring, and retainers; repair or replace as needed.
09.18	Inspect accumulator bore, piston, seals, spring, and retainer; repair or replace as needed.
09.19	Inspect, test, adjust, repair or replace transmission related electrical and electronic components (includes computers, solenoids, sensors, relays, switches, and harnesses).
09.20	Inspect, replace, and align power train mounts.
09.21	Inspect and replace parking pawl, shaft, spring, and retainer.
Off-Vehicle Transmission and Transaxle Repair (Removal, Disassembly, and Reinstallation)	
09.22	Remove and reinstall transmission/transaxle and torque converter.
09.23	Disassemble, clean, and inspect transmission/transaxle.
09.24	Assemble transmission/transaxle.
Oil Pump and Converter	
09.25	Inspect converter flex plate, attaching parts, pilot and pump drive, and seal areas.
09.26	Measure torque converter end play and check for interference check stator clutch.
09.27	Inspect, measure, and replace oil pump housings, shafts, vanes, rotors, gears, valves, seals, and bushings.
09.28	Check torque converter and transmission cooling system for contamination.
Gear Train, Shafts, Bushings and Case	
09.29	Check end play or preload; determine needed service.
09.30	Inspect, measure, and replace thrust washers and bearings.
09.31	Inspect oil delivery seal rings, ring grooves, and sealing surface areas.

09.32	Inspect bushings; replace as needed.
09.33	Inspect and measure planetary gear assembly (includes sun, ring gear, thrust washers, planetary gears, and carrier assembly); replace as needed.
09.34	Inspect cases, bores, passages, bushings, vents, and mating surfaces; replace as needed.
09.35	Inspect transaxle drive, link chains, sprockets, gears, bearings and bushings; replace as needed.
09.36	Inspect, measure, repair, adjust or replace transaxle final drive components.
09.37	Inspect and reinstall parking pawl, shaft, spring, and retainer; replace as needed.
Friction and Reaction Units	
09.38	Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; replace as needed.
09.39	Measure clutch pack clearance; adjust as needed.
09.40	Air test operation of clutch and servo assemblies.
09.41	Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; replace as needed.
09.42	Inspect bands and drums; replace as needed.
09.43	Service product specific automatic transmission/transaxle systems.
10.0	Demonstrate proficiency in the operation and assembly of manual drive transmission/transaxle--The student will be able to:
10.01	Diagnose clutch noise, binding, slippage, pulsation, and chatter problems; determine necessary action.
10.02	Inspect, adjust or replace clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs.
10.03	Inspect, adjust, repair or replace hydraulic clutch slave master-cylinders, lines, and hoses.
10.04	Inspect, adjust or replace release (throw-out) bearing, lever, and pivot.
10.05	Inspect and replace clutch pressure plate assembly and clutch disc.
10.06	Inspect, remove or replace crankshaft pilot bearing or bushing (as applicable).
10.07	Inspect, repair, and service or replace flywheel and ring gear.
10.08	Inspect engine block, clutch (bell) housing, and transmission case mating surface; determine necessary action.
10.09	Measure flywheel-to-block run out and crankshaft end play; determine necessary action.
10.10	Measure clutch (bell) housing bore-to-crankshaft run out and face squareness; determine needed service.
Transmission Diagnosis and Repair	
10.11	Diagnose transmission noise, hard shifting, jumping out of gear, and fluid leakage problems; determine necessary action.
10.12	Inspect, adjust, and replace transmission shift linkages, brackets, bearings, cables, pivots, and levers.
10.13	Inspect, replace, and align power train mounts.

10.14	Inspect and replace transmission gaskets, seals, and sealants; Inspect sealing surfaces.
10.15	Remove and reinstall transmission.
10.16	Disassemble, clean, and reassemble transmission components.
10.17	Inspect, adjust, and reinstall transmission shift cover, forks, grommets, levers, shafts, sleeves, detent mechanisms, interlocks, and springs.
10.18	Inspect and reinstall input (clutch) shaft and bearings.
10.19	Inspect and reinstall main shaft, gears, thrust washers, bearings, and retainers.
10.20	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.
10.21	Inspect and reinstall counter (cluster) gear, shaft, bearings, thrust washers, and retainers; check end play; adjust as needed.
10.22	Inspect and reinstall reverse idler gear, shaft, bearings, thrust washers, and retainers; check end play; adjust as needed.
10.23	Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.
10.24	Inspect, repair, and replace extension housing and transmission case mating surfaces, bores, bushings, and vents.
10.25	Inspect lubrication devices (oil pump or slingers).
10.26	Service product specific manual transmission systems.
Transaxle Diagnosis and Repair	
10.27	Diagnose transaxle noise, hard shifting, jumping out of gear, and fluid leakage problem; determine necessary action.
10.28	Inspect, adjust, and reinstall transaxle shift linkages, brackets, bushings, cables, pivots, and levers.
10.29	Inspect and reinstall power train mounts.
10.30	Remove and reinstall transaxle.
10.31	Inspect and replace transaxle gaskets, seals, and sealants; inspect sealing surfaces.
10.32	Remove and replace transaxle final drive.
10.33	Disassemble and clean transaxle final drive.
10.34	Inspect, adjust, and reinstall transaxle shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.
10.35	Inspect and reinstall input (clutch) shaft and bearings.
10.36	Inspect and reinstall output shaft, gears, thrust washers, bearings, and retainers.
10.37	Measure end play or preload (shim or spacer selection procedure) on transaxle shafts; adjust as needed.
10.38	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.
10.39	Inspect and reinstall reverse idler gear, shaft, bearings, thrust washers, and retainers.
10.40	Inspect transaxle case, mating surfaces, bores, bushings, and vents.

10.41	Inspect and reinstall speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.
10.42	Diagnose differential assembly noise and vibration problems; determine necessary action.
10.43	Remove, inspect, measure, adjust, and reinstall differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.
10.44	Inspect lubrication devices (oil pump or slingers).
10.45	Service product specific manual transaxle systems.
Drive and Half Shaft Universal and Constant-Velocity (CV) Joint Diagnosis and Repair	
10.46	Diagnose constant-velocity (CV) joint noise and vibration problems; determine necessary action.
10.47	Diagnose universal joint noise and vibration problems; determine necessary action.
10.48	Diagnose front wheel drive (FWD) front wheel bearing noise and vibration problems; determine necessary action.
10.49	Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.
10.50	Inspect, service, and replace shaft center support bearings.
10.51	Check and correct shaft balance; measure shaft run out; measure and adjust driveline angles.
Rear Axle Diagnosis and Repair; Ring and Pinion Gears and Differential Case Assembly	
10.52	Diagnose noise and vibration problems; determine necessary action.
10.53	Diagnose fluid leakage problems; determine necessary action.
10.54	Inspect and replace companion flange and pinion seal; measure companion flange run out.
10.55	Inspect ring gear and measure run out; determine necessary action.
10.56	Remove and inspect drive pinion gear, spacers, sleeves, and bearings.
10.57	Measure and adjust drive pinion depth.
10.58	Measure and adjust drive pinion bearing preload.
10.59	Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup and shim types).
10.60	Check ring and pinion tooth contact patterns; adjust as needed.
10.61	Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.
10.62	Reassemble and reinstall differential case assembly; measure run out; determine necessary action.
10.63	Service product specific differentials.
Limited Slip Differential	
10.64	Diagnose noise, slippage, and chatter problems; determine necessary action.

10.65	Inspect and flush differential housing; refill with correct lubricant.
10.66	Inspect and reinstall clutch (cone or plate) components.
10.67	Measure rotating torque; determine necessary action.
10.68	Verify matching tires & tolerances.
Axle Shaft	
10.69	Diagnose rear axle shafts, bearings, and seals for noise, vibration, and fluid leakage problems; determine necessary action.
10.70	Inspect and replace rear axle shaft wheel studs.
10.71	Remove and replace rear axle shafts.
10.72	Inspect and replace rear axle shaft seals, bearings, and retainers.
10.73	Measure rear axle flange run out and shaft end play; determine necessary action.
Four-Wheel Drive/All-Wheel Drive Component Diagnosis and Repair	
10.74	Diagnose noise, vibration, and unusual steering problems; determine necessary action.
10.75	Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.
10.76	Remove and reinstall transfer case.
10.77	Disassemble, service, and reassemble transfer case and components.
10.78	Inspect, service, and replace front-wheel bearings and locking hubs.
10.79	Check drive assembly seals and vents; check lube level.
10.80	Inspect viscous coupling assembly.
10.81	Verify matching tires & tolerances.
10.82	Service product specific all-wheel drive systems.
11.0	Demonstrate proficiency in the operation of steering and suspension systems--The student will be able to:
11.01	Disable supplemental restraint system (SRS) in accordance with manufacturer’s procedures.
11.02	Diagnose steering column noises, looseness, and binding problems (including tilt mechanisms); determine necessary action.
11.03	Diagnose power non-rack and pinion steering gear binding, uneven turning effort, looseness, hard steering, and fluid leakage problems; determine necessary action.
11.04	Diagnose power rack and pinion steering gear vibration, looseness, and hard steering problems; determine necessary action.
11.05	Inspect and replace steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel.
11.06	Adjust manual or power non-rack and pinion worm bearing preload and sector lash.
11.07	Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.

11.08	Adjust manual or power rack and pinion steering gear.
11.09	Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
11.10	Inspect manual and power steering fluid levels and condition.
11.11	Flush, fill, and bleed power steering system.
11.12	Diagnose power steering fluid leakage; determine necessary action.
11.13	Inspect, replace, and adjust power steering pump belt.
11.14	Remove, inspect, and replace power steering pump, pump mounts, pump seals, and gaskets.
11.15	Remove, inspect, and replace power steering pump pulley; check alignment.
11.16	Perform power steering system pressure test; determine needed repairs.
11.17	Inspect and replace power steering hoses and fittings.
11.18	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.
11.19	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.
11.20	Diagnose, inspect, adjust, repair or replace components of electronically-controlled steering systems.
11.21	Diagnose, inspect, repair or replace components of variable-assist steering systems.
11.22	Service product specific power assisted steering systems.
11.23	Service product specific variable assisted steering systems.
Suspension Systems Diagnosis and Repair; Front Suspensions	
11.24	Diagnose short and long arm suspension system noises, body sway, and uneven riding height problems; determine necessary action.
11.25	Diagnose MacPherson strut suspension system noises body sway, and uneven riding height problems; determine necessary action.
11.26	Remove, inspect, and replace upper and lower control arms, bushings, shafts, and rebound bumpers.
11.27	Remove, inspect, replace, and adjust strut (compression/tension) rods and bushings.
11.28	Remove, inspect, and replace upper and lower ball joints on short and long arm suspension systems.
11.29	Remove, inspect, and replace steering knuckle assemblies.
11.30	Remove, inspect, and replace short and long arm suspension system coil springs and spring insulators.
11.31	Remove, inspect, replace, and adjust suspension system torsion bars; inspect mounts.
11.32	Remove, inspect and replace stabilizer bar bushings, brackets, and links.
11.33	Remove, inspect, and replace ball joints on MacPherson strut suspension systems.
11.34	Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, insulators, and upper strut bearing mount.

11.35	Lubricate suspension and steering systems.
11.36	Service product specific suspension systems.
Rear Suspensions	
11.37	Remove, inspect, and replace coil springs and spring insulators.
11.38	Remove, inspect, and replace transverse links, control arms, bushings, and mounts.
11.39	Remove, inspect, and replace leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts.
11.40	Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, and insulators (silencers).
11.41	Service product specific suspension systems.
Miscellaneous Service	
11.42	Inspect, remove, and replace shock absorbers.
11.43	Remove, inspect, and service or replace front and rear wheel bearings.
11.44	Diagnose, inspect, adjust, repair or replace components of electronically-controlled suspension systems.
11.45	Service product specific ride height control systems.
Wheel Alignment Diagnosis, Adjustment, and Repair	
11.46	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return problems; determine necessary action.
11.47	Measure vehicle riding height; determine necessary action.
11.48	Check and adjust front and rear wheel camber; determine needed repairs.
11.49	Check and adjust caster; determine necessary action.
11.50	Check and adjust front wheel toe; adjust as needed.
11.51	Center steering wheel.
11.52	Check toe-out-on-turns (turning radius); determine needed repairs.
11.53	Check SAI (steering axis inclination) and included angle; determine necessary action.
11.54	Check and adjust rear wheel toe.
11.55	Check rear wheel thrust angle; determine necessary action.
11.56	Check for front wheel setback; determine necessary action.
11.57	Check front cradle (subframe) alignment; determine needed repairs.
Wheel and Tire Diagnosis and Repair	
11.58	Diagnose tire wear patterns; determine necessary action.

11.59	Inspect tires, diagnose tire wear patterns; check and adjust air pressure.
11.60	Diagnose wheel/tire vibration, shimmy, and noise problems; determine necessary action.
11.61	Rotate tires according to manufacturer's recommendations.
11.62	Measure wheel, tire, axle, and hub run out; determine needed repairs.
11.63	Diagnose tire pull (lead) problem; determine corrective actions.
11.64	Balance wheel and tire assembly (static and dynamic).
11.65	Dismount, inspect, repair, and remount tire on wheel.
11.66	Reinstall wheel; torque lug nuts.
12.0	Demonstrate proficiency in the operation and servicing of automotive brake system--The student will be able to:
12.01	Measure and adjust pedal pushrod length and pedal height.
12.02	Check master cylinder for internal and external leaks and proper operation; determine necessary action.
12.03	Remove, bench bleed, and replace master cylinder.
12.04	Diagnose poor stopping, pulling or dragging caused by problems in the hydraulic system; determine necessary action.
12.05	Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports.
12.06	Inspect flexible brake hoses for leaks, kinks, cracks, bulging or wear; tighten loose fittings and supports.
12.07	Fabricate and install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed.
12.08	Select, handle, store, and install brake fluids to proper level.
12.09	Inspect, test, and replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.
12.10	Inspect, test, replace, and adjust height (load) sensing proportioning valve.
12.11	Inspect, test, and replace components of brake warning light system.
12.12	Bleed (manual, pressure, vacuum or surge) brake system; flush hydraulic system.
Drum Brake Diagnosis and Repair	
12.13	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation problems; determine necessary action.
12.14	Remove, clean (using proper safety procedures), inspect, and measure brake drums; service or replace as needed.
12.15	Mount brake drum on lathe machine braking surface.
12.16	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
12.17	Remove and reinstall wheel cylinders.
12.18	Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.

12.19	Reinstall wheel, torque lug nuts, and make final checks and adjustments.
Disc Brake Diagnosis and Repair	
12.20	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation caused problems; determine necessary action.
12.21	Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing.
12.22	Clean and inspect caliper mounting and slides for wear and damage.
12.23	Remove, clean, and inspect pads and retaining hardware; determine needed service.
12.24	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.
12.25	Reassemble, lubricate, and reinstall caliper, pads, and related hardware.
12.26	Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace.
12.27	Refinish rotor according to manufacturer's recommendations.
12.28	Adjust calipers with integrated parking brake system.
12.29	Fill master cylinder with recommended fluid and seat pads; inspect caliper for leaks.
12.30	Reinstall wheel, torque lug nuts, and make final checks and adjustments.
12.31	Remove and replace rotor.
Power Assist Units Diagnosis and Repair	
12.32	Test pedal free travel with and without engine running; check power assist operation.
12.33	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
12.34	Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; repair or replace parts as needed.
Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair	
12.35	Diagnose wheel bearing noises, wheel shimmy, and vibration problems; determine necessary action.
12.36	Remove, clean, inspect, repack, and reinstall wheel bearings and replace seals; reinstall hub and adjust wheel bearings.
12.37	Check parking brake cables and components for wear, rusting, binding, and corrosion; clean, lubricate, and replace as needed.
12.38	Check parking brake operation; adjust as needed.
12.39	Check operation of parking brake indicator light system.
12.40	Check operation of brake stop light system; adjust and service as needed.
12.41	Replace wheel bearing and race.
Anti-Lock Brake System	

12.42	Inspect, test, and service anti-lock brake system (ABS) hydraulic, electrical, and mechanical components.
12.43	Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise problems caused by the anti-lock brake system (ABS); determine necessary action.
12.44	Observe anti-lock brake system (ABS) warning light(s) at startup; determine if further diagnosis is needed.
12.45	Diagnose anti-lock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment; determine necessary action.
12.46	Depressurize high pressure components of the anti-lock brake system (ABS) following manufacturer's recommended safety procedures.
12.47	Fill the anti-lock brake system (ABS) master cylinder with recommended fluid following manufacturer's procedures; inspect system for leaks.
12.48	Bleed the anti-lock brake system's (ABS) front and rear hydraulic circuits following manufacturer's procedures.
12.49	Perform a fluid pressure (hydraulic boost) diagnosis on the high pressure anti-lock brake system (ABS); determine necessary action.
12.50	Remove and install anti-lock brake system (ABS) electrical/electronic/hydraulic components following manufacturer's procedures and specifications.
12.51	Service, test, and adjust anti-lock brake system (ABS) speed sensors following manufacturer's recommended procedures.
12.52	Diagnose anti-lock brake system (ABS) braking problems caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).
12.53	Identify and inspect electronic brake control systems; determine necessary action.
12.54	Service product specific anti-lock brake systems.
12.55	Service product specific traction control systems.
13.0	Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic related components--The student will be able to:
13.01	Use wiring diagrams during diagnosis of electrical circuit problems.
13.02	Check electrical circuits with a test light; determine necessary action.
13.03	Check voltage and voltage drop in electrical/electronic circuits using a digital multimeter (DMM); determine needed repairs.
13.04	Check current flow in electrical/electronic circuits and components using an ammeter; determine necessary action.
13.05	Check electrical circuits using jumper wires; determine necessary action.
13.06	Find shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
13.07	Measure and diagnose the cause(s) of abnormal key-off battery drain; determine necessary action.
13.08	Inspect and test fusible links, circuit breakers, and fuses; replace as needed.
13.09	Inspect and test switches, connectors, relays, and wires of electrical/electronic circuits; repair or replace as needed.
Battery Diagnosis and Service	
13.10	Perform battery state-of-charge test; determine needed service.

13.11	Perform battery capacity (load, high-rate discharge) test; determine needed service.
13.12	Maintain or restore electronic memory functions.
13.13	Inspect, clean, and replace battery.
13.14	Perform slow/fast battery charge.
13.15	Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
13.16	Start a vehicle using jumper cables using a battery auxiliary power supply.
13.17	Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
13.18	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
Starting System Diagnosis and Repair	
13.19	Perform starter current draw and circuit voltage drop test; determine necessary action.
13.20	Inspect and test starter relays and solenoids; replace as needed.
13.21	Remove and replace/reinstall starter.
13.22	Perform starter bench tests; determine necessary action.
13.23	Inspect, test, and repair or replace switches, connectors, and wires of starter control circuits.
13.24	Disassemble, clean, inspect, and test starter components; replace as needed.
13.25	Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.
Charging System Diagnosis and Repair	
13.26	Diagnose charging system problems that cause an undercharge, a no-charge or an overcharge condition.
13.27	Inspect and adjust alternator drive belts; replace as needed.
13.28	Inspect and test voltage regulator; replace as needed.
13.29	Remove, inspect, and replace/reinstall alternator.
13.30	Perform charging circuit voltage drop tests; determine needed repairs.
Lighting Systems Diagnosis and Repair	
13.31	Diagnose brighter than normal, intermittent, dim or no light operation.
13.32	Inspect, replace, and aim headlights and bulbs.
13.33	Inspect and diagnose incorrect turn signal or hazard light operation; repair or replace as needed.
13.34	Identify system voltage and safety precautions associated with high-intensity discharge headlights.
Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair	

13.35	Diagnose intermediate, high, low or no gauge readings.
13.36	Test gauge circuit voltage regulators (limiters); replace as needed.
13.37	Inspect and test gauges and gauge sending units; replace as needed.
13.38	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; repair or replace as needed.
13.39	Diagnose incorrect operation of warning devices and other driver information systems.
13.40	Diagnose intermediate, high, low or no readings on electronic instrument clusters.
13.41	Inspect and test sensors, sending units, connectors, and wires of electronic instrument circuits; repair or replace as needed.
Horn and Wiper/Washer Diagnosis and Repair	
13.42	Diagnose incorrect horn operation; repair as needed.
13.43	Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; repair as needed.
13.44	Diagnose incorrect windshield washer operation; repair as needed.
Accessories Diagnosis and Repair	
13.45	Diagnose incorrect operation of motor-driven accessory circuits; repair as needed.
13.46	Diagnose incorrect heated glass operation; repair as needed.
13.47	Diagnose incorrect electric door and hatch/trunk lock operation; repair as needed.
13.48	Diagnose incorrect operation of cruise control systems; repair as needed.
13.49	Diagnose supplemental restraint system (SRS) problems; repair as needed. (NOTE: Follow manufacturer's safety procedures to prevent accidental deployment.)
13.50	Diagnose radio static and weak, intermittent, or no radio reception.
13.51	Service product specific electrical/electronic systems.
13.52	Perform product specific diagnostic procedures.
13.53	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
13.54	Remove and reinstall door panel.
14.0	Demonstrate proficiency in heating, air conditioning and engine cooling systems--The student will be able to:
14.01	Diagnose unusual operating noises in the A/C system; determine necessary action.
14.02	Conduct a performance test of the A/C system; determine needed repairs.
14.03	Leak test a/c system; determine necessary action.
14.04	Inspect the condition of discharged oil.
14.05	Select oil type; measure and add oil to the A/C system as needed.

Refrigeration System Component Diagnosis and Repair Compressor and Clutch	
14.06	Diagnose A/C system problems that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.
14.07	Inspect A/C compressor drive belts; replace and adjust as needed.
14.08	Inspect, test, and replace A/C compressor clutch components or assembly.
14.09	Remove and replace A/C compressor and mountings.
14.10	Inspect and replace A/C compressor shaft seal assembly(ies).
14.11	Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.
Evaporator, Receiver/Drier, Condenser, Etc.	
14.12	Diagnose A/C system problems caused by too much moisture in the refrigerant; determine necessary action.
14.13	Install A/C system filter.
14.14	Remove and inspect A/C system mufflers, hoses, lines, fittings, o-rings, seals, and service valves; replace as needed.
14.15	Inspect A/C condenser for air flow restrictions; service as required.
14.16	Inspect receiver/drier or accumulator/drier; replace as needed.
14.17	Inspect and test expansion valve or orifice (expansion) tube; replace as needed.
14.18	Inspect evaporator housing water drain; repair as needed.
Heating and Engine Cooling Systems Diagnosis and Repair	
14.19	Diagnose temperature control problems in the heater/ventilation system; determine necessary action.
14.20	Perform cooling system, cap, and recovery system tests (pressure, combustion leakage, and temperature); determine necessary action.
14.21	Inspect engine cooling and heater system hoses and belts; replace as needed.
14.22	Inspect, test, and replace thermostat and housing.
14.23	Determine coolant condition; drain and recover.
14.24	Flush system and refill with recommended coolant; bleed system.
14.25	Clean, inspect, and test fan, fan clutch (electrical and mechanical), fan shroud, and air dams; replace as needed.
14.26	Inspect and test heater control valve(s); replace as needed.
Operating Systems and Related Controls Diagnosis and Repairs	
14.27	Diagnose failures in the electrical controls of heating and A/C systems; determine necessary action.
14.28	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; repair as needed.
14.29	Test A/C compressor load cut-off systems; determine needed repairs.

14.30	Using a scan tool, observe and record related HVAC data and trouble codes.
Vacuum/Mechanical	
14.31	Diagnose failure in the vacuum and mechanical controls of the heating and A/C system; determine necessary action.
14.32	Inspect and test A/C-heater control panel assembly; replace as needed.
14.33	Inspect and test A/C-heater control cables and linkages adjust or replace as needed.
14.34	Inspect and test A/C-heater vacuum control switches, hoses, diaphragms (motor), vacuum reservoir, check valve, and restrictors; replace as needed.
14.35	Inspect and test A/C-heater ducts, doors, hoses, and outlets; replace as needed.
Automatic and Semi-Automatic Temperature Controls	
14.36	Check operation of automatic and semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.
Refrigerant Recovery, Recycling, and Handling	
14.37	Verify correct operation and maintenance of refrigerant handling equipment.
14.38	Identify and recover A/C system refrigerant.
14.39	Recycle refrigerant.
14.40	Label and store refrigerant.
14.41	Test recycled refrigerant for non-condensable gases.
14.42	Evaluate and charge A/C system.
14.43	Service product specific climate control systems.
15.0	Demonstrate proficiency in engine performance services--The student will be able to:
15.01	Interpret and verify complaint; determine necessary action.
15.02	Demonstrate proficiency in use of computer-based information systems.
15.03	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
15.04	Diagnose unusual engine noise or vibration problems; determine necessary action.
15.05	Diagnose unusual exhaust color, odor, and sound; determine needed action.
15.06	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
15.07	Perform cylinder power balance test; determine needed action.
15.08	Perform cylinder compression test; determine needed action.
15.09	Perform cylinder leakage test; determine needed action.

15.10	Diagnose engine mechanical, electrical, electronic, fuel and ignition problems with an oscilloscope and engine diagnostic equipment; determine needed action.
15.11	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test and obtain exhaust readings; interpret readings and determine needed action.
Computerized Engine Controls Diagnosis and Repair	
15.12	Diagnose emissions or driveability problems resulting from of computerized engine controls with no diagnostic trouble codes stored; determine necessary action.
15.13	Retrieve and record stored diagnostic trouble codes.
15.14	Diagnose the causes of emissions or driveability problems resulting from failure of computerized engine controls with stored diagnostic trouble codes.
15.15	Inspect, test, adjust, and replace computerized engine control system sensors, powertrain control module (PCM), actuators, and circuits.
15.16	Obtain and interpret digital multimeter (DMM) readings.
15.17	Access and use electronic service information (ESI).
15.18	Locate and interpret vehicle and major component identification number (VIN, vehicle certification labels and calibration decals).
15.19	Inspect and test power and ground circuits and connections; service or replace as needed.
15.20	Practice recommended precautions when handling static sensitive devices.
15.21	Diagnose driveability and emissions problems resulting from failures of interrelated systems (cruise control, security alarms, torque controls, suspension controls, traction controls, torque management, A/C, automatic transmissions, and similar systems); determine necessary action.
15.22	Service product specific diagnostic scanner.
15.23	Service product specific PROM reprogramming systems.
15.24	Perform product specific OBD II drive cycle diagnostic tests.
Ignition System Diagnosis and Repair	
15.25	Diagnose no-starting, driveability, and emissions problems on vehicles with electronic ignition (distributorless) systems; determine necessary action.
15.26	Diagnose no-starting, driveability, and emissions problems on vehicles with distributor ignition (DI) systems; determine needed repairs.
15.27	Inspect and test ignition primary circuit wiring and components; repair or replace as needed.
15.28	Inspect and test distributor; service as needed.
15.29	Inspect and test ignition system secondary circuit wiring and components; replace as needed.
15.30	Inspect and test ignition coil(s); replace as needed.
15.31	Check and adjust (where applicable) ignition system timing and timing advance/retard.
15.32	Inspect and test ignition wiring harness and connectors; replace as needed.

15.33	Inspect and test ignition system pick-up sensors or triggering devices including crankshaft and camshaft sensors; replace as needed.
15.34	Inspect, test, and/or replace ignition control module and powertrain/engine control module; reprogram as needed.
15.35	Service product specific ignition systems.
15.36	Remove and replace spark plugs; inspect secondary ignition components for wear and damage.
Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair	
15.37	Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems on vehicles with injection-type fuel system; determine needed action.
15.38	Inspect fuel tank and fuel cap; inspect and replace fuel lines, fittings, and hoses.
15.39	Check fuel for contaminants and quality.
15.40	Inspect and test mechanical and electrical fuel pumps and pump control systems; replace as needed.
15.41	Replace fuel filters.
15.42	Inspect and test fuel pressure regulation system and components.
15.43	Inspect and test cold enrichment system components; adjust or replace as needed.
15.44	Remove, clean, and reinstall throttle body; adjust related linkages
15.45	Inspect and test fuel injectors; clean and replace.
15.46	Inspect throttle body mounting plates, air induction and filtration system, intake manifold, and gaskets; clean or replace as needed.
15.47	Check/adjust idle speed and fuel mixture where applicable.
15.48	Remove, inspect, and test vacuum and electrical components and connections of fuel system; repair or replace as needed.
15.49	Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.
15.50	Perform exhaust system back-pressure test; determine needed action.
15.51	Test the operation of turbocharger/supercharger systems; determine needed action.
15.52	Remove, clean, inspect, and repair or replace turbocharger/supercharger system components.
15.53	Identify the causes of turbocharger/supercharger failure; determine needed action.
15.54	Service product specific fuel injection systems.
15.55	Inspect and test catalytic converter efficiency.
15.56	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.
Emissions Control Systems Diagnosis and Repair Positive Crankcase Ventilation	
15.57	Diagnose oil leaks, emissions, and driveability problems resulting from failure of the positive crankcase ventilation (PCV) system.

15.58	Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.
Exhaust Gas Recirculation	
15.59	Diagnose emissions and driveability problems caused by failure of the exhaust gas recirculation (EGR) system.
15.60	Inspect and test valve, valve manifold, and exhaust passages of exhaust gas recirculation (EGR) systems; service or replace as needed.
15.61	Inspect and test vacuum/pressure controls, filters, and hoses of exhaust gas recirculation (EGR) systems; service or replace as needed.
15.62	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; repair or replace as needed.
Exhaust Gas Treatment	
15.63	Diagnose emissions and driveability problems resulting from failure of the secondary air injection and catalytic converter systems.
15.64	Inspect and test mechanical components of secondary air injection systems; service or replace as needed.
15.65	Inspect and test electrical/electronically-operated components and circuits of air injection systems; replace as needed.
15.66	Inspect and test components of catalytic converter systems; replace as needed.
Intake Air Temperature Controls	
15.67	Diagnose emissions and driveability problems resulting from failure of the intake air temperature control systems.
15.68	Inspect and test components of intake air temperature control systems; replace as needed.
Early Fuel Evaporation (Intake Manifold Temperature) Controls	
15.69	Diagnose emissions and driveability problems resulting from failure of early fuel evaporation control systems.
15.70	Inspect and test components of early fuel evaporation control systems; service or replace as needed.
Evaporative Emissions Controls	
15.71	Diagnose emissions and driveability problems resulting from failure of evaporative emissions control system.
15.72	Inspect and test components and hoses of evaporative emissions control system; replace as needed.
Engine Related Service	
15.73	Adjust valves on engines with mechanical or hydraulic lifters.
15.74	Verify correct camshaft timing; determine needed action.
15.75	Verify engine operating temperature; determine needed action.
15.76	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; service or replace as needed.
15.77	Inspect and test thermostat, by-pass, and housing; replace as needed.
15.78	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; service or replace as needed.

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

The purpose of this program is to prepare students for employment and/or specialized training in the automotive industry. The program provides specialized corporate/association job preparatory training.

Automotive Technology Programs sponsored by automobile manufacturers require an internship at a dealership.

The program must be NATEF Master Certified and have a business plan approved by the appropriate industry affiliated organization. Instructors must be ASE Certified in all areas that they teach in addition to being certified in Engine Performance and Electrical/Electronic Systems. ASE Master Technician and Advanced Engine Performance (L1) ASE Certification is preferred. Instructors must meet the specific product certification as specified in the business plan.

Program must meet the equipment and specialty tool requirement as specified in the business plan. Must offer Federally recognized refrigerant-recycling certification training.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

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: **Dealer Service Technician**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0647060419
Program Type	College Credit
Standard Length	27 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Dealer-Specific Automotive Technology AAS degree program (0647060407).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to instruction in diagnosis of malfunctions in the repair of electrical, brake systems, steering and suspension systems; troubleshooting skills; and servicing, maintaining and repairing all mechanical systems on gasoline automobiles including electrical, brake, suspension and related systems. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive Service industry; technical and product skills, underlying principles of technology, and health, safety, and environmental issues.

The content includes but is not limited to a written business plan that establishes a partnership agreement between the educational institution and the automotive industry.

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

Standards

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

01.0 Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry.
02.0 Demonstrate proficiency in appropriate math skills.
03.0 Demonstrate proficiency in appropriate understanding of basic sciences.
04.0 Demonstrate proficiency in employability skills.
05.0 Demonstrate proficiency in appropriate communication skills.
06.0 Demonstrate proficiency in acceptable employee behavior in the automotive industry.
07.0 Demonstrate proficiency in routine maintenance and consumer services.
08.0 Demonstrate proficiency in engine theory and repairs.
09.0 Demonstrate proficiency in the operation of steering and suspension systems.
10.0 Demonstrate proficiency in the operation and servicing of automotive brake systems.
11.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components as related to power train.

Florida Department of Education
Student Performance Standards

Program Title: **Dealer Service Technician**
CIP Numbers: **0647060419**
Program Length: **27 credit hours**
SOC Code(s): **49-3023**

This certificate program is part of the Dealer-Specific Automotive Technology AAS degree program (0647060407). At the completion of this program, the student will be able to:	
01.0	Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry--The student will be able to:
01.01	Apply shop safety rules, EPA and OSHA standards.
01.02	Identify and initiate appropriate emergency response procedures.
01.03	Identify, use and maintain hand and power tools properly.
01.04	Identify and practice using appropriate precision measuring tools and torque methods.
01.05	Identify and describe the proper procedure to apply and remove automotive fasteners, to include thread repair.
01.06	Identify and use metric and English measurement skills.
01.07	Use computer and operate keyboard.
01.08	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.
01.09	Identify and describe typical automotive lubricants and lubricant properties.
01.10	Interpret the Florida 'Workers Right To Know Law'.
01.11	Identify and describe typical automotive seals and gaskets.
01.12	Identify and use the proper procedures required for cutting tubing and double and ISO flaring.
01.13	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.
01.14	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.
01.15	Describe and identify supplemental restraint systems (SRS).
01.16	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.
02.0	Demonstrate proficiency in appropriate math skills--The student will be able to:
02.01	Read and interpret measuring devices.
02.02	Solve number word problems.
02.03	Solve percentage problems.

	02.04	Operate a calculator.
	02.05	Use metric units related to auto industry.
	02.06	Convert inches to millimeters and millimeters to inches.
	02.07	Solve problems of length, area, volume and weight to include the circumference of a circle, the area of a rectangle, and the volume of a cylinder.
	02.08	Measure size within a specified tolerance.
	02.09	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	02.10	Identify various types of gears and interpret the meaning of a gear ratio number.
03.0	Demonstrate proficiency in appropriate understanding of basic sciences--The student will be able to:	
	03.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	03.02	Draw conclusions or make inferences from data.
	03.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	03.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
04.0	Demonstrate proficiency in employability skills--The student will be able to:	
	04.01	Identify employment requirements for an automotive career.
	04.02	Identify documents, which may be required when applying for a job.
	04.03	Complete a job application form correctly.
	04.04	Identify and adopt acceptable work habits.
	04.05	Identify acceptable employee health habits; including infection control of blood borne pathogens.
	04.06	Demonstrate appropriate telephone/communication skills.
	04.07	Conduct a job search.
	04.08	Demonstrate competence in job interview techniques.
	04.09	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	04.10	Demonstrate knowledge of how to make job changes appropriately.
	04.11	Identify and define payroll deductions (taxes, insurance, social security) employee benefits and pay systems.
05.0	Demonstrate proficiency in appropriate communication skills--The student will be able to:	
	05.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	05.02	Read and follow written and oral instructions.

	05.03 Answer and ask questions coherently and concisely.
	05.04 Identify and use critical thinking methodologies and techniques.
06.0	Demonstrate proficiency in acceptable employee behavior in the automotive industry--The student will be able to:
	06.01 Explain the effects of chemical/substance abuse.
	06.02 Identify principles of stress management.
	06.03 Identify and define career opportunities in the automotive service industry.
	06.04 Demonstrate acceptable industry dress code.
	06.05 Identify and demonstrate proper customer relations skills.
	06.06 Identify principles of time management.
	06.07 Identify acceptable customer relations.
07.0	Demonstrate proficiency in routine maintenance and consumer services--The student will be able to:
	07.01 Inspect, test head lamps, tail lamps and stop lamps. Aim headlights.
	07.02 Observe dash warning lamps during bulb check.
	07.03 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
	07.04 Perform product specific service procedures.
	07.05 Demonstrate retrieving stored diagnostic trouble codes.
	07.06 Reset product specific service indicator.
	07.07 Demonstrate knowledge of manufacturer policies and procedures.
	07.08 Identify and maintain product specific engine systems.
	07.09 Identify and maintain product specific automatic transmission systems.
	07.10 Identify and maintain product specific manual transmission systems.
	07.11 Identify and maintain product specific electrical and electronic systems.
	07.12 Identify and maintain product specific heating and A/C systems.
	07.13 Identify and maintain product specific steering and suspension systems.
	07.14 Identify and maintain product specific brake systems.
	07.15 Identify and maintain product specific audio systems.
	07.16 Identify and maintain product specific safety systems.
	07.17 Identify and maintain product specific accessories.
	07.18 Perform charging system test.

07.19	Inspect passenger restraint system, repair if needed.
08.0	Demonstrate proficiency in engine theory and repair--The student will be able to:
08.01	Service product specific engine systems.
08.02	Interpret and verify complaint; determine necessary action.
08.03	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
08.04	Listen to engine noises; determine necessary action.
08.05	Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine necessary action.
08.06	Perform engine vacuum tests; determine necessary action.
08.07	Perform cylinder power balance tests; determine necessary action.
08.08	Perform cylinder compression tests; determine necessary action.
08.09	Perform cylinder leakage tests; determine necessary action.
08.10	Remove engine (front-wheel drive); prepare for disassembly.
08.11	Reinstall engine (front-wheel drive).
08.12	Remove engine (rear-wheel drive); prepare for disassembly.
08.13	Reinstall engine (rear-wheel drive).
08.14	Identify hybrid vehicle internal combustion engine service precautions.
Cylinder Head and Valve Train Diagnosis and Repair	
08.15	Remove cylinder head(s); inspect cylinder head(s) for cracks; check gasket surface areas for warpage and leakage; check passage condition.
08.16	Install cylinder heads and gaskets; tighten according to manufacturer’s specifications and procedures.
08.17	Inspect and test valve springs for squareness, pressure, and free height comparison; replace as needed.
08.18	Inspect valve spring retainers, locks, and valve grooves.
08.19	Replace valve stem seals.
08.20	Inspect valve guides for wear; check valve guide height and stem- to-guide clearance; determine necessary action.
08.21	Inspect valves; determine necessary action.
08.22	Inspect valve seats; determine necessary action.
08.23	Check valve face-to-seat contact and valve seat concentricity (run out); determine necessary action.
08.24	Check valve spring assembled height and valve stem height; service valve and spring assemblies as needed.
08.25	Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); repair or replace.

08.26	Inspect hydraulic or mechanical lifters; replace as needed.
08.27	Adjust valves (mechanical or hydraulic lifters).
08.28	Inspect and replace camshaft drives (including gear wear and backlash, sprocket and chain wear, overhead cam drive sprockets, drive belts, belt tension, and tensioners).
08.29	Inspect camshaft for run out; measure journals and lobes for wear.
08.30	Inspect and measure camshaft bearings for wear, damage, out-of round, and alignment; determine necessary action.
08.31	Verify camshaft(s) timing according to manufacturer's specifications and procedure.
08.32	Service product specific cam drive systems.
08.33	Perform product specific valve adjustments.
08.34	Remove and replace valve cover gaskets.
Engine Block Diagnosis and Repair	
08.35	Inspect and replace pans, covers, gaskets, and seals.
08.36	Inspect engine block for cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed repairs.
08.37	Inspect internal and external threads; repair as needed.
08.38	Remove cylinder wall ridges.
08.39	Inspect and measure cylinder walls for damage and wear; determine necessary action.
08.40	Deglaze and clean cylinder walls.
08.41	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.
08.42	Inspect crankshaft for surface cracks and journal damage; check oil passage condition; measure journal wear; determine necessary action.
08.43	Inspect and measure main and connecting rod bearings for damage, clearance, and end play; determine necessary action (includes the proper selections of bearings).
08.44	Identify position and bearing wear patterns that include connecting rod alignment and main bearing bore problems; inspect rod alignment and bearing bore condition.
08.45	Inspect, measure, service or replace pistons.
08.46	Inspect, measure, and install piston rings.
08.47	Inspect, repair or replace crankshaft vibration damper (harmonic balancer).
08.48	Inspect flywheel or flexplate and ring gear for cracks and wear; measure run out; determine necessary action.
08.49	Inspect, remove, and replace crankshaft pilot bearing or bushing (as applicable).
08.50	Reassemble engine components using correct gaskets and sealants.

08.51	Inspect auxiliary (balance, intermediate, idler, counterbalance or silencer) shaft(s); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.
Lubrication and Cooling Systems Diagnosis and Repairs	
08.52	Prime engine lubrication system.
08.53	Perform oil pressure tests; determine necessary action.
08.54	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; replace as needed.
08.55	Perform cooling system tests (pressure, combustion leakage, and temperature); determine necessary action.
08.56	Inspect, replace, and adjust drive belts and pulleys.
08.57	Inspect and replace engine cooling and heater system hoses.
08.58	Inspect, test, and replace thermostat and housing.
08.59	Inspect coolant; drain, flush, and refill cooling system with recommended coolant and bleed air as required.
08.60	Inspect, test, remove, and replace water pump.
08.61	Inspect and test radiator, pressure cap, and coolant recovery system; remove and replace radiator.
08.62	Clean, inspect, and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.
08.63	Inspect and test electrical fan control system and circuits.
08.64	Inspect auxiliary oil coolers; replace as needed.
08.65	Inspect, test, and replace oil temperature and pressure switches and sensors.
08.66	Perform oil and filter change.
08.67	Service product specific water pumps.
08.68	Service product specific belt drive and tensioner systems.
09.0	Demonstrate proficiency in the operation of steering and suspension systems--The student will be able to:
09.01	Disable supplemental restraint system (SRS) in accordance with manufacturer’s procedures.
09.02	Diagnose steering column noises, looseness, and binding problems (including tilt mechanisms); determine necessary action.
09.03	Diagnose power non-rack and pinion steering gear binding, uneven turning effort, looseness, hard steering, and fluid leakage problems; determine necessary action.
09.04	Diagnose power rack and pinion steering gear vibration, looseness, and hard steering problems; determine necessary action.
09.05	Inspect and replace steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel.
09.06	Adjust manual or power non-rack and pinion worm bearing preload and sector lash.
09.07	Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.

09.08	Adjust manual or power rack and pinion steering gear.
09.09	Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
09.10	Inspect manual and power steering fluid levels and condition.
09.11	Flush, fill, and bleed power steering system.
09.12	Diagnose power steering fluid leakage; determine necessary action.
09.13	Inspect, replace, and adjust power steering pump belt.
09.14	Remove, inspect, and replace power steering pump, pump mounts, pump seals, and gaskets.
09.15	Remove, inspect, and replace power steering pump pulley; check alignment.
09.16	Perform power steering system pressure test; determine needed repairs.
09.17	Inspect and replace power steering hoses and fittings.
09.18	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.
09.19	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.
09.20	Diagnose, inspect, adjust, repair or replace components of electronically-controlled steering systems.
09.21	Diagnose, inspect, repair or replace components of variable-assist steering systems.
09.22	Service product specific power assisted steering systems.
09.23	Service product specific variable assisted steering systems.
Suspension Systems Diagnosis and Repair; Front Suspensions	
09.24	Diagnose short and long arm suspension system noises, body sway, and uneven riding height problems; determine necessary action.
09.25	Diagnose MacPherson strut suspension system noises body sway, and uneven riding height problems; determine necessary action.
09.26	Remove, inspect, and replace upper and lower control arms, bushings, shafts, and rebound bumpers.
09.27	Remove, inspect, replace, and adjust strut (compression/tension) rods and bushings.
09.28	Remove, inspect, and replace upper and lower ball joints on short and long arm suspension systems.
09.29	Remove, inspect, and replace steering knuckle assemblies.
09.30	Remove, inspect, and replace short and long arm suspension system coil springs and spring insulators.
09.31	Remove, inspect, replace, and adjust suspension system torsion bars; inspect mounts.
09.32	Remove, inspect and replace stabilizer bar bushings, brackets, and links.
09.33	Remove, inspect, and replace ball joints on MacPherson strut suspension systems.
09.34	Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, insulators, and upper strut bearing mount.

09.35	Lubricate suspension and steering systems.
09.36	Service product specific suspension systems.
Rear Suspensions	
09.37	Remove, inspect, and replace coil springs and spring insulators.
09.38	Remove, inspect, and replace transverse links, control arms, bushings, and mounts.
09.39	Remove, inspect, and replace leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts.
09.40	Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, and insulators (silencers).
09.41	Service product specific suspension systems.
Miscellaneous Service	
09.42	Inspect, remove, and replace shock absorbers.
09.43	Remove, inspect, and service or replace front and rear wheel bearings.
09.44	Diagnose, inspect, adjust, repair or replace components of electronically-controlled suspension systems.
09.45	Service product specific ride height control systems.
Wheel Alignment Diagnosis, Adjustment, and Repair	
09.46	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return problems; determine necessary action.
09.47	Measure vehicle riding height; determine necessary action.
09.48	Check and adjust front and rear wheel camber; determine needed repairs.
09.49	Check and adjust caster; determine necessary action.
09.50	Check and adjust front wheel toe; adjust as needed.
09.51	Center steering wheel.
09.52	Check toe-out-on-turns (turning radius); determine needed repairs.
09.53	Check SAI (steering axis inclination) and included angle; determine necessary action.
09.54	Check and adjust rear wheel toe.
09.55	Check rear wheel thrust angle; determine necessary action.
09.56	Check for front wheel setback; determine necessary action.
09.57	Check front cradle (subframe) alignment; determine needed repairs.
Wheel and Tire Diagnosis and Repair	
09.58	Diagnose tire wear patterns; determine necessary action.

	09.59	Inspect tires, diagnose tire wear patterns; check and adjust air pressure.
	09.60	Diagnose wheel/tire vibration, shimmy, and noise problems; determine necessary action.
	09.61	Rotate tires according to manufacturer's recommendations.
	09.62	Measure wheel, tire, axle, and hub run out; determine needed repairs.
	09.63	Diagnose tire pull (lead) problem; determine corrective actions.
	09.64	Balance wheel and tire assembly (static and dynamic).
	09.65	Dismount, inspect, repair, and remount tire on wheel.
	09.66	Reinstall wheel; torque lug nuts.
10.0	Demonstrate proficiency in the operation and servicing of automotive brake system--The student will be able to:	
	10.01	Measure and adjust pedal pushrod length and pedal height.
	10.02	Check master cylinder for internal and external leaks and proper operation; determine necessary action.
	10.03	Remove, bench bleed, and replace master cylinder.
	10.04	Diagnose poor stopping, pulling or dragging caused by problems in the hydraulic system; determine necessary action.
	10.05	Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports.
	10.06	Inspect flexible brake hoses for leaks, kinks, cracks, bulging or wear; tighten loose fittings and supports.
	10.07	Fabricate and install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed.
	10.08	Select, handle, store, and install brake fluids to proper level.
	10.09	Inspect, test, and replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.
	10.10	Inspect, test, replace, and adjust height (load) sensing proportioning valve.
	10.11	Inspect, test, and replace components of brake warning light system.
	10.12	Bleed (manual, pressure, vacuum or surge) brake system; flush hydraulic system.
Drum Brake Diagnosis and Repair		
	10.13	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation problems; determine necessary action.
	10.14	Remove, clean (using proper safety procedures), inspect, and measure brake drums; service or replace as needed.
	10.15	Mount brake drum on lathe machine braking surface.
	10.16	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
	10.17	Remove and reinstall wheel cylinders.
	10.18	Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.

10.19	Reinstall wheel, torque lug nuts, and make final checks and adjustments.
Disc Brake Diagnosis and Repair	
10.20	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation caused problems; determine necessary action.
10.21	Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing.
10.22	Clean and inspect caliper mounting and slides for wear and damage.
10.23	Remove, clean, and inspect pads and retaining hardware; determine needed service.
10.24	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.
10.25	Reassemble, lubricate, and reinstall caliper, pads, and related hardware.
10.26	Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace.
10.27	Refinish rotor according to manufacturer's recommendations.
10.28	Adjust calipers with integrated parking brake system.
10.29	Fill master cylinder with recommended fluid and seat pads; inspect caliper for leaks.
10.30	Reinstall wheel, torque lug nuts, and make final checks and adjustments.
10.31	Remove and replace rotor.
Power Assist Units Diagnosis and Repair	
10.32	Test pedal free travel with and without engine running; check power assist operation.
10.33	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
10.34	Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; repair or replace parts as needed.
Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair	
10.35	Diagnose wheel bearing noises, wheel shimmy, and vibration problems; determine necessary action.
10.36	Remove, clean, inspect, repack, and reinstall wheel bearings and replace seals; reinstall hub and adjust wheel bearings.
10.37	Check parking brake cables and components for wear, rusting, binding, and corrosion; clean, lubricate, and replace as needed.
10.38	Check parking brake operation; adjust as needed.
10.39	Check operation of parking brake indicator light system.
10.40	Check operation of brake stop light system; adjust and service as needed.
10.41	Replace wheel bearing and race.
Anti-Lock Brake System	

10.42	Inspect, test, and service anti-lock brake system (ABS) hydraulic, electrical, and mechanical components.
10.43	Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise problems caused by the anti-lock brake system (ABS); determine necessary action.
10.44	Observe anti-lock brake system (ABS) warning light(s) at startup; determine if further diagnosis is needed.
10.45	Diagnose anti-lock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment; determine necessary action.
10.46	Depressurize high pressure components of the anti-lock brake system (ABS) following manufacturer's recommended safety procedures.
10.47	Fill the anti-lock brake system (ABS) master cylinder with recommended fluid following manufacturer's procedures; inspect system for leaks.
10.48	Bleed the anti-lock brake system's (ABS) front and rear hydraulic circuits following manufacturer's procedures.
10.49	Perform a fluid pressure (hydraulic boost) diagnosis on the high pressure anti-lock brake system (ABS); determine necessary action.
10.50	Remove and install anti-lock brake system (ABS) electrical/electronic/hydraulic components following manufacturer's procedures and specifications.
10.51	Service, test, and adjust anti-lock brake system (ABS) speed sensors following manufacturer's recommended procedures.
10.52	Diagnose anti-lock brake system (ABS) braking problems caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).
10.53	Identify and inspect electronic brake control systems; determine necessary action.
10.54	Service product specific anti-lock brake systems.
10.55	Service product specific traction control systems.
11.0	Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic related components--The student will be able to:
11.01	Use wiring diagrams during diagnosis of electrical circuit problems.
11.02	Check electrical circuits with a test light; determine necessary action.
11.03	Check voltage and voltage drop in electrical/electronic circuits using a digital multimeter (DMM); determine needed repairs.
11.04	Check current flow in electrical/electronic circuits and components using an ammeter; determine necessary action.
11.05	Check electrical circuits using jumper wires; determine necessary action.
11.06	Find shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
11.07	Measure and diagnose the cause(s) of abnormal key-off battery drain; determine necessary action.
11.08	Inspect and test fusible links, circuit breakers, and fuses; replace as needed.
11.09	Inspect and test switches, connectors, relays, and wires of electrical/electronic circuits; repair or replace as needed.
Battery Diagnosis and Service	
11.10	Perform battery state-of-charge test; determine needed service.

11.11	Perform battery capacity (load, high-rate discharge) test; determine needed service.
11.12	Maintain or restore electronic memory functions.
11.13	Inspect, clean, and replace battery.
11.14	Perform slow/fast battery charge.
11.15	Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
11.16	Start a vehicle using jumper cables using a battery auxiliary power supply.
11.17	Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
11.18	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery.
Starting System Diagnosis and Repair	
11.19	Perform starter current draw and circuit voltage drop test; determine necessary action.
11.20	Inspect and test starter relays and solenoids; replace as needed.
11.21	Remove and replace/reinstall starter.
11.22	Perform starter bench tests; determine necessary action.
11.23	Inspect, test, and repair or replace switches, connectors, and wires of starter control circuits.
11.24	Disassemble, clean, inspect, and test starter components; replace as needed.
11.25	Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.
Charging System Diagnosis and Repair	
11.26	Diagnose charging system problems that cause an undercharge, a no-charge or an overcharge condition.
11.27	Inspect and adjust alternator drive belts; replace as needed.
11.28	Inspect and test voltage regulator; replace as needed.
11.29	Remove, inspect, and replace/reinstall alternator.
11.30	Perform charging circuit voltage drop tests; determine needed repairs.
Lighting Systems Diagnosis and Repair	
11.31	Diagnose brighter than normal, intermittent, dim or no light operation.
11.32	Inspect, replace, and aim headlights and bulbs.
11.33	Inspect and diagnose incorrect turn signal or hazard light operation; repair or replace as needed.
11.34	Identify system voltage and safety precautions associated with high-intensity discharge headlights.
Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair	

11.35	Diagnose intermediate, high, low or no gauge readings.
11.36	Test gauge circuit voltage regulators (limiters); replace as needed.
11.37	Inspect and test gauges and gauge sending units; replace as needed.
11.38	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; repair or replace as needed.
11.39	Diagnose incorrect operation of warning devices and other driver information systems.
11.40	Diagnose intermediate, high, low or no readings on electronic instrument clusters.
11.41	Inspect and test sensors, sending units, connectors, and wires of electronic instrument circuits; repair or replace as needed.
Horn and Wiper/Washer Diagnosis and Repair	
11.42	Diagnose incorrect horn operation; repair as needed.
11.43	Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; repair as needed.
11.44	Diagnose incorrect windshield washer operation; repair as needed.
Accessories Diagnosis and Repair	
11.45	Diagnose incorrect operation of motor-driven accessory circuits; repair as needed.
11.46	Diagnose incorrect heated glass operation; repair as needed.
11.47	Diagnose incorrect electric door and hatch/trunk lock operation; repair as needed.
11.48	Diagnose incorrect operation of cruise control systems; repair as needed.
11.49	Diagnose supplemental restraint system (SRS) problems; repair as needed. (NOTE: Follow manufacturer's safety procedures to prevent accidental deployment.)
11.50	Diagnose radio static and weak, intermittent, or no radio reception.
11.51	Service product specific electrical/electronic systems.
11.52	Perform product specific diagnostic procedures.
11.53	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
11.54	Remove and reinstall door panel.

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

The purpose of this program is to prepare students for employment and/or specialized training in the automotive industry. The program provides specialized corporate/association job preparatory training.

Automotive Technology Programs sponsored by automobile manufacturers require an internship at a dealership.

The program must be NATEF Master Certified and have a business plan approved by the appropriate industry affiliated organization. Instructors must be ASE Certified in all areas that they teach in addition to being certified in Engine Performance and Electrical/Electronic Systems. ASE Master Technician and Advanced Engine Performance (L1) ASE Certification is preferred. Instructors must meet the specific product certification as specified in the business plan.

Program must meet the equipment and specialty tool requirement as specified in the business plan. Must offer Federally recognized refrigerant-recycling certification training.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

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: **Marine Engineering, Management & Seamanship**
Career Cluster: **Transportation, Distribution and Logistics**

AAS	
CIP Number	0647060500
Program Type	College Credit
Standard Length	66 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	17-3023 – Electrical and Electronic Engineering Technicians 49-2093 – Electrical and Electronics Installers and Repairers, Transportation Equipment 49-2094 – Electrical and Electronics Repairers, Commercial and Industrial Equipment 49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles 49-2098 – Security and Fire Alarm Systems Installers 49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists 49-3051 – Motorboat Mechanics and Service Technicians 49-9071 – Maintenance and Repair Workers, General
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to installation and operation of diesel and gasoline engines; troubleshooting for diesel and gasoline engines; engine maintenance; propeller selection; corrosion control; fiberglass hull repair; vessel nomenclature; safety, installation, diagnosing and troubleshooting marine electronic devices and systems.

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

Standards

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

01.0 Perform basic shop practices.
02.0 Describe operational theory of (2) two and (4) four cycle engines - Diesel and Gasoline.
03.0 Use service manuals and parts references.
04.0 Perform basic welding skills.
05.0 Remove and install engines.
06.0 Recondition and service engines.
07.0 Perform diagnosis service and repairs to all types of marine ignition systems.
08.0 Develop skills in electrical-electronic theory of operation and application.
09.0 Troubleshoot and repair fuel systems.
10.0 Service cooling systems.
11.0 Service exhaust systems.
12.0 Demonstrate shop management functions.
13.0 Identify special marine principles.
14.0 Repair inboard drive systems.
15.0 Rig boats.
16.0 Repair lower units.
17.0 Perform corrosion experiments and understand corrosion control.
18.0 Apply fiberglass construction and maintenance procedures.
19.0 Demonstrate appropriate communication skills.
20.0 Demonstrate appropriate math skills.
21.0 Demonstrate appropriate understanding of basic science.
22.0 Demonstrate and practice employability skills.
23.0 Demonstrate an understanding of entrepreneurship.
24.0 Auxiliary systems.

Florida Department of Education
Student Performance Standards

Program Title: **Marine Engineering, Management & Seamanship**
CIP Numbers: **0647060500**
Program Length: **66 credit hours**
SOC Code(s): **17-3023, 49-2093, 49-2094, 49-2096, 49-2098, 49-3031, 49-3051, 49-9071**

The AAS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS. At the completion of this program, the student will be able to:	
01.0	Perform basic shop practices--The student will be able to:
01.01	Perform calculations with square roots and percentage.
01.02	Change fractions to decimals and decimals to fractions.
01.03	Understand the basic concepts of force, work, power, and motion
01.04	Determine metric system measurements.
01.05	Comply with safety rules and regulations.
01.06	Understand the basic concepts of technical drawing including orthographic projections, isometric, schematics, and measurements.
01.07	Understand the concept of friction and the different types of mechanical friction.
01.08	Operate hand tools safely and properly.
01.09	Set up and use power tools safely and properly.
01.10	Set up and use precision measuring tools.
01.11	Drill and remove broken studs and install helicoils.
01.12	Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
01.13	Install fasteners such as screws, bolts and keys; and utilize screw extractor, thread cutting tape and dies.
01.14	Locate and match electrical units by their symbols on a wiring diagram.
01.15	Draw performance charts and graphs on propeller selection and engine specifications.
02.0	Describe operational theory of (2) two and (4) four cycle engines diesel and gasoline--The student will be able to:
02.01	Distinguish between the characteristics of four-stroke cycle engine including diesel engines.
02.02	Identify the principal engine systems such as: Fuel, Cooling, Lubrication, Air Intake, and Electrical.
02.03	Identify basic engine parts.
02.04	Describe the functions of the crankshaft, camshaft, pistons, connecting rods, engine block, head valves, and accessories.

02.05	List the information which may be found on the engine nameplate.
02.06	Describe types of motion and simple machines and characteristics of energy.
02.07	Calculate problems using the formula for work, horsepower and torque.
02.08	Describe the main theoretical concept of heat engines.
02.09	Describe the process by which an internal combustion engine converts chemical energy into rotary motion.
02.10	Calculate problems using the formulas for engine cubic displacement and compression ratio.
02.11	Describe the principles of operation of four-and two-stroke cycle engines.
02.12	Identify the parts of a camshaft lobe-crankshaft lobe.
02.13	Describe valve timing and overlap procedures.
02.14	Identify types of valve arrangements.
02.15	Identify types of engine construction.
02.16	Describe piston engine operation, design loop charged.
02.17	Describe the operation of two- and four-stroke cycle engines to include diesel engines.
02.18	Distinguish different engine design by manufacturers.
02.19	Identify marine engine makeup and conversion from auto engines.
02.20	Describe the procedure, step-by-step, to convert a boat with gasoline engines into a boat with diesel engines.
03.0	Use service manuals and parts references--The student will be able to:
03.01	Demonstrate use of multiple and single type shop service manual.
03.02	Demonstrate use of specification handbooks and tune up charts.
03.03	Demonstrate use of manufacturer parts catalogs.
03.04	Demonstrate use of marine engine installation manuals.
03.05	Demonstrate use of flat rate and service bulletins.
03.06	Apply processes to create quotes and estimates which include, but are not limited to, parts and labor.
04.0	Perform basic welding skills--The student will be able to:
04.01	Set up and operate gas and electric various welding equipment.
04.02	Burn (cut) material using mechanized or hand-held gas torch equipment.
04.03	Prepare metal surfaces for welding.
04.04	Identify type of metal to be welded.
04.05	Braze metal frames and structures.

04.06	Fabricate metal frames and structures.
04.07	Pressure test weldment.
04.08	Perform plug weld technique.
04.09	Gas weld ferrous metals in all positions with or without filler rod.
04.10	Perform TIG welding in aluminum and stainless steel.
04.11	Use and maintain TIG welding equipment.
04.12	Perform MIG type welding on various metals.
04.13	Use welding principles to heat and remove broken screws and bolts.
05.0	Remove and install engines--The student will be able to:
05.01	Disconnect engine, mounts, wiring and lines.
05.02	Operate hydraulic engine hoist.
05.03	Mount engine mounts, wiring and lines.
05.04	Reconnect engine mounts, wiring and lines.
05.05	Cut openings for different engine installations.
05.06	Mount jet drive type of engine.
05.07	Align inboard (gas and diesel) engines to manufacturers' specifications.
05.08	Mount and align stern drive to housing using manufacturers' special tools and manuals.
06.0	Recondition and service engines--The student will be able to:
06.01	Remove and replace power head.
06.02	Disassemble engine.
06.03	Clean engine parts for inspection.
06.04	Inspect and check for proper condition.
06.05	Remove and replace oil pump.
06.06	Remove and replace fuel pump.
06.07	Service a multi-piece crankshaft.
06.08	Replace connecting rods and bearings.
06.09	Remove and replace flywheel.
06.10	Remove and replace exhaust manifolds and risers.
06.11	Perform cylinder compression test.

	06.12	Perform engine tune up.
	06.13	Perform operational inspection of engine lubrication system.
	06.14	Remove and service piston ring and pistons.
	06.15	Fit piston pins.
	06.16	Inspect crankshaft, camshaft, connecting rods and piston assembly.
	06.17	Perform the head valves job including: inspection of the head with different methods, replacement of spring valves and seals, and grinding of head valves.
	06.18	Torque power head and lower unit to specifications.
	06.19	Hone cylinders to manufacturers' specifications.
07.0	Perform diagnosis service and repairs for all types of marine ignition systems--The student will be able to:	
	07.01	Diagnose, repair and replace malfunctions of ignition system components.
	07.02	Set ignition timing.
	07.03	Inspect secondary circuit lead wires, distributor and rotor measure resistance in secondary wires.
	07.04	Analyze or adjust engine performance using engine analyzer devices.
	07.05	Remove and replace spark plugs.
	07.06	Adjust armature air gap.
	07.07	Time the ignition system for O/B engines.
	07.08	Use specialized test equipment.
	07.09	Test CD type ignition systems.
	07.10	Describe differences between marine and automotive type ignition components.
	07.11	Observe safety practices in marine applications.
	07.12	Read and interpret manufacturers wire diagrams.
	07.13	Operate an engine dynamometer.
08.0	Develop skills in electrical-electronic theory of operation and application--The student will be able to:	
	08.01	Apply Ohm's Law to series circuit.
	08.02	Apply Ohm's Law to parallel circuits.
	08.03	Apply Ohm's Law to series-parallel circuits.
	08.04	Perform continuity test.
	08.05	Diagnose and repair alternator.

08.06	Diagnose and repair or replace charging system regulator.
08.07	Service or replace battery cables and battery box.
08.08	Diagnose, repair or replace starter.
08.09	Diagnose and repair malfunctions in the cranking system.
08.10	Perform operational inspection of lighting system.
08.11	Measure voltage drops, current flow, resistance in a circuit or component with a multimeter.
08.12	Repair or replace switches to include ignition switches.
08.13	Repair or replace fuse block assembly.
08.14	Locate and repair shorts and open circuits in wiring.
08.15	Inspect or replace rectifier.
08.16	Replace diode assembly.
08.17	Remove, replace and repair electrical remote control assembly.
08.18	Service and install diesel and gasoline marine alarm systems.
09.0	Troubleshoot and repair fuel systems--The student will be able to:
09.01	Identify fuel system components.
09.02	Explain operation of fuel system and components.
09.03	Repair carburetion.
09.04	Repair gasoline injection systems.
09.05	Replace fuel system components.
09.06	Identify fuel systems malfunction.
09.07	Replace fuel filter.
09.08	Repair fuel lines.
09.09	Adjust carburetor.
09.10	Service automatic or manual choke.
09.11	Service fuel pump.
09.12	Analyze for foreign particles in fuel system.
09.13	Correct fuel tank installation.
09.14	Test engines fuel flow using manufacturers' procedures and test equipment.
09.15	Identify fuel and oil specification for outboard motors, four-cycle engines and diesel applications.

09.16	Repair and test diesel fuel injector nozzles.
09.17	Repair and test diesel fuel pumps.
09.18	Replace and adjust unit type injector or marine diesel engines.
09.19	Correct procedure and timing of fuel injector pumps.
09.20	Conduct diesel fuel pressure test.
09.21	Correct rack adjustment on diesel engines.
10.0	Service cooling systems--The student will be able to:
10.01	Check engine temperature.
10.02	Test thermostat.
10.03	Inspect and/or replace water pump.
10.04	Inspect and/or replace circulating water pump.
10.05	Pressure test cooling system.
10.06	Remove, clean and replace water cooling parts.
10.07	Inspect and repair heat exchanges on gasoline and marine diesel engine.
10.08	Inspect and repair marine keel coolers.
10.09	Identify different types of approved coolant used in marine closed cooling systems.
10.10	Check engine block cooling passages for corrosion and build-up.
11.0	Service exhaust systems--The student will be able to:
11.01	Remove, inspect and replace an exhaust housing.
11.02	Remove, inspect and replace inner exhaust housing.
11.03	Remove, inspect and replace seal.
11.04	Remove, inspect and replace aft exhaust cover.
11.05	Remove, inspect and replace rubber mount.
11.06	Remove, inspect and replace clamp.
11.07	Remove, inspect and replace mount cover.
11.08	Remove, inspect and replace water tube.
11.09	Inspect service turbo charger.
11.10	Recommend correct exhaust tubing for different marine applications.
11.11	Service marine water cooled exhaust systems.

	11.12 Determine back pressure by under stator exhaust applications.
12.0	Demonstrate shop management functions--The student will be able to:
	12.01 Process work orders.
	12.02 Process merchandise return.
	12.03 Select shop equipment and materials.
	12.04 Supervise employees.
	12.05 Develop work schedules.
	12.06 Process warranty claims.
	12.07 Perform business and computation skills.
	12.08 Use inventory card files and select parts from stock.
	12.09 Sell marine merchandise.
	12.10 Process sales and service receipts.
	12.11 Operate computer for inventory control.
	12.12 Operate computer for service orders.
	12.13 Program computers for new marine parts/merchandise received.
	12.14 Place marine merchandise into correct/orderly inventory.
	12.15 Complete correct order forms and perform both by computer program and written process.
13.0	Identify special marine principles--The student will be able to:
	13.01 Explain basic principles of thrust in marine applications.
	13.02 Explain basic principles of propulsion in marine applications.
	13.03 Explain correct propeller selection and performance.
	13.04 Identify types of hulls used in marine applications.
	13.05 Explain speed-length ratio and calculate hull speed and engine selection.
	13.06 Identify bow angle and its effect on performance.
	13.07 Perform dynamometer test on different horsepower engines.
	13.08 Perform test tank operations using manufacturer's test wheels.
	13.09 Identify transom heights and explain the effects on engine performance/speed/horsepower.
14.0	Repair inboard drive systems--The student will be able to:
	14.01 Inspect gear housing assembly.

	14.02 Determine fluid levels.
	14.03 Adjust gear linkages.
	14.04 Torque mounting bolts.
	14.05 Inspect vacuum shift controls.
	14.06 Inspect drive shaft.
	14.07 Lubricate universal joint.
	14.08 Inspect gimbal bearing.
	14.09 Inspect constant velocity joint.
	14.10 Measure drive shaft angle and runout.
	14.11 Replace power transmission system.
	14.12 Rebuild power transmission.
	14.13 Correctly apply manufacturers' procedures in shimming and adjusting operations.
15.0	Rig boats--The student will be able to:
	15.01 Install engine steering components.
	15.02 Install and service electrical wiring harness.
	15.03 Install and adjust trim tabs on outboard and stern drivers, both mechanical and hydraulic type.
	15.04 Identify sea drive installation.
	15.05 List methods of outboard motor transom bracket installation.
	15.06 Describe and illustrate correct lighting/wiring procedures.
	15.07 Install engine remote control by manufacturers' specifications.
16.0	Repair lower units--The student will be able to:
	16.01 Lubricate lower unit.
	16.02 Pressure and vacuum test lower unit.
	16.03 Lubricate transom steering busing, cables, etc.
	16.04 Inspect, clean and lubricate propeller shaft.
	16.05 Inspect and install propeller.
	16.06 Remove and replace magnets in lower unit.
	16.07 Inspect, remove and replace vertical drive gear.
	16.08 Remove, inspect and replace clutch dog.

16.09	Remove, inspect and replace clutch coils.
16.10	Remove, inspect and replace drive shaft pinion.
16.11	Remove, inspect and replace drive components.
16.12	Remove, inspect and replace lower unit seals.
16.13	Remove and replace swivel bracket.
16.14	Remove, inspect and replace forward and reverse driving gears.
16.15	Remove, inspect and replace drive shaft and components.
16.16	Remove, inspect and replace hydraulic pump, shaft rod end plunger.
16.17	Adjust trim tab.
16.18	Inspect and replace U-joints.
16.19	Inspect and repair or replace lower unit lock.
16.20	Remove, replace and repair tilt assemblies to include hydraulic tilt.
16.21	Correctly shim lower units to engine manufacturer's specifications.
16.22	Disassemble/reassemble stern drive gear cases.
16.23	Disassemble/inspect/service/reassemble inboard marine transmissions both gasoline and diesel.
16.24	Demonstrate the ability to analyze and solve problems, to do necessary research and to report the results in good form.
16.25	Develop individual responsibility for work done in the lab.
16.26	Develop an understanding and skill in testing and diagnosing marine engine service problems and to develop appreciation of the true value of testing equipment.
16.27	Calculate torque and gear ratio.
16.28	Compare and identify all types of gear arrangements.
16.29	Explain operation theory of mechanical shifting, electric shifting, and hydroelectric shifting.
16.30	Identify the major parts of these shifting mechanisms.
16.31	Understand by examination the principles of marine propulsion propeller theory.
16.32	Demonstrate an understanding of engine installation.
16.33	Apply knowledge to disassemble and assembly of all marine transmissions.
16.34	Handle lifting devices properly.
16.35	Diagnose planetary gear principle of operation and theory.
17.0	Perform corrosion experiments and understand corrosion control--The student will be able to:

17.01	Identify galvanic corrosion.
17.02	Explain the use and function of the galvanic series.
17.03	Understand corrosion and its prevention.
17.04	List chemical equation and symbols.
17.05	Demonstrate a basic knowledge of electricity.
17.06	Identify maintenance of boat hulls and when to determine its time.
17.07	Identify difference in corrosion and cavitation.
17.08	Demonstrate by lab experiments cause of corrosion.
17.09	List in test form, actual lab reports in the field.
17.10	Distinguish fatigue corrosion.
17.11	Understand electrolysis and its causes of corrosions.
17.12	Correctly prepare metals for protective coatings.
17.13	Identify protective coatings.
17.14	Practice safe lab experiences with dangerous chemicals.
17.15	Demonstrate theory of operation of impress currents.
17.16	Show proper installation procedure of impress current unit onboard ship.
17.17	Maintain records and diagnose impress current failure.
17.18	Write report analysis on corrosion in our environment.
17.19	Identify non-metallic corrosion.
17.20	Define special tools used in the maintenance and testing of sacrificial anodes.
17.21	Understand acrylic and styrene copolymer coating.
17.22	List causes of stray current corrosion.
18.0	Apply fiberglass construction and maintenance procedures--The student will be able to:
18.01	Describe safe handling procedures and care of fiberglass resins and materials.
18.02	Apply mixture methods of resins, coal tars, gel coat and paints.
18.03	Describe fiberglass boat manufacturing concepts.
18.04	Prepare a mold for casting a fiberglass hull.
18.05	Describe installation procedures of decks and gunwale.
18.06	Repair damaged fiberglass hulls.

	18.07	Apply modern methods of maintaining new and old fiberglass hulls.
	18.08	Demonstrate advance methods of boat building and the manufacturing of fiberglass accessories.
19.0	Demonstrate appropriate communication skills--The student will be able to:	
	19.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	19.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
	19.03	Read and follow written and oral instructions.
	19.04	Answer and ask questions coherently and concisely.
	19.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
	19.06	Demonstrate appropriate telephone/communication skills.
20.0	Demonstrate appropriate math skills--The student will be able to:	
	20.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
	20.02	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
	20.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	20.04	Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
	20.05	Demonstrate an understanding of federal, state and local taxes and their computation.
21.0	Demonstrate appropriate understanding of basic science--The student will be able to:	
	21.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	21.02	Draw conclusions or make inferences from data.
	21.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	21.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
22.0	Demonstrate employability skills--The student will be able to:	
	22.01	Conduct a job search.
	22.02	Secure information about a job.
	22.03	Identify documents which may be required when applying for a job interview.
	22.04	Complete a job application form correctly.
	22.05	Demonstrate competence in job interview techniques.
	22.06	Identify and adopt acceptable work habits.
	22.07	Demonstrate knowledge of how to make appropriate job changes.

	22.08	Demonstrate acceptable employee health habits.
	22.09	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200)
23.0	Demonstrate an understanding of entrepreneurship--The student will be able to:	
	23.01	Define entrepreneurship.
	23.02	Describe the importance of entrepreneurship to the American economy.
	23.03	List the advantages and disadvantages of business ownership.
	23.04	Identify the risks involved in ownership of a business.
	23.05	Identify the necessary personal characteristics of a successful entrepreneur.
	23.06	Identify the business skills needed to operate a small business efficiently and effectively.
24.0	Auxiliary systems--The student will be able to:	
	24.01	Familiarize with fire protection systems.
	24.02	Compare the Code of Federal Regulations (CFR) to ABYC A-4 as it applies to recreational craft and firefighting equipment.
	24.03	Discuss extinguishing agent characteristics at length and EPA mandates as they apply to Halon gas.
	24.04	Practice measuring engine room compartments and tankage volumes to determine net compartment volume and correct sizing of extinguishing agent bottle systems.
	24.05	Inspect engine rooms on boats and "spec out" a design for a permanently installed automatic system to include a full system layout with wiring schematic.
	24.06	Install and service on-board liquefied petroleum gas and compressed natural gas systems.
	24.07	Identify the differences between LPG and CNG gasses.
	24.08	Inspect CO detectors and review standard installation procedures with live units.
	24.09	Practice assembling a typical LPG system.
	24.10	Inspect approved appliances and identify the features that make them Standards compliant.
	24.11	Inspect examples of all of the systems and devices covered and identify the key points mentioned within the respective standards.
	24.12	Compare the differences between global LPG installation Standards and ABYC Standards.
	24.13	Install and Repair Piping and Plumbing/Potable Water Systems.
	24.14	Drill and prepare cored composite hull for installation of a seacock and learn the importance of isolation of metallic thru-hull fittings on aluminum and steel vessels.
	24.15	Inspect bilge pump and scupper installations on a variety of boats in the IYRS collection to determine compliance with the two ABYC standards.
	24.16	Design and build a potable hot and cold water system mock up to include a pressurized system.
	24.17	Inspect gray water systems on new boats and then design a system based on equipment manufacturer’s recommendations, building a small mockup in the lab.

24.18	Practice the procedures necessary to properly decommission a potable water system after discussing the proper procedures for commissioning and decommissioning on board plumbing systems.
24.19	Familiarized with specific information regarding onboard tankage for fuel, water and waste.
24.20	Review ABYC Standards and USCG Federal Regulations as they apply to Gasoline and Diesel Fuel tank design and installations.
24.21	Recognize potable water storage tank requirements and ABYC Standard H-23, Potable Water Systems.
24.22	Identify issues related to waste holding tanks and cover best industry practices for their design and installation.
24.23	Learn to troubleshoot and repair tank level gauge problems.
24.24	Familiarize the student with a variety of steering system types available for power and sailing craft.
24.25	Review basic hydraulic principles as applied to steering systems, component placement and Bleeding procedures as specified by the various vendors.
24.26	Review ABYC Standard P-21, Manual Hydraulic Steering Systems.
24.27	Practice selecting a system for several hypothetical boat types.
24.28	Practice steering system maintenance and adjustment procedures on steering system mock-ups.
24.29	Examine the three ABYC Standards that address steering or propulsion control systems, P-22, Steering Wheels, P-23 Steering and Propulsion Controls for Jet Boats, and P-24 Electric/Electronic Propulsion Control Systems.
24.30	Demonstrate knowledge of Federal and local regulations related to waste water systems.
24.31	Identify Federal Laws as they apply to marine sanitation systems as installed on boats and compile a written report on regional and local laws as they apply to marine sanitation devices and overboard discharge of gray water and black water.
24.32	Inspect systems to determine if the design criteria of the MSD's installation have been met and how to service anti-siphon systems and deal with the problem of a system blockage.
24.33	Provide further detail to the typical type two manually operated systems most common on recreational boats, commissioning and decommissioning, and routine servicing of the various systems.
24.34	Disassemble and inspect a typical Lectra San system by Raritan Engineering.
24.35	Design and construct a gray water system mock-up assuming there is no overboard discharge.
24.36	Inspect a vacuum-flush system and their specialized installation, design and service requirements.
24.37	Use of auxiliary power systems and gensets.
24.38	Installation, maintenance & repair of direct current generators.
24.39	Installation, maintenance & repair of alternate current generators.
24.40	Installation, maintenance & repair of governors.
24.41	Bow Thrusters, stabilizers, and stabilizing systems.
24.42	Discuss various types of thrusters.
24.43	How bow & stern thrusters operate.

24.44	Maintenance and repair of thruster systems.
24.45	Discuss various types of stabilizers & systems.
24.46	Define: Heave, pitch, yaw, sway, and roll.
24.47	Maintenance & repair of stabilizers & stabilizing systems.
24.48	Principles of air conditioning and refrigeration systems on marine vessels.
24.49	Discuss destruction of ozone by chlorine and HCFC refrigerants.
24.50	Understand the refrigeration cycle.
24.51	Determine EPA requirements for refrigeration.
24.52	Working with refrigeration evacuation and recovery equipment.
24.53	Troubleshooting refrigeration & A/C equipment.
24.54	Demonstrate Brazing, Swaging, and flaring copper piping.
24.55	Understanding Hydraulic Systems.
24.56	Describe the principle of Hydraulic systems.
24.57	Understanding hydraulic cylinders, actuators, and pressures.
24.58	Troubleshooting hydraulic systems.
24.59	Maintenance & repair of hydraulic systems.
24.60	Windlass anchor systems.
24.61	Describe types of windlass systems.
24.62	Describe components of a windlass system and how they are used: bitter end, bits gypsies/wildcats, and devil’s claw.
24.63	Installation, maintenance & repair of windlass systems.
24.64	Desalinization systems.
24.65	Describe different methods of desalinization.
24.66	Define the components of a desalinization systems.
24.67	Maintenance & repair of desalinization systems.

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)

SkillsUSA 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.

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.

Articulation

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

Program Length

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

Certificate Programs

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

Marine Electrician (0647060506) – 12 credit hours
Marine Propulsion Technician (0647060505) – 24 credit hours
Marine Systems Technician (0647060513) - 24 credit hours
Marine Technology (0647060512) – 34 credit hours

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

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: **Marine Propulsion Technician**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0647060505
Program Type	College Credit Certificate (CCC)
Standard Length	24 Credits
CTSO	SkillsUSA
SOC Codes (all applicable)	17-3023 – Electrical and Electronic Engineering Technicians 49-2093 – Electrical and Electronics Installers and Repairers, Transportation Equipment 49-2094 – Electrical and Electronics Repairers, Commercial and Industrial Equipment 49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles 49-2098 – Security and Fire Alarm Systems Installers 49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists 49-3051 – Motorboat Mechanics and Service Technicians 49-9071 – Maintenance and Repair Workers, General
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Marine Engineering, Management & Seamanship AAS degree program 0647060500.

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to vessel nomenclature, safety, installation, diagnosing and troubleshooting marine electronic devices and systems, the installation and operation of diesel and gasoline engines; troubleshooting for diesel and gasoline engines; and engine maintenance.

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

Standards

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

01.0 Perform basic shop practices.
02.0 Describe operational theory of (2) two and (4) four cycle engines - Diesel and Gasoline.
03.0 Use service manuals and parts references.
04.0 Remove and install engines.
05.0 Recondition and service engines.
06.0 Perform diagnosis service and repairs to all types of marine ignition systems.
07.0 Develop skills in electrical-electronic theory of operation and application.
08.0 Troubleshoot and repair fuel systems.
09.0 Service cooling systems.
10.0 Service exhaust systems.
11.0 Identify special marine principles.
12.0 Repair inboard drive systems.
13.0 Repair lower units.
14.0 Demonstrate appropriate communication skills.
15.0 Demonstrate appropriate math skills.
16.0 Demonstrate appropriate understanding of basic science.
17.0 Demonstrate and practice employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Marine Propulsion Technician**
CIP Number: **0647060505**
Program Length: **24 Credit Hours**
SOC Code(s): **17-3023, 49-2093, 49-2094, 49-2096, 49-2098, 49-3031, 49-3051, 49-9071**

This certificate program is part of the Marine Engineering, Management & Seamanship AAS degree program 0647060500. At the completion of this program, the student will be able to:	
01.0	Perform basic shop practices--The student will be able to:
01.01	Perform calculations using decimals and fractions to include subtraction, multiplication and division.
01.02	Change fractions to decimals and decimals to fractions.
01.03	Determine metric system measurements.
01.04	Comply with safety rules and regulations.
01.05	Operate hand tools safely and properly.
01.06	Set up and use power tools safely and properly.
01.07	Set up and use precision measuring tools.
01.08	Drill and remove broken studs and install helicoils.
01.09	Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
01.10	Install fasteners such as screws, bolts and keys; and utilize screw extractor, thread cutting tape and dies.
01.11	Locate and match electrical units by their symbols on a wiring diagram.
01.12	Draw performance charts and graphs on propeller selection and engine specifications.
02.0	Describe operational theory of (2) two and (4) four cycle engines diesel and gasoline--The student will be able to:
02.01	Distinguish between the characteristics of four-stroke cycle engine including diesel engines.
02.02	Identify basic engine parts.
02.03	Describe the functions of the crankshaft.
02.04	List the information which may be found on the engine nameplate.
02.05	Describe types of motion and simple machines and characteristics of energy.
02.06	Calculate problems using the formula for work, horsepower and torque.
02.07	Describe the main theoretical concept of heat engines.

02.08	Describe the process by which an internal combustion engine converts chemical energy into rotary motion.
02.09	Calculate problems using the formulas for engine cubic displacement and compression ratio.
02.10	Describe the principles of operation of four-and two-stroke cycle engines.
02.11	Identify the parts of a camshaft lobe-crankshaft lobe.
02.12	Describe valve timing and overlap procedures.
02.13	Identify types of valve arrangements.
02.14	Identify types of engine construction.
02.15	Describe piston engine operation, design loop charged.
02.16	Describe the operation of two- and four-stroke cycle engines to include diesel engines.
02.17	Distinguish different engine design by manufacturers.
02.18	Identify marine engine makeup and conversion from auto engines.
03.0	Use service manuals and parts references--The student will be able to:
03.01	Demonstrate use of multiple and single type shop service manual.
03.02	Demonstrate use of specification handbooks and tune up charts.
03.03	Demonstrate use of manufacturer parts catalogs.
03.04	Demonstrate use of microfiche.
03.05	Demonstrate use of marine engine installation manuals.
03.06	Demonstrate use of flat rate and service bulletins.
04.0	Remove and install engines--The student will be able to:
04.01	Disconnect engine, mounts, wiring and lines.
04.02	Operate hydraulic engine hoist.
04.03	Mount engine mounts, wiring and lines.
04.04	Reconnect engine mounts, wiring and lines.
04.05	Cut openings for different engine installations.
04.06	Mount jet drive type of engine.
04.07	Align inboard (gas and diesel) engines to manufacturers' specifications.
04.08	Mount and align stern drive to housing using manufacturers' special tools and manuals.
05.0	Recondition and service engines--The student will be able to:
05.01	Remove and replace power head.

05.02	Disassemble engine.
05.03	Clean engine parts for inspection.
05.04	Inspect and check for proper condition.
05.05	Remove and replace oil pump.
05.06	Remove and replace fuel pump.
05.07	Service a multi-piece crankshaft.
05.08	Replace connecting rods and bearings.
05.09	Grind valves and time valves.
05.10	Inspect and grind power head.
05.11	Remove and replace flywheel.
05.12	Remove and replace exhaust manifolds.
05.13	Perform cylinder compression test.
05.14	Perform engine tune up.
05.15	Perform operational inspection of engine lubrication system.
05.16	Remove and service piston ring and pistons.
05.17	Fit piston pins.
05.18	Inspect crankshaft, camshaft, connecting rods and piston assembly.
05.19	Torque power head and lower unit to specifications.
05.20	Hone cylinders to manufacturers' specifications.
06.0	Perform diagnosis service and repairs for all types of marine ignition systems--The student will be able to:
06.01	Diagnose, repair and replace malfunctions of ignition system components.
06.02	Set ignition timing.
06.03	Inspect secondary circuit lead wires, distributor and rotor measure resistance in secondary wires.
06.04	Inspect points and condensers of the primary circuit.
06.05	Overhaul distributors.
06.06	Analyze or adjust engine performance using engine analyzer devices.
06.07	Remove and replace spark plugs.
06.08	Adjust armature air gap.
06.09	Time the ignition system for O/B engines.

	06.10 Use specialized test equipment.
	06.11 Test CD type ignition systems.
	06.12 Describe differences between marine and automotive type ignition components.
	06.13 Observe safety practices in marine applications.
	06.14 Read and interpret manufacturers wire diagrams.
	06.15 Operate an engine dynamometer.
07.0	Develop skills in electrical-electronic theory of operation and application--The student will be able to:
	07.01 Apply Ohm's Law to series circuit.
	07.02 Apply Ohm's Law to parallel circuits.
	07.03 Apply Ohm's Law to series-parallel circuits.
	07.04 Perform continuity test.
	07.05 Diagnose and repair alternator.
	07.06 Diagnose and repair or replace charging system regulator.
	07.07 Service or replace battery cables and battery box.
	07.08 Diagnose, repair or replace starter.
	07.09 Diagnose and repair malfunctions in the cranking system.
	07.10 Perform operational inspection of lighting system.
	07.11 Measure voltage drops, current flow, resistance in a circuit or component with a multimeter.
	07.12 Repair or replace switches to include ignition switches.
	07.13 Repair or replace fuse block assembly.
	07.14 Locate and repair shorts and open circuits in wiring.
	07.15 Inspect and test windshield wiper motor, blades and arms.
	07.16 Inspect or replace rectifier.
	07.17 Replace diode assembly.
	07.18 Remove, replace and repair electrical remote control assembly.
	07.19 Service and install diesel and gasoline marine alarm systems.
08.0	Troubleshoot and repair fuel systems--The student will be able to:
	08.01 Identify fuel system components.
	08.02 Explain operation of fuel system and components.

08.03	Repair carburetion.
08.04	Repair gasoline injection systems.
08.05	Replace fuel system components.
08.06	Identify fuel systems malfunction.
08.07	Replace fuel filter.
08.08	Repair fuel lines.
08.09	Adjust carburetor.
08.10	Service automatic or manual choke.
08.11	Service fuel pump.
08.12	Analyze for foreign particles in fuel system.
08.13	Correct fuel tank installation.
08.14	Test engines fuel flow using manufacturers' procedures and test equipment.
08.15	Identify fuel and oil specification for outboard motors, four-cycle engines and diesel applications.
08.16	Repair and test diesel fuel injector nozzles.
08.17	Repair and test diesel fuel pumps.
08.18	Replace and adjust unit type injector or marine diesel engines.
08.19	Correct procedure and timing of fuel injector pumps.
08.20	Conduct diesel fuel pressure test.
08.21	Correct rack adjustment on diesel engines.
09.0	Service cooling systems--The student will be able to:
09.01	Check engine temperature.
09.02	Test thermostat.
09.03	Inspect and/or replace water pump.
09.04	Inspect and/or replace circulating water pump.
09.05	Pressure test cooling system.
09.06	Remove, clean and replace water cooling parts.
09.07	Inspect and repair heat exchanges on gasoline and marine diesel engine.
09.08	Inspect and repair marine keel coolers.
09.09	Identify different types of approved coolant used in marine closed cooling systems.

	09.10 Check engine block cooling passages for corrosion and build-up.
10.0	Service exhaust systems--The student will be able to:
	10.01 Remove, inspect and replace an exhaust housing.
	10.02 Remove, inspect and replace inner exhaust housing.
	10.03 Remove, inspect and replace seal.
	10.04 Remove, inspect and replace aft exhaust cover.
	10.05 Remove, inspect and replace rubber mount.
	10.06 Remove, inspect and replace clamp.
	10.07 Remove, inspect and replace mount cover.
	10.08 Remove, inspect and replace water tube.
	10.09 Inspect service turbo charger.
	10.10 Recommend correct exhaust tubing for different marine applications.
	10.11 Service marine water cooled exhaust systems.
	10.12 Determine back pressure by under stator exhaust applications.
11.0	Identify special marine principles--The student will be able to:
	11.01 Explain basic principles of thrust in marine applications.
	11.02 Explain basic principles of propulsion in marine applications.
	11.03 Explain correct propeller selection and performance.
	11.04 Identify types of hulls used in marine applications.
	11.05 Explain speed-length ratio and calculate hull speed and engine selection.
	11.06 Identify bow angle and its effect on performance.
	11.07 Perform dynamometer test on different horsepower engines.
	11.08 Perform test tank operations using manufacturer's test wheels.
	11.09 Perform sea trials.
	11.10 Identify transom heights and explain the effects on engine performance/speed/horsepower.
12.0	Repair inboard drive systems--The student will be able to:
	12.01 Inspect gear housing assembly.
	12.02 Determine fluid levels.
	12.03 Adjust gear linkages.

12.04	Torque mounting bolts.
12.05	Inspect vacuum shift controls.
12.06	Inspect drive shaft.
12.07	Lubricate universal joint.
12.08	Inspect gimbal bearing.
12.09	Inspect constant velocity joint.
12.10	Measure drive shaft angle and runout.
12.11	Replace power transmission system.
12.12	Rebuild power transmission.
12.13	Correctly apply manufacturers' procedures in shimming and adjusting operations.
13.0	Repair lower units--The student will be able to:
13.01	Lubricate lower unit.
13.02	Pressure and vacuum test lower unit.
13.03	Lubricate transom steering busing, cables, etc.
13.04	Inspect, clean and lubricate propeller shaft.
13.05	Inspect and install propeller.
13.06	Remove and replace magnets in lower unit.
13.07	Inspect, remove and replace vertical drive gear.
13.08	Remove, inspect and replace clutch dog.
13.09	Remove, inspect and replace clutch coils.
13.10	Remove, inspect and replace drive shaft pinion.
13.11	Remove, inspect and replace drive components.
13.12	Remove, inspect and replace lower unit seals.
13.13	Remove and replace swivel bracket.
13.14	Remove, inspect and replace forward and reverse driving gears.
13.15	Remove, inspect and replace drive shaft and components.
13.16	Remove, inspect and replace hydraulic pump, shaft rod end plunger.
13.17	Adjust trim tab.
13.18	Inspect and replace U-joints.

	13.19	Inspect and repair or replace lower unit lock.
	13.20	Remove, replace and repair tilt assemblies to include hydraulic tilt.
	13.21	Correctly shim lower units to engine manufacturer's specifications.
	13.22	Disassemble/reassemble stern drive gear cases.
	13.23	Disassemble/inspect/service/reassemble inboard marine transmissions both gasoline and diesel.
	13.24	Demonstrate the ability to analyze and solve problems, to do necessary research and to report the results in good form.
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	13.26	Develop an understanding and skill in testing and diagnosing marine engine service problems and to develop appreciation of the true value of testing equipment.
	13.27	Calculate torque and gear ratio.
	13.28	Compare and identify all types of gear arrangements.
	13.29	Explain operation theory of mechanical shifting, electric shifting, and hydroelectric shifting.
	13.30	Identify the major parts of these shifting mechanisms.
	13.31	Understand by examination the principles of marine propulsion propeller theory.
	13.32	Demonstrate an understanding of engine installation.
	13.33	Apply knowledge to disassemble and assembly of all marine transmissions.
	13.34	Handle lifting devices properly.
	13.35	Diagnose planetary gear principle of operation and theory.
14.0	Demonstrate appropriate communication skills--The student will be able to:	
	14.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	14.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
	14.03	Read and follow written and oral instructions.
	14.04	Answer and ask questions coherently and concisely.
	14.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
	14.06	Demonstrate appropriate telephone/communication skills.
15.0	Demonstrate appropriate math skills--The student will be able to:	
	15.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
	15.02	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
	15.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

	15.04	Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
	15.05	Demonstrate an understanding of federal, state and local taxes and their computation.
16.0	Demonstrate appropriate understanding of basic science--The student will be able to:	
	16.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	16.02	Draw conclusions or make inferences from data.
	16.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	16.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
17.0	Demonstrate employability skills--The student will be able to:	
	17.01	Conduct a job search.
	17.02	Secure information about a job.
	17.03	Identify documents which may be required when applying for a job interview.
	17.04	Complete a job application form correctly.
	17.05	Demonstrate competence in job interview techniques.
	17.06	Identify and adopt acceptable work habits.
	17.07	Demonstrate knowledge of how to make appropriate job changes.
	17.08	Demonstrate acceptable employee health habits.
	17.09	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200)

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)

SkillsUSA 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.

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.

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: **Marine Electrician**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0647060506
Program Type	College Credit Certificate (CCC)
Standard Length	12 Credits
CTSO	SkillsUSA
SOC Codes (all applicable)	17-3023 – Electrical and Electronic Engineering Technicians 49-2093 – Electrical and Electronics Installers and Repairers, Transportation Equipment 49-2094 – Electrical and Electronics Repairers, Commercial and Industrial Equipment 49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles 49-2098 – Security and Fire Alarm Systems Installers 49-9071 – Maintenance and Repair Workers, General
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Marine Engineering, Management & Seamanship AAS degree program 0647060500.

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to vessel nomenclature, safety, installation, diagnosing and troubleshooting marine electronic devices and systems.

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

Standards

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

01.0 Perform basic shop practices.
02.0 Use service manuals and parts references.
03.0 Develop skills in electrical-electronic theory of operation and application.
04.0 Demonstrate appropriate communication skills.
05.0 Demonstrate appropriate math skills.
06.0 Demonstrate appropriate understanding of basic science.
07.0 Demonstrate and practice employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Marine Electrician**
CIP Number: **0647060506**
Program Length: **12 Credit Hours**
SOC Code(s): **17-3023, 49-2093, 49-2094, 49-2096, 49-2098, 49-9071**

This certificate program is part of the Marine Engineering, Management & Seamanship AAS degree program 0647060500. At the completion of this program, the student will be able to:	
01.0	Perform basic shop practices--The student will be able to:
01.01	Perform calculations using decimals and fractions to include subtraction, multiplication and division.
01.02	Change fractions to decimals and decimals to fractions.
01.03	Determine metric system measurements.
01.04	Comply with safety rules and regulations.
01.05	Operate hand tools safely and properly.
01.06	Set up and use power tools safely and properly.
01.07	Set up and use precision measuring tools.
01.08	Drill and remove broken studs and install helicoils.
01.09	Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
01.10	Install fasteners such as screws, bolts and keys; and utilize screw extractor, thread cutting tape and dies.
01.11	Locate and match electrical units by their symbols on a wiring diagram.
01.12	Draw performance charts and graphs on propeller selection and engine specifications.
02.0	Use service manuals and parts references--The student will be able to:
02.01	Demonstrate use of multiple and single type shop service manual.
02.02	Demonstrate use of specification handbooks and tune up charts.
02.03	Demonstrate use of manufacturer parts catalogs.
02.04	Demonstrate use of microfiche.
02.05	Demonstrate use of marine engine installation manuals.
02.06	Demonstrate use of flat rate and service bulletins.
03.0	Develop skills in electrical-electronic theory of operation and application--The student will be able to:

03.01	Apply Ohm's Law to series circuit.
03.02	Apply Ohm's Law to parallel circuits.
03.03	Apply Ohm's Law to series-parallel circuits.
03.04	Perform continuity test.
03.05	Diagnose and repair alternator.
03.06	Diagnose and repair or replace charging system regulator.
03.07	Service or replace battery cables and battery box.
03.08	Diagnose, repair or replace starter.
03.09	Diagnose and repair malfunctions in the cranking system.
03.10	Perform operational inspection of lighting system.
03.11	Measure voltage drops, current flow, resistance in a circuit or component with a multimeter.
03.12	Repair or replace switches to include ignition switches.
03.13	Repair or replace fuse block assembly.
03.14	Locate and repair shorts and open circuits in wiring.
03.15	Inspect and test windshield wiper motor, blades and arms.
03.16	Inspect or replace rectifier.
03.17	Replace diode assembly.
03.18	Remove, replace and repair electrical remote control assembly.
03.19	Service and install diesel and gasoline marine alarm systems.
04.0	Demonstrate appropriate communication skills--The student will be able to:
04.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
04.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
04.03	Read and follow written and oral instructions.
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	05.05	Demonstrate an understanding of federal, state and local taxes and their computation.
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	06.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	06.02	Draw conclusions or make inferences from data.
	06.03	Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	06.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
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	07.01	Conduct a job search.
	07.02	Secure information about a job.
	07.03	Identify documents which may be required when applying for a job interview.
	07.04	Complete a job application form correctly.
	07.05	Demonstrate competence in job interview techniques.
	07.06	Identify and adopt acceptable work habits.
	07.07	Demonstrate knowledge of how to make appropriate job changes.
	07.08	Demonstrate acceptable employee health habits.
	07.09	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200)

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.

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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.

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: **Marine Technology**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0647060512
Program Type	College Credit Certificate (CCC)
Standard Length	34 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3051 – Motorboat Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Marine Engineering, Management & Seamanship AAS degree program (0647060500).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to installation and operation of diesel and gasoline engines; troubleshooting for diesel and gasoline engines; engine maintenance; propeller selection; and corrosion control.

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

Standards

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

01.0 Perform basic shop practices.
02.0 Describe operational theory of (2) two and (4) four cycle engines - Diesel and Gasoline.
03.0 Use service manuals and parts references.
04.0 Perform basic welding skills.
05.0 Remove and install engines.
06.0 Recondition and service engines.
07.0 Perform diagnosis service and repairs to all types of marine ignition systems.
08.0 Develop skills in electrical-electronic theory of operation and application.
09.0 Troubleshoot and repair fuel systems.
10.0 Service cooling systems.
11.0 Service exhaust systems.
12.0 Repair inboard drive systems.
13.0 Rig boats.
14.0 Repair lower units.
15.0 Perform corrosion experiments and understand corrosion control.

Florida Department of Education
Student Performance Standards

Program Title: **Marine Technology**
CIP Number: **0647060512**
Program Length: **34 credit hours**
SOC Code(s): **49-3051**

This certificate program is part of the Marine Engineering, Management & Seamanship AAS degree program (0647060500). At the completion of this program, the student will be able to:	
01.0	Perform basic shop practices--The student will be able to:
01.01	Perform calculations using decimals and fractions to include subtraction, multiplication and division.
01.02	Change fractions to decimals and decimals to fractions.
01.03	Determine metric system measurements.
01.04	Comply with safety rules and regulations.
01.05	Operate hand tools safely and properly.
01.06	Set up and use power tools safely and properly.
01.07	Set up and use precision measuring tools.
01.08	Drill and remove broken studs and install helicoils.
01.09	Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
01.10	Install fasteners such as screws, bolts and keys; and utilize screw extractor, thread cutting tape and dies.
01.11	Locate and match electrical units by their symbols on a wiring diagram.
01.12	Draw performance charts and graphs on propeller selection and engine specifications.
02.0	Describe operational theory of (2) two and (4) four cycle engines diesel and gasoline--The student will be able to:
02.01	Distinguish between the characteristics of four-stroke cycle engine including diesel engines.
02.02	Identify basic engine parts.
02.03	Describe the functions of the crankshaft.
02.04	List the information which may be found on the engine nameplate.
02.05	Describe types of motion and simple machines and characteristics of energy.
02.06	Calculate problems using the formula for work, horsepower and torque.
02.07	Describe the main theoretical concept of heat engines.

02.08	Describe the process by which an internal combustion engine converts chemical energy into rotary motion.
02.09	Calculate problems using the formulas for engine cubic displacement and compression ratio.
02.10	Describe the principles of operation of four-and two-stroke cycle engines.
02.11	Identify the parts of a camshaft lobe-crankshaft lobe.
02.12	Describe valve timing and overlap procedures.
02.13	Identify types of valve arrangements.
02.14	Identify types of engine construction.
02.15	Describe piston engine operation, design loop charged.
02.16	Describe the operation of two- and four-stroke cycle engines to include diesel engines.
02.17	Distinguish different engine design by manufacturers.
02.18	Identify marine engine makeup and conversion from auto engines.
03.0	Use service manuals and parts references--The student will be able to:
03.01	Demonstrate use of multiple and single type shop service manual.
03.02	Demonstrate use of specification handbooks and tune up charts.
03.03	Demonstrate use of manufacturer parts catalogs.
03.04	Demonstrate use of microfiche.
03.05	Demonstrate use of marine engine installation manuals.
03.06	Demonstrate use of flat rate and service bulletins.
04.0	Perform basic welding skills--The student will be able to:
04.01	Set up and operate gas and electric various welding equipment.
04.02	Burn (cut) material using mechanized or hand-held gas torch equipment.
04.03	Prepare metal surfaces for welding.
04.04	Identify type of metal to be welded.
04.05	Braze metal frames and structures.
04.06	Fabricate metal frames and structures.
04.07	Pressure test weldment.
04.08	Perform plug weld technique.
04.09	Gas weld ferrous metals in all positions with or without filler rod.
04.10	Perform TIG welding in aluminum and stainless steel.

	04.11 Use and maintain TIG welding equipment.
	04.12 Perform MIG type welding on various metals.
	04.13 Use welding principles to heat and remove broken screws and bolts.
05.0	Remove and install engines--The student will be able to:
	05.01 Disconnect engine, mounts, wiring and lines.
	05.02 Operate hydraulic engine hoist.
	05.03 Mount engine mounts, wiring and lines.
	05.04 Reconnect engine mounts, wiring and lines.
	05.05 Cut openings for different engine installations.
	05.06 Mount jet drive type of engine.
	05.07 Align inboard (gas and diesel) engines to manufacturers' specifications.
	05.08 Mount and align stern drive to housing using manufacturers' special tools and manuals.
06.0	Recondition and service engines--The student will be able to:
	06.01 Remove and replace power head.
	06.02 Disassemble engine.
	06.03 Clean engine parts for inspection.
	06.04 Inspect and check for proper condition.
	06.05 Remove and replace oil pump.
	06.06 Remove and replace fuel pump.
	06.07 Service a multi-piece crankshaft.
	06.08 Replace connecting rods and bearings.
	06.09 Grind valves and time valves.
	06.10 Inspect and grind power head.
	06.11 Remove and replace flywheel.
	06.12 Remove and replace exhaust manifolds.
	06.13 Perform cylinder compression test.
	06.14 Perform engine tune up.
	06.15 Perform operational inspection of engine lubrication system.
	06.16 Remove and service piston ring and pistons.

	06.17 Fit piston pins.
	06.18 Inspect crankshaft, camshaft, connecting rods and piston assembly.
	06.19 Torque power head and lower unit to specifications.
	06.20 Hone cylinders to manufacturers' specifications.
07.0	Perform diagnosis service and repairs for all types of marine ignition systems--The student will be able to:
	07.01 Diagnose, repair and replace malfunctions of ignition system components.
	07.02 Set ignition timing.
	07.03 Inspect secondary circuit lead wires, distributor and rotor measure resistance in secondary wires.
	07.04 Inspect points and condensers of the primary circuit.
	07.05 Overhaul distributors.
	07.06 Analyze or adjust engine performance using engine analyzer devices.
	07.07 Remove and replace spark plugs.
	07.08 Adjust armature air gap.
	07.09 Time the ignition system for O/B engines.
	07.10 Use specialized test equipment.
	07.11 Test CD type ignition systems.
	07.12 Describe differences between marine and automotive type ignition components.
	07.13 Observe safety practices in marine applications.
	07.14 Read and interpret manufacturers wire diagrams.
	07.15 Operate an engine dynamometer.
08.0	Develop skills in electrical-electronic theory of operation and application--The student will be able to:
	08.01 Apply Ohm's Law to series circuit.
	08.02 Apply Ohm's Law to parallel circuits.
	08.03 Apply Ohm's Law to series-parallel circuits.
	08.04 Perform continuity test.
	08.05 Diagnose and repair alternator.
	08.06 Diagnose and repair or replace charging system regulator.
	08.07 Service or replace battery cables and battery box.
	08.08 Diagnose, repair or replace starter.

08.09	Diagnose and repair malfunctions in the cranking system.
08.10	Perform operational inspection of lighting system.
08.11	Measure voltage drops, current flow, resistance in a circuit or component with a multimeter.
08.12	Repair or replace switches to include ignition switches.
08.13	Repair or replace fuse block assembly.
08.14	Locate and repair shorts and open circuits in wiring.
08.15	Inspect and test windshield wiper motor, blades and arms.
08.16	Inspect or replace rectifier.
08.17	Replace diode assembly.
08.18	Remove, replace and repair electrical remote control assembly.
08.19	Service and install diesel and gasoline marine alarm systems.
09.0	Troubleshoot and repair fuel systems--The student will be able to:
09.01	Identify fuel system components.
09.02	Explain operation of fuel system and components.
09.03	Repair carburetion.
09.04	Repair gasoline injection systems.
09.05	Replace fuel system components.
09.06	Identify fuel systems malfunction.
09.07	Replace fuel filter.
09.08	Repair fuel lines.
09.09	Adjust carburetor.
09.10	Service automatic or manual choke.
09.11	Service fuel pump.
09.12	Analyze for foreign particles in fuel system.
09.13	Correct fuel tank installation.
09.14	Test engines fuel flow using manufacturers' procedures and test equipment.
09.15	Identify fuel and oil specification for outboard motors, four-cycle engines and diesel applications.
09.16	Repair and test diesel fuel injector nozzles.
09.17	Repair and test diesel fuel pumps.

	09.18 Replace and adjust unit type injector or marine diesel engines.
	09.19 Correct procedure and timing of fuel injector pumps.
	09.20 Conduct diesel fuel pressure test.
	09.21 Correct rack adjustment on diesel engines.
10.0	Service cooling systems--The student will be able to:
	10.01 Check engine temperature.
	10.02 Test thermostat.
	10.03 Inspect and/or replace water pump.
	10.04 Inspect and/or replace circulating water pump.
	10.05 Pressure test cooling system.
	10.06 Remove, clean and replace water cooling parts.
	10.07 Inspect and repair heat exchanges on gasoline and marine diesel engine.
	10.08 Inspect and repair marine keel coolers.
	10.09 Identify different types of approved coolant used in marine closed cooling systems.
	10.10 Check engine block cooling passages for corrosion and build-up.
11.0	Service exhaust systems--The student will be able to:
	11.01 Remove, inspect and replace an exhaust housing.
	11.02 Remove, inspect and replace inner exhaust housing.
	11.03 Remove, inspect and replace seal.
	11.04 Remove, inspect and replace aft exhaust cover.
	11.05 Remove, inspect and replace rubber mount.
	11.06 Remove, inspect and replace clamp.
	11.07 Remove, inspect and replace mount cover.
	11.08 Remove, inspect and replace water tube.
	11.09 Inspect service turbo charger.
	11.10 Recommend correct exhaust tubing for different marine applications.
	11.11 Service marine water cooled exhaust systems.
	11.12 Determine back pressure by under stator exhaust applications.
12.0	Repair inboard drive systems--The student will be able to:

12.01	Inspect gear housing assembly.
12.02	Determine fluid levels.
12.03	Adjust gear linkages.
12.04	Torque mounting bolts.
12.05	Inspect vacuum shift controls.
12.06	Inspect drive shaft.
12.07	Lubricate universal joint.
12.08	Inspect gimbal bearing.
12.09	Inspect constant velocity joint.
12.10	Measure drive shaft angle and runout.
12.11	Replace power transmission system.
12.12	Rebuild power transmission.
12.13	Correctly apply manufacturers' procedures in shimming and adjusting operations.
13.0	Rig boats--The student will be able to:
13.01	Install engine steering components.
13.02	Install and service electrical wiring harness.
13.03	Install and adjust trim tabs on outboard and stern drivers, both mechanical and hydraulic type.
13.04	Identify sea drive installation.
13.05	List methods of outboard motor transom bracket installation.
13.06	Describe and illustrate correct lighting/wiring procedures.
13.07	Install engine remote control by manufacturers' specifications.
14.0	Repair lower units--The student will be able to:
14.01	Lubricate lower unit.
14.02	Pressure and vacuum test lower unit.
14.03	Lubricate transom steering busing, cables, etc.
14.04	Inspect, clean and lubricate propeller shaft.
14.05	Inspect and install propeller.
14.06	Remove and replace magnets in lower unit.
14.07	Inspect, remove and replace vertical drive gear.

14.08	Remove, inspect and replace clutch dog.
14.09	Remove, inspect and replace clutch coils.
14.10	Remove, inspect and replace drive shaft pinion.
14.11	Remove, inspect and replace drive components.
14.12	Remove, inspect and replace lower unit seals.
14.13	Remove and replace swivel bracket.
14.14	Remove, inspect and replace forward and reverse driving gears.
14.15	Remove, inspect and replace drive shaft and components.
14.16	Remove, inspect and replace hydraulic pump, shaft rod end plunger.
14.17	Adjust trim tab.
14.18	Inspect and replace U-joints.
14.19	Inspect and repair or replace lower unit lock.
14.20	Remove, replace and repair tilt assemblies to include hydraulic tilt.
14.21	Correctly shim lower units to engine manufacturer's specifications.
14.22	Disassemble/reassemble stern drive gear cases.
14.23	Disassemble/inspect/service/reassemble inboard marine transmissions both gasoline and diesel.
14.24	Demonstrate the ability to analyze and solve problems, to do necessary research and to report the results in good form.
14.25	Develop individual responsibility for work done in the lab.
14.26	Develop an understanding and skill in testing and diagnosing marine engine service problems and to develop appreciation of the true value of testing equipment.
14.27	Calculate torque and gear ratio.
14.28	Compare and identify all types of gear arrangements.
14.29	Explain operation theory of mechanical shifting, electric shifting, and hydroelectric shifting.
14.30	Identify the major parts of these shifting mechanisms.
14.31	Understand by examination the principles of marine propulsion propeller theory.
14.32	Demonstrate an understanding of engine installation.
14.33	Apply knowledge to disassemble and assembly of all marine transmissions.
14.34	Handle lifting devices properly.
14.35	Diagnose planetary gear principle of operation and theory.

15.0	Perform corrosion experiments and understand corrosion control--The student will be able to:
15.01	Identify galvanic corrosion.
15.02	Explain the use and function of the galvanic series.
15.03	Understand corrosion and its prevention.
15.04	List chemical equation and symbols.
15.05	Demonstrate a basic knowledge of electricity.
15.06	Identify maintenance of boat hulls and when to determine its time.
15.07	Identify difference in corrosion and cavitation.
15.08	Demonstrate by lab experiments cause of corrosion.
15.09	List in test form, actual lab reports in the field.
15.10	Distinguish fatigue corrosion.
15.11	Understand electrolysis and its causes of corrosions.
15.12	Correctly prepare metals for protective coatings.
15.13	Identify protective coatings.
15.14	Practice safe lab experiences with dangerous chemicals.
15.15	Demonstrate theory of operation of impress currents.
15.16	Show proper installation procedure of impress current unit onboard ship.
15.17	Maintain records and diagnose impress current failure.
15.18	Write report analysis on corrosion in our environment.
15.19	Identify non-metallic corrosion.
15.20	Define special tools used in the maintenance and testing of sacrificial anodes.
15.21	Understand acrylic and styrene copolymer coating.
15.22	List causes of stray current corrosion.

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)

SkillsUSA 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.

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.

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: **Marine Systems Technician**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0647060513
Program Type	College Credit
Standard Length	24 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2093 – Electrical and Electronics Installers and Repairers, Transportation Equipment 49-2094 – Electrical and Electronics Repairers, Commercial and Industrial Equipment 49-2096 – Electronic Equipment Installers and Repairers, Motor Vehicles 49-2098 – Security and Fire Alarm Systems Installers 49-9071 – Maintenance and Repair Workers, General
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Marine Engineering, Management & Seamanship AAS degree program 0647060500.

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to installation and operation; propeller selection; corrosion control; fiberglass hull repair; vessel nomenclature; safety, installation, diagnosing and troubleshooting marine electronic devices and systems including MSD, A/C & Refrigeration, desalinization systems, windless, hydraulics, fire suppression, and CNG & LPG systems.

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

Standards

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

01.0 Perform basic shop practices.
02.0 Use service manuals and parts references.
03.0 Develop skills in electrical-electronic theory of operation and application.
04.0 Identify special marine principles.
05.0 Perform corrosion experiments and understand corrosion control.
06.0 Apply fiberglass construction and maintenance procedures.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate appropriate math skills.
09.0 Demonstrate appropriate understanding of basic science.
10.0 Demonstrate and practice employability skills.
11.0 Develop skills in Auxiliary Systems.

Florida Department of Education
Student Performance Standards

Program Title: **Marine Systems Technician**
CIP Numbers: **0647060513**
Program Length: **24 credit hours**
SOC Code(s): **49-2093, 49-2094, 49-2096, 49-2098, 49-9071**

This certificate program is part of the Transportation, Distribution and Logistics AAS degree program 0647060500. At the completion of this program, the student will be able to:	
01.0	Perform basic shop practices--The student will be able to:
01.01	Perform calculations with square roots and percentage.
01.02	Change fractions to decimals and decimals to fractions.
01.03	Understand the basic concepts of force, work, power, and motion
01.04	Determine metric system measurements.
01.05	Comply with safety rules and regulations.
01.06	Understand the basic concepts of technical drawing including orthographic projections, isometric, schematics, and measurements.
01.07	Understand the concept of friction and the different types of mechanical friction.
01.08	Operate hand tools safely and properly.
01.09	Set up and use power tools safely and properly.
01.10	Set up and use precision measuring tools.
01.11	Drill and remove broken studs and install helicoils.
01.12	Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
01.13	Install fasteners such as screws, bolts and keys; and utilize screw extractor, thread cutting tape and dies.
01.14	Locate and match electrical units by their symbols on a wiring diagram.
01.15	Draw performance charts and graphs on propeller selection and engine specifications.
02.0	Use service manuals and parts references--The student will be able to:
02.01	Demonstrate use of multiple and single type shop service manual.
02.02	Demonstrate use of specification handbooks and tune up charts.
02.03	Demonstrate use of manufacturer parts catalogs.
02.04	Demonstrate use of marine engine installation manuals.

	02.05 Demonstrate use of flat rate and service bulletins.
	02.06 Apply processes to create quotes and estimates, which include, but are not limited to, parts and labor.
03.0	Develop skills in electrical-electronic theory of operation and application--The student will be able to:
	03.01 Apply Ohm's Law to series circuit.
	03.02 Apply Ohm's Law to parallel circuits.
	03.03 Apply Ohm's Law to series-parallel circuits.
	03.04 Perform continuity test.
	03.05 Diagnose and repair alternator.
	03.06 Diagnose and repair or replace charging system regulator.
	03.07 Service or replace battery cables and battery box.
	03.08 Diagnose, repair or replace starter.
	03.09 Diagnose and repair malfunctions in the cranking system.
	03.10 Perform operational inspection of lighting system.
	03.11 Measure voltage drops, current flow, resistance in a circuit or component with a multimeter.
	03.12 Repair or replace switches to include ignition switches.
	03.13 Repair or replace fuse block assembly.
	03.14 Locate and repair shorts and open circuits in wiring.
	03.15 Inspect or replace rectifier.
	03.16 Replace diode assembly.
	03.17 Remove, replace and repair electrical remote control assembly.
	03.18 Service and install diesel and gasoline marine alarm systems.
04.0	Identify special marine principles--The student will be able to:
	04.01 Explain basic principles of thrust in marine applications.
	04.02 Explain basic principles of propulsion in marine applications.
	04.03 Explain correct propeller selection and performance.
	04.04 Identify types of hulls used in marine applications.
	04.05 Explain speed-length ratio and calculate hull speed and engine selection.
	04.06 Identify bow angle and its effect on performance.
	04.07 Identify transom heights and explain the effects on engine performance/speed/horsepower.

05.0	Perform corrosion experiments and understand corrosion control--The student will be able to:
05.01	Identify galvanic corrosion.
05.02	Explain the use and function of the galvanic series.
05.03	Understand corrosion and its prevention.
05.04	List chemical equation and symbols.
05.05	Demonstrate a basic knowledge of electricity.
05.06	Identify maintenance of boat hulls and when to determine its time.
05.07	Identify difference in corrosion and cavitation.
05.08	Demonstrate by lab experiments cause of corrosion.
05.09	List in test form, actual lab reports in the field.
05.10	Distinguish fatigue corrosion.
05.11	Understand electrolysis and its causes of corrosions.
05.12	Correctly prepare metals for protective coatings.
05.13	Identify protective coatings.
05.14	Practice safe lab experiences with dangerous chemicals.
05.15	Demonstrate theory of operation of impress currents.
05.16	Show proper installation procedure of impress current unit onboard ship.
05.17	Maintain records and diagnose impress current failure.
05.18	Write report analysis on corrosion in our environment.
05.19	Identify non-metallic corrosion.
05.20	Define special tools used in the maintenance and testing of sacrificial anodes.
05.21	Understand acrylic and styrene copolymer coating.
05.22	List causes of stray current corrosion.
06.0	Apply fiberglass construction and maintenance procedures--The student will be able to:
06.01	Describe safe handling procedures and care of fiberglass resins and materials.
06.02	Apply mixture methods of resins, coal tars, gel coat and paints.
06.03	Describe fiberglass boat manufacturing concepts.
06.04	Prepare a mold for casting a fiberglass hull.
06.05	Describe installation procedures of decks and gunwale.

	06.06 Repair damaged fiberglass hulls.
	06.07 Apply modern methods of maintaining new and old fiberglass hulls.
	06.08 Demonstrate advance methods of boat building and the manufacturing of fiberglass accessories.
07.0	Demonstrate appropriate communication skills--The student will be able to:
	07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
	07.03 Read and follow written and oral instructions.
	07.04 Answer and ask questions coherently and concisely.
	07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
	07.06 Demonstrate appropriate telephone/communication skills.
08.0	Demonstrate appropriate math skills--The student will be able to:
	08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
	08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
	08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
	08.05 Demonstrate an understanding of federal, state and local taxes and their computation.
09.0	Demonstrate appropriate understanding of basic science--The student will be able to:
	09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
	09.02 Draw conclusions or make inferences from data.
	09.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
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 which may be required when applying for a job interview.
	10.04 Complete a job application form correctly.
	10.05 Demonstrate competence in job interview techniques.
	10.06 Identify and adopt acceptable work habits.

	10.07	Demonstrate knowledge of how to make appropriate job changes.
	10.08	Demonstrate acceptable employee health habits.
	10.09	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200)
11.0	Develop skills in Auxiliary systems--The student will be able to:	
	11.01	Familiarize with fire protection systems.
	11.02	Compare the Code of Federal Regulations (CFR) to ABYC A-4 as it applies to recreational craft and firefighting equipment.
	11.03	Discuss extinguishing agent characteristics at length and EPA mandates as they apply to Halon gas.
	11.04	Practice measuring engine room compartments and tankage volumes to determine net compartment volume and correct sizing of extinguishing agent bottle systems.
	11.05	Inspect engine rooms on boats and "spec out" a design for a permanently installed automatic system to include a full system layout with wiring schematic.
	11.06	Install and service on-board liquefied petroleum gas and compressed natural gas systems.
	11.07	Identify the differences between LPG and CNG gasses.
	11.08	Inspect CO detectors and review standard installation procedures with live units.
	11.09	Practice assembling a typical LPG system.
	11.10	Inspect approved appliances and identify the features that make them Standards compliant.
	11.11	Inspect examples of all of the systems and devices covered and identify the key points mentioned within the respective standards.
	11.12	Compare the differences between global LPG installation Standards and ABYC Standards.
	11.13	Install and Repair Piping and Plumbing/Potable Water Systems.
	11.14	Drill and prepare cored composite hull for installation of a seacock and learn the importance of isolation of metallic thru-hull fittings on aluminum and steel vessels.
	11.15	Inspect bilge pump and scupper installations on a variety of boats in the IYRS collection to determine compliance with the two ABYC standards.
	11.16	Design and build a potable hot and cold water system mock up to include a pressurized system.
	11.17	Inspect gray water systems on new boats and then design a system based on equipment manufacturer’s recommendations, building a small mockup in the lab.
	11.18	Practice the procedures necessary to properly decommission a potable water system after discussing the proper procedures for commissioning and decommissioning on board plumbing systems.
	11.19	Familiarized with specific information regarding onboard tankage for fuel, water and waste.
	11.20	Review ABYC Standards and USCG Federal Regulations as they apply to Gasoline and Diesel Fuel tank design and installations.
	11.21	Recognize potable water storage tank requirements and ABYC Standard H-23, Potable Water Systems.
	11.22	Identify issues related to waste holding tanks and cover best industry practices for their design and installation.

11.23	Learn to troubleshoot and repair tank level gauge problems.
11.24	Familiarize the student with a variety of steering system types available for power and sailing craft.
11.25	Review basic hydraulic principles as applied to steering systems, component placement and Bleeding procedures as specified by the various vendors.
11.26	Review ABYC Standard P-21, Manual Hydraulic Steering Systems.
11.27	Practice selecting a system for several hypothetical boat types.
11.28	Practice steering system maintenance and adjustment procedures on steering system mock-ups.
11.29	Examine the three ABYC Standards that address steering or propulsion control systems, P-22, Steering Wheels, P-23 Steering and Propulsion Controls for Jet Boats, and P-24 Electric/Electronic Propulsion Control Systems.
11.30	Demonstrate knowledge of Federal and local regulations related to waste water systems.
11.31	Identify Federal Laws as they apply to marine sanitation systems as installed on boats and compile a written report on regional and local laws as they apply to marine sanitation devices and overboard discharge of gray water and black water.
11.32	Inspect systems to determine if the design criteria of the MSD's installation have been met and how to service anti-siphon systems and deal with the problem of a system blockage.
11.33	Provide further detail to the typical type two manually operated systems most common on recreational boats, commissioning and decommissioning, and routine servicing of the various systems.
11.34	Disassemble and inspect a typical Lectra San system by Raritan Engineering.
11.35	Design and construct a gray water system mock-up assuming there is no overboard discharge.
11.36	Inspect a vacuum-flush system and their specialized installation, design and service requirements.
11.37	Use of auxiliary power systems and gensets.
11.38	Installation, maintenance & repair of direct current generators.
11.39	Installation, maintenance & repair of alternate current generators.
11.40	Installation, maintenance & repair of governors.
11.41	Bow Thrusters, stabilizers, and stabilizing systems.
11.42	Discuss various types of thrusters.
11.43	How bow & stern thrusters operate.
11.44	Maintenance and repair of thruster systems.
11.45	Discuss various types of stabilizers & systems.
11.46	Define: Heave, pitch, yaw, sway, and roll.
11.47	Maintenance & repair of stabilizers & stabilizing systems.
11.48	Principles of air conditioning and refrigeration systems on marine vessels.
11.49	Discuss destruction of ozone by chlorine and HCFC refrigerants.

11.50	Understand the refrigeration cycle.
11.51	Determine EPA requirements for refrigeration.
11.52	Working with refrigeration evacuation and recovery equipment.
11.53	Troubleshooting refrigeration & A/C equipment.
11.54	Demonstrate Brazing, Swaging, and flaring copper piping.
11.55	Understanding Hydraulic Systems.
11.56	Describe the principle of Hydraulic systems.
11.57	Understanding hydraulic cylinders, actuators, and pressures.
11.58	Troubleshooting hydraulic systems.
11.59	Maintenance & repair of hydraulic systems.
11.60	Windlass anchor systems.
11.61	Describe types of windlass systems.
11.62	Describe components of a windlass system and how they are used: bitter end, bits gypsies/wildcats, and devil's claw.
11.63	Installation, maintenance & repair of windlass systems.
11.64	Desalinization systems.
11.65	Describe different methods of desalinization.
11.66	Define the components of a desalinization systems.
11.67	Maintenance & repair of desalinization systems.

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.

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Additional Resources

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Florida Department of Education
Curriculum Framework

Program Title: **Commercial Pilot**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0649010202
Program Type	College Credit Certificate (CCC)
Standard Length	24 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-2012 – Commercial Pilots
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Professional Pilot Technology AS degree program (1649010200).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to communications skills, employability skills, safe and efficient work practices, FAA pilot certification procedures, aircraft systems and components, flight safety, and instrumentation. This program focuses on specific, transferable skills. It stresses understanding and demonstration of the following elements of the commercial pilot industry: flight planning, managing commercial flight operations, flight safety and environmental issues.

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

Standards

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

01.0 Demonstrate an understanding of safe and effective work practices.
02.0 Demonstrate an understanding of fundamentals of flight.
03.0 Understand and explain pertinent Federal Aviation Administration Regulations.
04.0 Demonstrate understanding of meteorology.
05.0 Demonstrate knowledge of aircraft communications equipment.
06.0 Demonstrate knowledge and an understanding of aircraft propulsion, and associated systems.
07.0 Demonstrate an understanding of navigation systems and procedures.
08.0 Demonstrate flight planning skills.

Florida Department of Education
Student Performance Standards

Program Title: **Commercial Pilot**
CIP Number: **0649010202**
Program Length: **24 credit hours**
SOC Code(s): **53-2012**

This certificate program is part of the Professional Pilot Technology AS degree program (1649010200). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of safe and effective work practices--The student will be able to:
01.01	Demonstrate an awareness and understanding of health and safety hazards, prevention and correction of environmental problems and know the solutions unique to the industry.
01.02	Demonstrate an awareness and understanding of fueling operations.
01.03	Demonstrate an understanding of situational awareness related to operational hazards.
01.04	Demonstrate an awareness of fire hazards, and awareness of proper techniques to control and extinguish fires.
01.05	Demonstrate an awareness and understanding for the need of safety devices, controls, guards and equipment.
02.0	Demonstrate an understanding of fundamentals of flight--The student will be able to:
02.01	Name and compare the four forces of flight.
02.02	Describe an airfoil.
02.03	Explain how lift is produced.
02.04	Discuss how and why an airplane stalls and spins.
02.05	Describe and explain how pitot/static, vacuum, pressure, and engine instruments work.
02.06	Explain factors affecting aircraft design, performance, and operation.
02.07	Describe and explain how advanced avionics systems work.
03.0	Understand and explain Federal Aviation Administration Regulations--The student will be able to:
03.01	Explain relevant portions of Parts 1, 61, 91, 110, 119, 121, 135, 141 and NTSB 830 of the Federal Aviation Regulations.
04.0	Demonstrate understanding of meteorology--The student will be able to:
04.01	Describe the composition, circulation and stability of the atmosphere.
04.02	Demonstrate an understanding of air mass development, the movement of fronts and their effect on aviation.
04.03	Demonstrate an awareness of weather hazards to aviation and an understanding of how to avoid them.
04.04	Demonstrate the ability to access weather information prior to and during flights through a variety of media.

	04.05	Interpret printed reports, forecasts and graphic weather products.
05.0	Demonstrate knowledge of aircraft communication equipment--The student will be able to:	
	05.01	Use and explain aircraft voice communication equipment.
	05.02	Explain function and use of ELT's, voice recorders, and other emergency communication systems.
	05.03	Demonstrate use of proper phraseology in ATC communications.
	05.04	Discuss uses and limitations of portable transceivers.
	05.05	Demonstrate use of phonetic alphabet.
06.0	Demonstrate knowledge and understanding of aircraft propulsion and associated systems--The student will be able to:	
	06.01	Describe and identify reciprocating and turbine engine components.
	06.02	Describe a typical lubrication system.
	06.03	Describe a typical magneto ignition system, including proper magneto checks.
	06.04	Describe the difference between a normally aspirated engine and one that is supercharged or turbocharged.
	06.05	Demonstrate basic operation of an aircraft engine, including proper interpretation of instruments and use of appropriate engine controls.
07.0	Demonstrate an understanding of navigation systems and procedures--The student will be able to:	
	07.01	Define radio navigation using both conventional and advanced avionics.
	07.02	Explain the magnetic compass.
	07.03	Describe and demonstrate use of VOR equipment and navigation.
	07.04	Describe and demonstrate use of GPS equipment and navigation.
	07.05	Explain DME, GPS, and RNAV principles.
	07.06	Demonstrate the use of a flight computer.
	07.07	Interpret sectional charts.
	07.08	Interpret en route and terminal charts and approach plates.
	07.09	Explain lost communications emergency procedures under VFR and IFR.
	07.10	Read and interpret aircraft performance charts.
	07.11	Plot and explain a cross-country course.
	07.12	Describe the FAA national airspace system.
	07.13	Define DP's and STAR's.
	07.14	Read and interpret instrument approach charts and procedures.

08.0	Demonstrate flight planning skills--The student will be able to:
08.01	Explain relevant portions of Parts 1, 91, 110, 121, 135, and NTSB 830 of the Federal Aviation Regulations.
08.02	Define weight and balance.
08.03	Define center of gravity, moment, datum line, CG envelope, basic empty weight, and gross weight.
08.04	Calculate, compute, and solve given weight and balance problems.
08.05	Determine route of flight.
08.06	Demonstrate acquisition of appropriate weather data.
08.07	Demonstrate proper selection of destination/enroute/alternate airports.
08.08	Explain fuel requirements.
08.09	Calculate aircraft performance.
08.10	Access and analyze NOTAMS.
08.11	Acquire, define, and validate a mission profile.
08.12	Demonstrate the creation of, and explain the effective use of a navigation log.
08.13	Demonstrate methods in VFR/IFR flight planning and demonstrate the ability to make a valid go / no-go decision.

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

This course provides an expedited method of transition from an academic institution into the workforce. There are a number of students who wish to pursue their FAA licenses but do not want to seek a degree. Formalized training in an institution leads to safer pilot practices as demonstrated by statistical data. The Commercial Pilot Certificate supports entry level job functions in the pilot industry. The typical length of this program for the average achieving student is nine calendar months.

Prior to beginning flight training, students will be required to obtain an FAA medical certificate and comply with the TSA requirements. Community/State Colleges initiating this program are strongly encouraged to visit existing Florida Community/State Colleges with active programs.

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Accommodations

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Florida Department of Education
Curriculum Framework

Program Title: **Airline / Aviation Management**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0649010403
Program Type	College Credit Certificate (CCC)
Standard Length	16 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-2021 – Air Traffic Controllers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

As part of the AS degrees Aviation Administration and Aviation Administration (60), the purpose of this certificate program is to prepare students who are seeking employment with a fast track in the aviation/airline fields. Some of the students will able to obtain opportunities in the federal, state and local government aviation fields, while others will find opportunities in airline fields, such as initial entry level jobs in customer service and operations as well as lower to middle level management positions. Others will find positions in supporting aviation entities, such as suppliers and service providers to airlines and government aviation agencies. This program will benefit both students who do not have any other college experience, as well as those who have an associate or bachelor's degree in another area and would like to acquire the specific skills in this area.

The content includes but is not limited to, communication skills, leadership skills, directing, planning and controlling, human relations and employability skills, marketing, legal issues and Federal Aviation Regulations.

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

Standards

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

01.0 Demonstrate an understanding of basic aviation terminology and history.
02.0 Demonstrate an understanding of aviation operations practices, limitations and procedures.
03.0 Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation.
04.0 Demonstrate an understanding of airline and airport management practices.
05.0 Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing.
06.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Airline / Aviation Management**
CIP Number: **0649010403**
Program Length: **16 credit hours**
SOC Code(s): **53-2021**

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of basic aviation terminology and history--The student will be able to:
01.01	Explain the overall scope and breadth of the aviation industry including its impact on the economy.
01.02	Distinguish the terms and vocabularies that are used in the aerospace and commercial aviation industry.
01.03	Describe the history of technological, governmental, social and economic developments of aviation.
01.04	Explain the different types and categories of aircraft in use in the industry by distinguishing and identifying: Various wide body, narrow body types and general aviation aircraft.
01.05	Demonstrate an understanding of the oversight role of the Federal Government and its effect on the aviation industry.
02.0	Demonstrate an understanding of aviation operations practices, limitations and procedures--The student will be able to:
02.01	Demonstrate knowledge of aircraft systems as they apply to flight operations, including engines, fuel, electrical, hydraulics, pneumatics, flight controls and avionics.
02.02	Understand the various factors of aircraft performance, including takeoff, enroute and landing limitations and weight and balance.
02.03	Demonstrate knowledge of the function of flight operations, including pilot hiring, training, standards, safety issues, security issues, FAA and TSA regulations, documentation requirements, operations specifications, operating within the ATC system, and crew scheduling as well as flight attendant and aircraft dispatcher requirements.
02.04	Describe maintenance operations and their role and effect on flight operations.
02.05	Demonstrate an understanding of the role of the flight operations professional in the economic and planning functions.
02.06	Explain FAA requirements such as flight standards, types of certificates, training and record keeping, surveillance, and investigations, as well as the operator’s response and its relationship with the FAA.
02.07	Describe the role of the National Transportation Safety Board in accident investigation, NASA’s role in aviation safety reporting systems and research, and industry-specific safety reporting programs.
02.08	Demonstrate knowledge of the application of information technology systems in flight operations as they relate to flight planning systems, flight management systems, satellite communication and navigation systems, weight and balance, maintenance monitoring, and management information systems.
03.0	Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation--The student will be able to:

	03.01	Demonstrate knowledge of the history and foundations of the legal and court system in the United States as it pertains to development of aviation law and regulations.
	03.02	Explain the role and function of the U.S. DOT, FAA, TSA, and the NTSB as it relates to their legal responsibilities and authority.
	03.03	Demonstrate knowledge of airmen rights and responsibilities, negligence, FAA enforcement, immunity, and degrees of care.
	03.04	Explain state aviation law, relating to airports, fixed based operators, aircraft sales, registration, and taxation issues.
	03.05	Demonstrate knowledge of the legal matters relating to the aircraft manufacturing and airline industry, including warranties, products liability, negligence, accident litigation, labor, and consumer issues.
	03.06	Demonstrate knowledge of international air law, bilateral and multilateral agreements, international jurisdiction, and limits of liability and damages.
	03.07	Demonstrate knowledge of legal issues that relate to aviation security.
04.0	Demonstrate an understanding of airline and airport management practices --The student will be able to:	
	04.01	Describe how historical and current changes in competition, social factors, government policies, and technology affect aviation and airport management.
	04.02	Demonstrate understanding of organizational design and functional areas of an aviation business.
	04.03	Demonstrate understanding of the various functions of an airport, including airside and landside operations and management, financial planning, airport master plans, environmental issues, and land use.
	04.04	Describe the factors of effective communication, leadership styles, and motivating employees in an aviation environment with an emphasis on individual performance.
	04.05	Demonstrate an understanding of labor relations contract negotiations, and the grievance process in an aviation environment, including issues specific to airline labor relations.
	04.06	Explain how strategic planning and control processes are used in the aviation industry.
05.0	Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing--The student will be able to:	
	05.01	Explain the Marketing Concept and how it differs from the Product and Sales Concepts.
	05.02	Analyze the various environmental factors that affect aviation/airline marketing.
	05.03	Demonstrate an understanding of market demographics, segmentation, methods of market research and analysis, and pricing strategies.
	05.04	Analyze why a customer buys a particular product or service.
	05.05	Explain the advantages and disadvantages of the media available for aviation industry advertising and promotion.
	05.06	Describe the factors of delivering quality customer service, why companies lose customer, and how to salvage a bad customer experience.
	05.07	Explain the principles of reservations, ticketing, internet sales, e-ticketing, and travel agency functions.
06.0	Demonstrate employability skills--The student will be able to:	
	06.01	Describe positions available and requirements for careers in aviation administration.
	06.02	Describe qualification and certification requirements for careers in aviation administration.

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)

SkillsUSA 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.

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.

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: **Air Cargo Management**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0649010404
Program Type	College Credit Certificate (CCC)
Standard Length	16 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-1011 – Aircraft Cargo Handling Supervisors
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

As part of the AS degrees Aviation Administration and Aviation Administration (60), the purpose of this certificate program is to prepare students who are seeking employment in the aviation/airline/air cargo fields in a fast track. Some of the students will able to obtain opportunities in airline fields, such as initial entry level jobs in air cargo and customer service as well as lower level management positions. Others will find positions in supporting aviation entities, such as suppliers and service providers to air cargo airlines and government aviation agencies.

The content includes but is not limited to, customer service, human relations and employability skills, safe and efficient work practices, technical skills such air cargo documentation and terminology, records management, Federal Aviation Regulations, and air cargo processes and practices.

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

Standards

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

01.0 Demonstrate an understanding of basic aviation terminology and history.
02.0 Demonstrate an understanding of aviation operations practices, limitations and procedures.
03.0 Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing.
04.0 Demonstrate an understanding of air cargo operations and procedures.
05.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Air Cargo Management**
CIP Number: **0649010404**
Program Length: **16 credit hours**
SOC Code(s): **53-1011**

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of basic aviation terminology and history--The student will be able to:
01.01	Explain the overall scope and breadth of the aviation industry including its impact on the economy.
01.02	Distinguish the terms and vocabularies that are used in the aerospace and commercial aviation industry.
01.03	Describe the history of technological, governmental, social and economic developments of aviation.
01.04	Explain the different types and categories of aircraft in use in the industry by distinguishing and identifying: Various wide body, narrow body types and general aviation aircraft.
01.05	Demonstrate an understanding of the oversight role of the Federal Government and its effect on the aviation industry.
02.0	Demonstrate an understanding of aviation operations practices, limitations and procedures--The student will be able to:
02.01	Demonstrate knowledge of aircraft systems as they apply to flight operations, including engines, fuel, electrical, hydraulics, pneumatics, flight controls and avionics.
02.02	Understand the various factors of aircraft performance, including takeoff, enroute and landing limitations and weight and balance.
02.03	Demonstrate knowledge of the function of flight operations, including pilot hiring, training, standards, safety issues, security issues, FAA and TSA regulations, documentation requirements, operations specifications, operating within the ATC system, and crew scheduling as well as flight attendant and aircraft dispatcher requirements.
02.04	Describe maintenance operations and their role and effect on flight operations.
02.05	Demonstrate an understanding of the role of the flight operations professional in the economic and planning functions.
02.06	Explain FAA requirements such as flight standards, types of certificates, training and record keeping, surveillance, and investigations, as well as the operator's response and its relationship with the FAA.
02.07	Describe the role of the National Transportation Safety Board in accident investigation, NASA's role in aviation safety reporting systems and research, and industry-specific safety reporting programs.
02.08	Demonstrate knowledge of the application of information technology systems in flight operations as they relate to flight planning systems, flight management systems, satellite communication and navigation systems, weight and balance, maintenance monitoring, and management information systems.
03.0	Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing--The student will be able to:
03.01	Explain the Marketing Concept and how it differs from the Product and Sales Concepts.

	03.02	Analyze the various environmental factors that affect aviation/airline marketing.
	03.03	Demonstrate an understanding of market demographics, segmentation, methods of market research and analysis, and pricing strategies.
	03.04	Analyze why a customer buys a particular product or service.
	03.05	Explain the advantages and disadvantages of the media available for aviation industry advertising and promotion.
	03.06	Describe the factors of delivering quality customer service, why companies lose customer, and how to salvage a bad customer experience.
	03.07	Explain the principles of reservations, ticketing, internet sales, e-ticketing, and travel agency functions.
04.0	Demonstrate an understanding of air cargo operations and procedures--The student will be able to:	
	04.01	Describe the importance of air cargo to the economy.
	04.02	Describe air cargo customers, freight forwarders, customs brokers, and how marketing is done in the air cargo industry.
	04.03	Explain the different classes of air cargo, and the required documentation of each.
	04.04	Describe and discuss cargo packaging and how cargo is loaded on an aircraft.
	04.05	Describe HAZMAT classification, labeling, packaging, shipping requirements, and related incident/accident procedures and required reports.
	04.06	Describe the security requirements for air cargo personnel, facilities, and aircraft.
05.0	Demonstrate employability skills--The student will be able to:	
	05.01	Describe positions available and requirements for careers in aviation administration.
	05.02	Describe qualification and certification requirements for careers in aviation administration.

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)

SkillsUSA 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.

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.

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: **Airport Management**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0649010405
Program Type	College Credit Certificate (CCC)
Standard Length	16 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-2021 – Air Traffic Controllers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

As part of the AS degrees Aviation Administration and Aviation Administration (60), the purpose of this certificate program is to prepare students who are seeking employment a fast track in the airport management field. Some of the students will able to obtain opportunities in the federal, state and local government aviation fields, some will find opportunities in initial entry level jobs in airport customer service and operations as well as lower to middle level management positions. Others will find positions in supporting aviation entities, such as suppliers and service providers to government aviation agencies. This program will benefit both students who do not have any other college experience, as well as those who have an associate or bachelor's degree in another area and would like to acquire the specific skills in this area.

The content includes but is not limited to, communication skills, leadership skills, directing, planning and controlling, human relations and employability skills, safe and efficient work practices, airport facilities and planning, security issues, Federal Aviation Regulations, and other law related to aviation/airports.

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

Standards

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

01.0 Demonstrate an understanding of basic aviation terminology and history.
02.0 Demonstrate an understanding of aviation operations practices, limitations and procedures.
03.0 Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation.
04.0 Demonstrate an understanding of airline and airport management practices.
05.0 Demonstrate an understanding of aviation security.
06.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Airport Management**
CIP Number: **0649010405**
Program Length: **16 credit hours**
SOC Code(s): **53-2021**

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of basic aviation terminology and history--The student will be able to:
01.01	Explain the overall scope and breadth of the aviation industry including its impact on the economy.
01.02	Distinguish the terms and vocabularies that are used in the aerospace and commercial aviation industry.
01.03	Describe the history of technological, governmental, social and economic developments of aviation.
01.04	Explain the different types and categories of aircraft in use in the industry by distinguishing and identifying: Various wide body, narrow body types and general aviation aircraft.
01.05	Demonstrate an understanding of the oversight role of the Federal Government and its effect on the aviation industry.
02.0	Demonstrate an understanding of aviation operations practices, limitations and procedures--The student will be able to:
02.01	Demonstrate knowledge of aircraft systems as they apply to flight operations, including engines, fuel, electrical, hydraulics, pneumatics, flight controls and avionics.
02.02	Understand the various factors of aircraft performance, including takeoff, enroute and landing limitations and weight and balance.
02.03	Demonstrate knowledge of the function of flight operations, including pilot hiring, training, standards, safety issues, security issues, FAA and TSA regulations, documentation requirements, operations specifications, operating within the ATC system, and crew scheduling as well as flight attendant and aircraft dispatcher requirements.
02.04	Describe maintenance operations and their role and effect on flight operations.
02.05	Demonstrate an understanding of the role of the flight operations professional in the economic and planning functions.
02.06	Explain FAA requirements such as flight standards, types of certificates, training and record keeping, surveillance, and investigations, as well as the operator’s response and its relationship with the FAA.
02.07	Describe the role of the National Transportation Safety Board in accident investigation, NASA’s role in aviation safety reporting systems and research, and industry-specific safety reporting programs.
02.08	Demonstrate knowledge of the application of information technology systems in flight operations as they relate to flight planning systems, flight management systems, satellite communication and navigation systems, weight and balance, maintenance monitoring, and management information systems.
03.0	Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation--The student will be able to:

	03.01	Demonstrate knowledge of the history and foundations of the legal and court system in the United States as it pertains to development of aviation law and regulations.
	03.02	Explain the role and function of the U.S. DOT, FAA, TSA, and the NTSB as it relates to their legal responsibilities and authority.
	03.03	Demonstrate knowledge of airmen rights and responsibilities, negligence, FAA enforcement, immunity, and degrees of care.
	03.04	Explain state aviation law, relating to airports, fixed based operators, aircraft sales, registration, and taxation issues.
	03.05	Demonstrate knowledge of the legal matters relating to the aircraft manufacturing and airline industry, including warranties, products liability, negligence, accident litigation, labor, and consumer issues.
	03.06	Demonstrate knowledge of international air law, bilateral and multilateral agreements, international jurisdiction, and limits of liability and damages.
	03.07	Demonstrate knowledge of legal issues that relate to aviation security.
04.0	Demonstrate an understanding of airline and airport management practices--The student will be able to:	
	04.01	Describe how historical and current changes in competition, social factors, government policies, and technology affect aviation and airport management.
	04.02	Demonstrate understanding of organizational design and functional areas of an aviation business.
	04.03	Demonstrate understanding of the various functions of an airport, including airside and landside operations and management, financial planning, airport master plans, environmental issues, and land use.
	04.04	Describe the factors of effective communication, leadership styles, and motivating employees in an aviation environment with an emphasis on individual performance.
	04.05	Demonstrate an understanding of labor relations contract negotiations, and the grievance process in an aviation environment, including issues specific to airline labor relations.
	04.06	Explain how strategic planning and control processes are used in the aviation industry.
05.0	Demonstrate an understanding of aviation security--The student will be able to:	
	05.01	Describe aviation security threats and responses.
	05.02	Discuss aspects of aviation security, such the Aviation Safety and Security Act of 2001, and FAR Parts 108 and 109.
	05.03	Describe the components of a layered aviation security system, including personnel selection and training, and performance of security personnel.
	05.04	Explain the importance of planning for security threats, and having contingency plans and responsive measures.
	05.05	Explain the ground security measures and technology, including restricted access, inspections of personnel, baggage and goods, and effective screening techniques.
	05.06	Discuss inflight threats and security procedures.
06.0	Demonstrate employability skills--The student will be able to:	
	06.01	Describe positions available and requirements for careers in aviation administration.
	06.02	Describe qualification and certification requirements for careers in aviation administration.

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)

SkillsUSA 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.

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.

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: **Passenger Service Agent**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0649010406
Program Type	College Credit Certificate (CCC)
Standard Length	16 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	43-4051 – Customer Service Representatives
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403).

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

As part of the AS degrees Aviation Administration and Aviation Administration (60), the purpose of this certificate program is to prepare students who are seeking employment in the aviation/airline/airport fields as a passenger service agent. Some of the students will able to obtain opportunities in the federal, state and local government aviation fields, while others will find opportunities in airline fields, such as initial entry level jobs in customer service and operations and ticketing.

The content includes but is not limited to, communication skills, customer service skills, ticketing and reservations, aviation security, human relations and employability skills, operations and terminology.

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

Standards

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

01.0 Demonstrate an understanding of aviation operations practices, limitations and procedures.
02.0 Demonstrate an understanding of aviation security.
03.0 Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing.
04.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Passenger Service Agent**
CIP Number: **0649010406**
Program Length: **16 credit hours**
SOC Code(s): **43-4051**

This certificate program is part of the Aviation Administration AS degree program (1649010402) and the Aviation Administration (60) AS degree program (1649010403). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of aviation operations practices, limitations and procedures--The student will be able to:
01.01	Demonstrate knowledge of aircraft systems as they apply to flight operations, including engines, fuel, electrical, hydraulics, pneumatics, flight controls and avionics.
01.02	Understand the various factors of aircraft performance, including takeoff, enroute and landing limitations and weight and balance.
01.03	Demonstrate knowledge of the function of flight operations, including pilot hiring, training, standards, safety issues, security issues, FAA and TSA regulations, documentation requirements, operations specifications, operating within the ATC system, and crew scheduling as well as flight attendant and aircraft dispatcher requirements.
01.04	Describe maintenance operations and their role and effect on flight operations.
01.05	Demonstrate an understanding of the role of the flight operations professional in the economic and planning functions.
01.06	Explain FAA requirements such as flight standards, types of certificates, training and record keeping, surveillance, and investigations, as well as the operator's response and its relationship with the FAA.
01.07	Describe the role of the National Transportation Safety Board in accident investigation, NASA's role in aviation safety reporting systems and research, and industry-specific safety reporting programs.
01.08	Demonstrate knowledge of the application of information technology systems in flight operations as they relate to flight planning systems, flight management systems, satellite communication and navigation systems, weight and balance, maintenance monitoring, and management information systems.
02.0	Demonstrate an understanding of aviation security--The student will be able to:
02.01	Describe aviation security threats and responses.
02.02	Discuss aspects of aviation security, such the Aviation Safety and Security Act of 2001, and FAR Parts 108 and 109.
02.03	Describe the components of a layered aviation security system, including personnel selection and training, and performance of security personnel.
02.04	Explain the importance of planning for security threats, and having contingency plans and responsive measures.
02.05	Explain the ground security measures and technology, including restricted access, inspections of personnel, baggage and goods, and effective screening techniques.
02.06	Discuss inflight threats and security procedures.
03.0	Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing--The student will be able to:

	03.01	Explain the Marketing Concept and how it differs from the Product and Sales Concepts.
	03.02	Analyze the various environmental factors that affect aviation/airline marketing.
	03.03	Demonstrate an understanding of market demographics, segmentation, methods of market research and analysis, and pricing strategies.
	03.04	Analyze why a customer buys a particular product or service.
	03.05	Explain the advantages and disadvantages of the media available for aviation industry advertising and promotion.
	03.06	Describe the factors of delivering quality customer service, why companies lose customer, and how to salvage a bad customer experience.
	03.07	Explain the principles of reservations, ticketing, internet sales, e-ticketing, and travel agency functions.
04.0	Demonstrate employability skills--The student will be able to:	
	04.01	Describe positions available and requirements for careers in aviation administration.
	04.02	Describe qualification and certification requirements for careers in aviation administration.

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)

SkillsUSA 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.

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.

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: **International Freight Transportation**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0652020302
Program Type	College Credit Certificate (CCC)
Standard Length	15 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	11-3071 – Transportation, Storage and Distribution Managers 13-1081 – Logisticians 43-5011 – Cargo and Freight Agents 43-5071 – Shipping, Receiving and Traffic Clerks 53-1011 – Aircraft Cargo Handling Supervisors 53-1031 – First-Line Supervisors of Transportation and Material Moving Machine and Vehicle Operators
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Transportation and Logistics AS degree program 0652020301

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to related business, accounting, and financial practices such as standard policies and operating procedures, negotiation techniques, planning, organizing, purchasing and inventory control theory.

The purpose of this program is to prepare students for initial employment with an occupational title or to provide supplemental training for persons previously or currently employed in these occupations with cross-functional skills necessary for planning, and operations of transportation systems and the flow and distribution of goods and people.

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

Standards

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

01.0 Demonstrate an understanding of the basic concepts and terms used in transportation and logistics
02.0 Demonstrate an understanding of the transportation and logistics regulatory environment
03.0 Identify risks and safety and security measures in transportation and logistics
04.0 Demonstrate the ability to use technology as it relates to transportation and logistics
05.0 Demonstrate knowledge of documentation (domestic, international, and customs) related to transportation and logistics
06.0 Demonstrate the ability to manipulate quantitative data including international weights and measures, as it relates to the movement of goods
07.0 Demonstrate an understanding of reverse logistics
08.0 Demonstrate knowledge of border security
09.0 Demonstrate knowledge of procurement, contracts and contract administration as it applies to transportation and logistics
10.0 Demonstrate knowledge of geography, culture, customs, and language in international trade
11.0 Demonstrate knowledge of pricing as it relates to shipping methods
12.0 Demonstrate knowledge of the air, sea, truck, and rail operations in the movement of freight
13.0 Distinguish the difference between domestic and international freight movements

Florida Department of Education
Student Performance Standards

Program Title: **International Freight Transportation**
CIP Numbers: **0652020302**
Program Length: **15 Credits**
SOC Code(s): **11-3071; 13-1081; 43-5011; 43-5071; 53-1011; 53-1031**

This certificate program is part of the Transportation and Logistics AS degree program (0652020301). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of the basic concepts and terms used in transportation and logistics--The student will be able to:
01.01	Compare various shipping options
01.02	Analyze types of goods and products and impact on logistics
01.03	Identify the characteristics of a full-service transportation organization
01.04	Demonstrate an understanding of intermodalism
01.05	Demonstrate knowledge of mode-specific logistics
01.06	Demonstrate knowledge of Incoterms versus Uniform Commercial Code (UCC)
01.07	Demonstrate knowledge of how goods move through freight forwarder and customs broker
01.08	Demonstrate knowledge of inventory and warehousing concepts
01.09	Explain the relevance of Just-in-Time (JIT) logistics
01.10	Demonstrate knowledge of shipment process for perishables
01.11	Demonstrate knowledge of packaging and labeling requirements
01.12	Demonstrate knowledge of the advantages and disadvantages of combining given modes of transportation air/sea/land)
01.13	Identify the various governmental regulatory agencies by their names and initials
01.14	Demonstrate the ability to read, write, and conduct a conversation using common terms of freight movement by transportation mode
02.0	Demonstrate an understanding of the transportation and logistics regulatory environment--The student will be able to:
02.01	Demonstrate knowledge of the “alphabet soup” of regulatory agencies
02.02	Identify which agency (ies) have jurisdiction over a given transportation system
02.03	Demonstrate knowledge of DOT regulations
02.04	Identify who has regulatory authority over a given project
02.05	Identify regulatory requirements

	02.06	Identify permits needed for a given project
	02.07	Identify consequences of violations of regulatory requirements
	02.08	Identify policy issues and political factors in a regulatory environment
	02.09	Demonstrate skill in regulatory research
	02.10	Demonstrate knowledge of labor laws
03.0	Identify risks and safety and security measures in transportation and logistics--The student will be able to:	
	03.01	Establish an emergency management plan
	03.02	Identify the need for security background check requirements
	03.03	Demonstrate knowledge of OSHA and all agencies involved in the movement of goods including Customs and Border Protection, Transportation and Security Administration, U.S. Department of Agriculture
	03.04	Demonstrate knowledge of the impact of technology on countering threats to transportation systems and border security
	03.05	Identify differences in dealing with security threats for passenger versus freight/cargo transportation systems including the impact on supply chain logistics
	03.06	Outline the primary federal, state, and local agencies in the U.S. that are affiliated with border security and transportation security
	03.07	Identify the ethical parameters in which border security agencies operate
	03.08	Identify the difference in safety and security threats as they relate to rail, seaport, trucking, and aviation
	03.09	Identify the cost/benefit analysis of various safety and security measures
	03.10	Implement a schedule
	03.11	Analyze system performance
	03.12	Develop process maps
	03.13	Develop knowledge of process analysis
04.0	Demonstrate the ability to use technology as it relates to transportation and logistics--The student will be able to:	
	04.01	Demonstrate the ability to use spreadsheet, word processing, and presentation software
	04.02	Demonstrate the ability to use scheduling/planning software
	04.03	Identify the electronic systems used in a modern transportation system
	04.04	Utilize Internet resources
	04.05	Demonstrate ability to use logistics software for bookings, shipments, consolidations, and shipment verifications
05.0	Demonstrate knowledge of documentation (domestic, international, and customs) related to transportation and logistics --The student will be able to:	
	05.01	Identify basic documents used in freight forwarding and customs brokering

	05.02 Prepare an airway bill
	05.03 Demonstrate knowledge of letters of credit
	05.04 Identify components of a bill of lading.
06.0	Demonstrate the ability to manipulate quantitative data including international weights and measures, as it relates to the movement of goods--The student will be able to:
	06.01 Convert standard weights and measures to metric and vice versa
	06.02 Conduct currency exchange calculations
	06.03 Demonstrate skill in practical math for transportation
	06.04 Develop quantitative methods for assessing transportation loads
07.0	Demonstrate an understanding of reverse logistics--The student will be able to:
	07.01 Assess the nature and scope of reverse logistics
	07.02 Explain the waste management process
08.0	Demonstrate knowledge of border security--The student will be able to:
	08.01 Identify the various agencies affiliated with border security
	08.02 Construct a historical timeline reflecting significant transportation-related terrorist threats and events involving border security
	08.03 Demonstrate an understanding of the social and cultural issues involved in border security
	08.04 Classify the roles, functions, and interdependency between local, federal, and international law enforcement and military agencies to foster border security
09.0	Demonstrate knowledge of procurement, contracts and contract administration as it applies to transportation and logistics--The student will be able to:
	09.01 Identify the basic components of a contract
	09.02 Identify the difference between “void” and “voidable” contracts
	09.03 Demonstrate an understanding of the importance of being in compliance with the terms of a contract
	09.04 Determine appropriate methods of procurement
	09.05 Explain competitive bids, quotations, and proposals
	09.06 Evaluate competitive bids to determine the best offer
	09.07 Manage contracts and purchase orders from award to completion
	09.08 Resolve contract and/or purchase order differences with suppliers
	09.09 Explain payment problems with suppliers and user departments
	09.10 Discuss the scope of compliance requirements

	09.11 Conduct a negotiation
10.0	Demonstrate knowledge of geography, culture, customs, and language in international trade--The student will be able to:
	10.01 Demonstrate an understanding of world geography
	10.02 Demonstrate knowledge of various cultural customs as it relates to conducting business
	10.03 Abstain from the use of idioms when dealing with foreign customers and colleagues
	10.04 Demonstrate knowledge of time and date differences in international trade
	10.05 Identify customer service techniques that account for cultural differences when working with international clients
11.0	Demonstrate knowledge of pricing as it relates to shipping methods--The student will be able to:
	11.01 Identify the importance of time in a given shipment
	11.02 Identify issues such as perishability, weight, fragility, and packing method
	11.03 Identify best combination of shipping methods given knowledge of product and customer's requirements
	11.04 Describe pricing strategies
12.0	Demonstrate knowledge of the air, sea, truck and rail operations for the movement of freight--The student will be able to:
	12.01 Describe the knowledge of the organizational structure for each mode of transportation relative to the movement of freight
	12.02 Describe the basic function of each mode
	12.03 Identify the important markets for the each mode
	12.04 Identify the major companies in each mode
	12.05 Compare the various key specializations within an intermodal cargo operation
13.0	Distinguish the difference between domestic and international freight movements--The student will be able to:
	13.01 Describe how legal standards vary
	13.02 Describe how safety rules vary
	13.03 Distinguish the cultural, political, and geographic effects on the international cargo operations
	13.04 Describe the use of a foreign (free) trade zone its advantages

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)

SkillsUSA 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.

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.

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: **Intermodal Freight Transportation**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0652020303
Program Type	College Credit Certificate (CCC)
Standard Length	18 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	11-3071 – Transportation, Storage and Distribution Managers 13-1081 – Logisticians 43-5011 – Cargo and Freight Agents 43-5071 – Shipping, Receiving and Traffic Clerks 53-1011 – Aircraft Cargo Handling Supervisors 53-1031 – First-Line Supervisors of Transportation and Material Moving Machine and Vehicle Operators
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Transportation and Logistics AS degree program 1652020301

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

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to related business, accounting, and financial practices such as standard policies and operating procedures, negotiation techniques, planning, organizing, purchasing and inventory control theory.

The purpose of this program is to prepare students for initial employment with an occupational title or to provide supplemental training for persons previously or currently employed in these occupations with cross-functional skills necessary for planning, and operations of transportation systems and the flow and distribution of goods.

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

Standards

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

01.0 Demonstrate an understanding of the basic concepts and terms used in transportation and logistics
02.0 Demonstrate an understanding of the transportation and logistics regulatory environment
03.0 Identify risks and safety and security measures in transportation and logistics
04.0 Demonstrate the ability to use technology as it relates to transportation and logistics
05.0 Demonstrate knowledge of contemporary issues in transportation and logistics
06.0 Demonstrate knowledge of documentation (domestic, international, and customs) related to transportation and logistics
07.0 Demonstrate an understanding of reverse logistics
08.0 Demonstrate knowledge of border security
09.0 Identify characteristics and benefits of intermodal transportation
10.0 Demonstrate knowledge of the air, sea, truck, and rail operations in the movement of freight
11.0 Describe the various control processes in freight movement
12.0 Demonstrate knowledge of the Port freight operations
13.0 Demonstrate knowledge of rail freight operations
14.0 Demonstrate knowledge of trucking operations
15.0 Demonstrate knowledge of air cargo operations

Florida Department of Education
Student Performance Standards

Program Title: **Intermodal Freight Transportation**
CIP Numbers: **0652020303**
Program Length: **18 Credits**
SOC Code(s): **11-3071; 13-1081; 43-5011; 43-5071; 53-1011; 53-1031**

This certificate program is part of the Transportation and Logistics AS degree program (0652020301). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of the basic concepts and terms used in transportation and logistics--The student will be able to:
01.01	Compare various shipping options
01.02	Analyze types of goods and products and impact on logistics
01.03	Identify the characteristics of a full-service transportation organization
01.04	Demonstrate an understanding of intermodalism
01.05	Demonstrate knowledge of mode-specific logistics
01.06	Demonstrate knowledge of Incoterms versus Uniform Commercial Code (UCC)
01.07	Demonstrate knowledge of how goods move through freight forwarder and customs broker
01.08	Demonstrate knowledge of inventory and warehousing concepts
01.09	Explain the relevance of Just-in-Time (JIT) logistics
01.10	Demonstrate knowledge of shipment process for perishables
01.11	Demonstrate knowledge of packaging and labeling requirements
01.12	Demonstrate knowledge of the advantages and disadvantages of combining given modes of transportation air/sea/land)
01.13	Identify the various governmental regulatory agencies by their names and initials
01.14	Demonstrate the ability to read, write, and conduct a conversation using common terms of freight movement by transportation mode
02.0	Demonstrate an understanding of the transportation and logistics regulatory environment--The student will be able to:
02.01	Demonstrate knowledge of the “alphabet soup” of regulatory agencies
02.02	Identify which agency (ies) have jurisdiction over a given transportation system
02.03	Demonstrate knowledge of DOT regulations
02.04	Identify who has regulatory authority over a given project
02.05	Identify regulatory requirements

	02.06	Identify permits needed for a given project
	02.07	Identify consequences of violations of regulatory requirements
	02.08	Identify policy issues and political factors in a regulatory environment
	02.09	Demonstrate skill in regulatory research
	02.10	Demonstrate knowledge of labor laws
03.0	Identify risks and safety and security measures in transportation and logistics--The student will be able to:	
	03.01	Establish an emergency management plan
	03.02	Identify the need for security background check requirements
	03.03	Demonstrate knowledge of OSHA and all agencies involved in the movement of goods including Customs and Border Protection, Transportation and Security Administration, U.S. Department of Agriculture
	03.04	Demonstrate knowledge of the impact of technology on countering threats to transportation systems and border security
	03.05	Identify differences in dealing with security threats for passenger versus freight/cargo transportation systems including the impact on supply chain logistics
	03.06	Outline the primary federal, state, and local agencies in the U.S. that are affiliated with border security and transportation security
	03.07	Identify the ethical parameters in which border security agencies operate
	03.08	Identify the difference in safety and security threats as they relate to rail, seaport, trucking, and aviation
	03.09	Identify the cost/benefit analysis of various safety and security measures
	03.10	Implement a schedule
	03.11	Analyze system performance
	03.12	Develop process maps
	03.13	Develop knowledge of process analysis
04.0	Demonstrate the ability to use technology as it relates to transportation and logistics--The student will be able to:	
	04.01	Demonstrate the ability to use spreadsheet, word processing, and presentation software
	04.02	Demonstrate the ability to use scheduling/planning software
	04.03	Identify the electronic systems used in a modern transportation system
	04.04	Utilize Internet resources
	04.05	Demonstrate ability to use logistics software for bookings, shipments, consolidations, and shipment verifications
05.0	Demonstrate knowledge of contemporary issues in transportation and logistics--The student will be able to:	
	05.01	Identify the factors that influence changes in costs among the various modes of transportation
	05.02	Demonstrate an understanding of current trends in containerized shipping

	05.03	Identify current security issues among the various modes of transportation
	05.04	Demonstrate knowledge of the effect of current technology on intermodal transportation systems
	05.05	Describe the pros and cons of free trade agreements
	05.06	Describe “push” versus “pull” logistics
	05.07	Demonstrate knowledge of current trends in currency exchange rates
	05.08	Demonstrate knowledge of advantages and disadvantages of logistics centers, intermodal container transfer facilities and intermodal rail yards
06.0	Demonstrate knowledge of documentation (domestic, international, and customs) related to transportation and logistics --The student will be able to:	
	06.01	Identify basic documents used in freight forwarding and customs brokering
	06.02	Prepare an airway bill
	06.03	Demonstrate knowledge of letters of credit
	06.04	Identify components of a bill of lading.
07.0	Demonstrate an understanding of reverse logistics--The student will be able to:	
	07.01	Assess the nature and scope of reverse logistics
	07.02	Explain the waste management process
08.0	Demonstrate knowledge of border security--The student will be able to:	
	08.01	Identify the various agencies affiliated with border security
	08.02	Construct a historical timeline reflecting significant transportation-related terrorist threats and events involving border security
	08.03	Demonstrate an understanding of the social and cultural issues involved in border security
	08.04	Classify the roles, functions, and interdependency between local, federal, and international law enforcement and military agencies to foster border security
09.0	Identify characteristics and benefits of intermodal transportation--The student will be able to:	
	09.01	Compare various shipping options
	09.02	Analyze types of goods and products and impact on logistics
	09.03	Identify the characteristics of a full-service transportation organization
	09.04	Demonstrate knowledge of mode-specific logistics
	09.05	Demonstrate knowledge of contemporary issues in intermodal transportation
	09.06	Demonstrate knowledge of Incoterms versus Uniform Commercial Codes (UCC)
	09.07	Demonstrate knowledge of how goods move through freight forwarder and customs broker

09.08	Demonstrate knowledge of warehousing
09.09	Demonstrate knowledge of packaging and labeling requirements
09.10	Demonstrate knowledge of the advantages and disadvantages of combining given modes of transportation (air/sea/truck/rail)
10.0	Demonstrate knowledge of the air, sea, truck and rail operations for the movement of freight--The student will be able to:
10.01	Describe the knowledge of the organizational structure for each mode of transportation relative to the movement of freight
10.02	Describe the basic function of each mode
10.03	Identify the important markets for the each mode
10.04	Identify the major companies in each mode
10.05	Compare the various key specializations within an intermodal cargo operation
11.0	Describe the various control processes in freight movement--The student will be able to:
11.01	Demonstrate knowledge of budgeting and auditing
11.02	Demonstrate knowledge of quality measurements such as on-time performance
11.03	Demonstrate knowledge of customer complaints and quality issues
12.0	Demonstrate knowledge of the Port freight operations--The student will be able to:
12.01	Describe the different types of Ports including seaports, waterway ports and inland ports
12.02	Identify the types of water-borne and inland freight and the types of cargo documentation required
12.03	Describe Port facilities for processing domestic and international cargo
12.04	Describe the types and functions of intermodal facilities at a Port
12.05	Describe the typical organizational structure of a Port and its operations
12.06	Define the role and impact of government and other regulatory agencies in this industry
12.07	Define various terms and abbreviations used in Port freight operations
12.08	Identify the types of hazardous materials moved through Ports and the rules governing this type of shipment
12.09	Describe process for movement of perishable goods
13.0	Demonstrate knowledge of rail freight operations--The student will be able to:
13.01	Demonstrate knowledge of scheduling shipments and documentation procedures required
13.02	Identify the railroad companies serving the state and what areas their lines serve
13.03	Describe the function of intermodal rail yards, on-Port rail facilities, and intermodal container facilities
13.04	Identify the types of cargo moved by rail and the types of documentation required
13.05	Identify the types of hazardous materials moved by rail and the rules governing this type of shipment

	13.06	Describe the role of rail at logistics centers
	13.07	Describe the typical organizations structure of a railroad company and its operations
	13.08	Describe the role and impact of government and other regulatory agencies in the rail industry
	13.09	Define various terms and abbreviations used in the rail industry
	13.10	Describe process for movement of perishable goods
14.0	Demonstrate knowledge of trucking operations--The student will be able to:	
	14.01	Identify the advantages and disadvantages of trucking company versus owner-operator
	14.02	Demonstrate knowledge of processing truck shipments and the driver scheduling issues
	14.03	Identify the types of carriers and equipment
	14.04	Demonstrate knowledge of weight and load distribution.
	14.05	Identify the types of cargo moved by truck and the types of cargo documentation required
	14.06	Describe the role of trucking at logistics centers
	14.07	Identify the types of hazardous materials moved by truck and the rules governing this type of shipment
	14.08	Demonstrate knowledge of intrastate, interstate and international trucking operations
	14.09	Define the role and impact of government and other regulatory agencies in the trucking industry
	14.10	Define various terms and abbreviations used in the trucking industry
	14.11	Describe process for movement of perishable goods
15.0	Demonstrate knowledge of air cargo operations--The student will be able to:	
	15.01	Demonstrate knowledge of intrastate, interstate and international air cargo operations
	15.02	Describe the air industry as it is found today: the different types of cargo, the different types of carriers, the major players, upstarts, and the future of the industry
	15.03	Identify sales and marketing ideals used in the industry, the various rates, and the various tariffs in the air cargo industry
	15.04	Differentiate the various types of terminal facilities and equipment, including aircraft, used by the air cargo companies to run an operation
	15.05	Define the role and impact of the government and other regulatory agencies in the air cargo industry
	15.06	Define various terms and abbreviations used in the air cargo industry
	15.07	Categorize the various types of cargo and its major classifications
	15.08	Identify the types of hazardous materials moved by air and the regulations governing this type shipment
	15.09	Describe the process for movement of perishable goods

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)

SkillsUSA 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.

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.

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: **Logistics and Transportation Specialist**
Career Cluster: **Transportation, Distribution and Logistics**

CCC	
CIP Number	0652020901
Program Type	College Credit Certificate (CCC)
Standard Length	18 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	11-3071 – Transportation, Storage, and Distribution Managers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

This certificate program is part of the Supply Chain Management AS degree program (1652020900) and the Supply Chain Management (60) AS degree program (1652020901).

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

The purpose of this program is to prepare students for further education and employment in the Transportation, Distribution and Logistics career cluster. The program is designed to develop the student's general employability by improving their work attitudes, communication, critical thinking, technical skills, problem-solving skills and occupation-specific skills relative to supply chain management.

The program content is broad-based to reflect the cross-functional relationships prevalent in supply chain management. Students are exposed to related business practices such as standard operating procedures, negotiation techniques, planning, organizing, and accounting concepts, purchasing, sustainability, warehousing, project management, quality control, import/export, and asset management theory. Emphasis is placed on understanding the planning, acquisition, flow, and distribution of goods and services while managing the complexity of operational linkages in a fast-paced global supply chain. Learning is promoted via team work, case studies, practitioner guest lectures, and visits to work sites.

This program prepares students for employment in roles such as: Integrated Logistics Planner, Purchasing Analyst, Cargo Scheduler, International Logistics Clerk, Quality Associate, Inventory Control Manager, Logistics Analyst, Junior Buyer, Customer Service Associate, Materials Analyst, Material Manager, Supply Manager, Dispatcher, Supply Technician, Operations Supervisor, Order Fulfillment Associate, Transportation Coordinator, Distribution Planning Analyst, Packing Supervisor, Transportation Clerk, Cargo Sales, Receiving/Shipping Supervisor, Transportation Specialist, Procurement Clerk, Product Tracing and Tracking Clerk, Warehouse Shift Supervisor, Import/Export Clerk, and Purchasing Agent.

The content includes but is not limited to related business and accounting practices such as: standard policies and operating procedures, negotiation techniques, planning, organizing, logistics concepts, purchasing and inventory control theory. Emphasis is placed on the development of business and managerial skills necessary for the efficient and effective performance of all operations within a company's supply chain.

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

Standards

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

01.0 Demonstrate an understanding of personal development and professional networking.
02.0 Demonstrate an understanding of professional effectiveness.
03.0 Demonstrate an understanding of logistics, and supply chain management basics.
04.0 Demonstrate an understanding of transportation systems.
05.0 Demonstrate an understanding of warehousing and materials handling.
06.0 Demonstrate an understanding of packaging.
07.0 Demonstrate an understanding of inventory and supply planning.
08.0 Demonstrate an understanding of reverse logistics.
09.0 Demonstrate an understanding of procurement/contracting.
10.0 Demonstrate an understanding of production.
11.0 Demonstrate an understanding of product management.
12.0 Demonstrate an understanding of pricing.
13.0 Demonstrate an understanding of customer relationship management.
14.0 Demonstrate an understanding of management practices.
15.0 Demonstrate an understanding of supply chain risk management.
16.0 Demonstrate an understanding of project and quality management.
17.0 Demonstrate an understanding of business law, ethics and legal issues.
18.0 Demonstrate an understanding of writing and presenting documentation.
19.0 Demonstrate an understanding of the differences between a manufacturing and a services supply chain.

Florida Department of Education
Student Performance Standards

Program Title: **Logistics and Transportation Specialist**
CIP Number: **0652020901**
Program Length: **18 credit hours**
SOC Code(s): **11-3071**

This certificate program is part of the Supply Chain Management AS degree program (1652020900) and the Supply Chain Management (60) AS degree program (1652020901). At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of personal development and professional networking--The student will be able to:
01.01	Explore career pathways in supply chain management.
01.02	Explore professional development opportunities for a supply chain management professional.
01.03	Prepare for career advancement in supply chain management.
02.0	Demonstrate an understanding of professional effectiveness--The student will be able to:
02.01	Explain professional responsibilities in supply chain management.
02.02	Develop self-management skills.
02.03	Demonstrate appropriate work ethics as they apply to supply chain management.
02.04	Apply problem-solving techniques.
02.05	Manage stressful situations.
02.06	Build professional communication skills.
02.07	Disseminate information.
02.08	Develop and achieve goals.
02.09	Manage change.
02.10	Identify time-management skills.
03.0	Demonstrate an understanding of logistics, and supply chain management basics--The student will be able to:
03.01	Define and characterize supply chain management and logistics.
03.02	Describe the role of other business functional areas in supply chain management.
04.0	Demonstrate an understanding of transportation systems--The student will be able to:
04.01	Assess the importance of the transportation system.
04.02	Explain the scope of the domestic and global transportation system.

04.03	Describe various services in the transportation industry and how these services are coordinated.
04.04	Explain the infrastructure and equipment used by the various modes of transportation.
04.05	Determine the costs/benefits of company-owned versus for-hire transportation.
04.06	Explain the scope of international transportation.
04.07	Explain the complexities of international transportation.
04.08	Explain the general costs included in transportation rates.
04.09	Analyze rate structures.
04.10	Determine multimodal rates.
04.11	Explain common transportation documents.
04.12	Explain procedures to expedite deliveries and conduct follow-up procedures as needed.
05.0	Demonstrate an understanding of warehousing and materials handling--The student will be able to:
05.01	Explain the reasons for maintaining warehousing.
05.02	Explain the functions of warehouses.
05.03	Compare and contrast public and private warehouses.
05.04	Explain common warehouse documents.
05.05	Describe materials handling functions.
05.06	Explain the elements that influence space layout in warehousing (e.g. productivity, damage, safety, security, etc.)
05.07	Create a cost-benefit analysis.
05.08	Explain the product characteristics that impact logistics.
05.09	Explain order fulfillment procedures.
05.10	Analyze rate structures.
06.0	Demonstrate an understanding of packaging--The student will be able to:
06.01	Assess types of packaging.
06.02	Explain the functions of packaging.
06.03	Explain how packaging influences other logistic activities.
07.0	Demonstrate an understanding of inventory and supply planning--The student will be able to:
07.01	Explain the importance of inventory.
07.02	Explain how inventory management is measured.
07.03	Analyze just-in time (JIT) inventory process.

	07.04 Understand the use and output of a MRP system.
	07.05 Analyze types of inventory management tools and their impact on logistics.
08.0	Demonstrate an understanding of reverse logistics--The student will be able to:
	08.01 Assess the nature and scope of reverse logistics.
	08.02 Explain the waste management process.
	08.03 Explain the disposition of assets.
09.0	Demonstrate an understanding of procurement/contracting--The student will be able to:
	09.01 Develop a procurement/acquisition plan.
	09.02 Analyze organizational requirements for procurement requisitions.
	09.03 Determine appropriate methods of procurement.
	09.04 Work collaboratively to develop and review specifications, statements of work, performance terms, and/or acceptance criteria.
	09.05 Identify and select potential sources of materials or services.
	09.06 Explain competitive bids, quotations, and proposals.
	09.07 Prepare and solicit competitive bids, quotations, and proposals.
	09.08 Evaluate competitive bids to determine the best offer.
	09.09 Conduct supplier visits and/or evaluations to determine suitability when needed.
	09.10 Analyze elements of contracts.
	09.11 Issue contracts.
	09.12 Review legal implications of contracting.
	09.13 Manage contracts and purchase orders from award to completion.
	09.14 Resolve contract and/or purchase order differences with suppliers.
	09.15 Explain payment problems with suppliers and user departments.
	09.16 Discuss the scope of compliance requirements.
	09.17 Conduct a negotiation.
10.0	Demonstrate an understanding of production--The student will be able to:
	10.01 Explain the relationship between manufacturing, purchasing, and logistics.
	10.02 Explain the concept of production.
	10.03 Plan production.
	10.04 Apply best practices for production operations.

	10.05 Explain impact of new production technology for profitability.
	10.06 Analyze job costing using appropriate application software.
11.0	Demonstrate an understanding of product management--The student will be able to:
	11.01 Describe the factors involved in product/service operations.
	11.02 Plan product/service management strategies.
	11.03 Explain types of products and their impact on logistics.
	11.04 Explain the impact of packaging on product/service management.
	11.05 Explain the impact of product promotions within supply chain and logistics.
12.0	Demonstrate an understanding of pricing--The student will be able to:
	12.01 Explain pricing fundamentals.
	12.02 Evaluate pricing fundamentals.
	12.03 Explain how logistics cost can influence pricing decisions.
	12.04 Determine prices for products/services.
13.0	Demonstrate an understanding of customer relationship management--The student will be able to:
	13.01 Explain basic customer relationship management (CRM) concepts.
	13.02 Demonstrate quality customer service focus.
	13.03 Describe the concept of order cycle time.
	13.04 Explain the importance of logistic performance on customer service in generating revenue.
	13.05 Explain the role of technology in order processing, tracking, and customer research.
	13.06 Process orders and returns.
14.0	Demonstrate an understanding of management practices--The student will be able to:
	14.01 Explain basic management concepts.
	14.02 Assess and manage human resources and integrated teams.
	14.03 Provide leadership to procurement, acquisition, logistic, and supply chain management employees.
	14.04 Apply sound decision-making strategies.
15.0	Demonstrate an understanding of supply chain risk management--The student will be able to:
	15.01 Explain types of risk.
	15.02 Explain risk management.
	15.03 Analyze safety/security risks.

16.0	Demonstrate an understanding of project and quality management--The student will be able to:
	16.01 Plan and coordinate the diverse components of a project.
	16.02 Assess and manage a project.
	16.03 Build interpersonal skills with individuals and teams.
	16.04 Explain quality assurance.
	16.05 Select and employ quality tools.
	16.06 Examine quality cost implications.
17.0	Demonstrate an understanding of business law, ethics and legal issues--The student will be able to:
	17.01 Review and discuss current legal and ethical considerations as they relate to supply chain management.
	17.02 Evaluate policies for managing privacy and ethical issues.
18.0	Demonstrate an understanding of writing and presenting documentation--The student will be able to:
	18.01 Assess report writing requirements.
	18.02 Create, write, and present reports using APA format.
19.0	Demonstrate an understanding of the differences between a manufacturing and a services supply chain--The student will be able to:
	19.01 Describe the basic concepts of manufacturing and service operations and their role in meeting customer needs.
	19.02 Define the key elements and processes in manufacturing and service operations.
	19.03 Describe how to assess the performance of manufacturing and service operations.

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)

SkillsUSA 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.

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.

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: **Unmanned Vehicle Systems Operations**
Career Cluster: **Transportation, Distribution & Logistics**

AS	
CIP Number	1615080102
Program Type	College Credit
Standard Length	62 College Credits
CTSO	SkillsUSA
SOC Codes (all applicable)	17-3021 - Aerospace Engineering and Operations Technicians 17-3024 - Electro-Mechanical 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 transportation, distribution and logistics 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 transportation, distribution and logistics career cluster.

The content includes but is not limited to communications, ethics, mathematics, science, management, psychology, unmanned systems, private pilot ground school, electronics data acquisition and control, robotics, underwater and surface unmanned systems, operation and application of unmanned systems and techniques to defeat an unmanned vehicle.

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

Program Structure

This program is a planned sequence of instruction consisting of 62 credit hours.

Standards

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

01.0 Demonstrate the ability to communicate effectively.
02.0 Demonstrate the ability to think critically and ethically.
03.0 Apply appropriate mathematical and computational models and methods in problem solving.
04.0 Demonstrate a clear and logical understanding of the fundamental physics principles, laws and applications.
05.0 Demonstrate a comprehensive understanding of the theory, practice, ideals and realities of government and politics in the United States.
06.0 Demonstrate an understanding of weather variables, atmospheric motion participation and topics in modern weather science.
07.0 Apply fundamentals of management to solve problems and improve the organization and operation of business enterprises.
08.0 Demonstrate an understanding of human behavior.
09.0 Demonstrate understanding of unmanned vehicle systems emphasizing the military and commercial history growth and application of UVS's.
10.0 Demonstrate ability to operate a UVS in normal and abnormal conditions.
11.0 Demonstrate aeronautical knowledge required for certification as a private pilot with Airplane Single Engine Land rating.
12.0 Demonstrate personal, interpersonal, intellectual and social skills necessary to succeed in a flight-related college degree program.
13.0 Demonstrate competency in measurement of resistance, current and voltage in any electrical circuit.
14.0 Analyze and report sensor information pertinent to safety of flight and mission accomplishment.
15.0 Demonstrate a practical understanding of remote sensing systems, their respective capabilities and their relationship to unmanned vehicle systems (UVS).
16.0 Demonstrate the ability to operate an unmanned vehicle through either direct visual observation or the remote use of sensors.
17.0 Demonstrate fundamental knowledge of VFR tower terminal operations within US air traffic control system.
18.0 Demonstrate ability to apply knowledge of rules and regulations governing the legal, safe and ethical use of unmanned vehicle systems.
19.0 Demonstrate understanding of how to defeat an unmanned vehicle.

Florida Department of Education
Student Performance Standards

Program Title: **Unmanned Vehicle Systems Operation**
CIP Number: **1615080102**
Program Length: **60 college credits**
SOC Code(s): **17-3021, 17-3024**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:	
01.0	Demonstrate the ability to communicate effectively--The student will be able to:
	01.01 Communicate effectively and accurately in writing.
	01.02 Talk with others to effectively convey information.
	01.03 Listen to others taking time to understand points being made.
	01.04 Understand written sentences and paragraphs in work related documents.
02.0	Demonstrate the ability to think critically and ethically--The student will be able to:
	02.01 Use logic and analysis to identify strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
	02.02 Weigh the relative costs and benefits of a potential action to choose the most appropriate one.
	02.03 Adhere to the highest level of ethical standards in the operation of unmanned vehicle systems.
03.0	Apply appropriate mathematical and computational models and methods in problem solving--The student will be able to:
	03.01 Add, subtract, multiply and divide using fractions, decimals, whole numbers, percentages and ratios.
	03.02 Demonstrate knowledge of arithmetic, algebra and geometry, calculus, statistics and their applications
04.0	Demonstrate a clear and logical understanding of the fundamental physics principles, laws and applications--The student will be able to:
	04.01 Understand the basic concepts of physics and the methods scientist use to explore natural phenomena.
	04.02 Describe the fundamental laws of physics and the application of each.
	04.03 Apply problem solving skills regarding physical phenomena using relevant mathematical models.
05.0	Demonstrate a comprehensive understanding of the theory, practice, ideals and realities of government and politics in the United States--The student will be able to:
	05.01 Understand the structure and development of the American system of government.
	05.02 Identify the structure and roles of the institutions of government.
06.0	Demonstrate an understanding of weather variables, atmospheric motion participation and topics in modern weather science--The student will be able to:

	06.01 Describe the compositions, circulation and stability of the atmosphere.
	06.02 Demonstrate an understanding of air mass development, the movement of fronts and their effect on aviation.
	06.03 Demonstrate an awareness of weather hazards to aviation and an understanding of how to avoid them.
	06.04 Demonstrate the ability to access weather information prior to and during flights through a variety of media.
	06.05 Interpret printed reports, forecasts and graphic weather products.
07.0	Apply fundamentals of management to solve problems and improve the organization and operation of business enterprises--The student will be able to:
	07.01 Identify what management is and what it does.
	07.02 Describe and illustrate basic management functions.
	07.03 Understand the planning, organizing, leading and controlling functions.
	07.04 Create an awareness of the use of operating plans, policies, procedures and rules.
08.0	Demonstrate an understanding of human behavior--The student will be able to:
	08.01 Understand the vocabulary and concepts of psychology.
	08.02 Understand how critical thinking skills are developed.
	08.03 Understand the research upon which the knowledge of human thought and behavior is based.
09.0	Demonstrate understanding of unmanned vehicle systems emphasizing the military and commercial history growth and application of UVS--The student will be able to:
	09.01 Understand the history of UVS in the military.
	09.02 Understand the history of unmanned vehicle systems in the commercial sector.
	09.03 Describe the pros and cons of UVS in each sector.
	09.04 Explain the concerns and challenges associated with the use of UVS in both sectors.
10.0	Demonstrate ability to operate a UVS in normal and abnormal conditions--The student will be able to:
	10.01 Operate a UVS in normal conditions.
	10.02 Operate a UVS in abnormal conditions.
11.0	Demonstrate aeronautical knowledge required for certification as a private pilot with Airplane Single Engine Land rating--The student will be able to:
	11.01 Demonstrate understanding of the National Airspace System.
	11.02 Demonstrate an understanding of aviation charts.
	11.03 Demonstrate an understanding of operational weather factors and a practical understanding of obtaining a weather briefing and making the go-no decision.

	11.04	Demonstrate understanding of the factors which affect airplane performance and a working knowledge of ground reference maneuvers.
	11.05	Calculate weight and balance.
	11.06	Demonstrate understanding of aerodynamics.
	11.07	Demonstrate the ability to make good decisions.
	11.08	Describe the FAA regulations and rules which individuals, private pilots, unmanned aircraft system operators, and general aviation flight must adhere to.
	11.09	Understand the factors that impact safety in flight.
	11.10	Demonstrate understanding of pre-solo maneuvers.
	11.11	Demonstrate knowledge of take-off, landing and enroute performance.
	11.12	Understand airports and airport procedures.
	11.13	Understand pre-solo requirements.
	11.14	Understand the fundamentals of visual navigation.
	11.15	Understand flight planning and weather in planning for solo cross-country flight.
	11.16	Demonstrate practical understanding of radio navigation and enroute navigation.
12.0	Demonstrate personal, interpersonal, intellectual and social skills necessary to succeed in a flight-related college degree program--The student will be able to:	
	12.01	Understand strategies for effectively managing time.
	12.02	Describe effective study skills.
	12.03	Explain principles of learning.
	12.04	Describe the importance of clarifying goals.
	12.05	Identify strategies for coping with challenges.
13.0	Demonstrate competency in measurement of resistance, current and voltage in any electrical circuit--The student will be able to:	
	13.01	Perform measurements and work with electricity in a safe manner.
	13.02	Understand basic concepts.
	13.03	Understand electrical quantities and units.
	13.04	Understand basic circuits, laws and measurements.
14.0	Analyze and report sensor information pertinent to safety of flight and mission accomplishment--The student will be able to:	
	14.01	Understand and be able to process and analyze remote sensory data.

15.0	Demonstrate a practical understanding of remote sensing systems, their respective capabilities and their relationship to unmanned vehicle systems (UVS) --The student will be able to:
	15.01 Understand the overall concepts of sensors and uses.
	15.02 Understand the applications of remote sensory data.
16.0	Demonstrate the ability to operate an unmanned vehicle through either direct visual observation or the remote use of sensors--The student will be able to:
	16.01 Examine control and system programming in the context of specific missions.
	16.02 Operate unmanned vehicle systems.
17.0	Demonstrate fundamental knowledge of VFR tower terminal operations within US air traffic control system--The student will be able to:
	17.01 Understand controller and pilot phraseology.
	17.02 Understand role and responsibilities of tower terminal operations.
18.0	Demonstrate ability to apply knowledge of rules and regulations governing the legal, safe and ethical use of unmanned vehicle systems--The student will be able to:
	18.01 Understand and be able to apply local, state and federal regulations regarding the operation of UVS.
	18.02 Adhere to the highest ethical standards in the operation of UVS.
19.0	Demonstrate understanding of how to defeat an unmanned vehicle system--The student will be able to:
	19.01 Understand the components of UVS systems that are vulnerable to hacking.
	19.02 Understand the concepts of GPS spoofing.
	19.03 Understand spoofing attacks countermeasures.
	19.04 Understand GPS signal jamming.
	19.05 Understand the use of cyber-attacks malware against UVS.

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

In order for this A.S. degree to be offered by a Florida college the facility and devices must undergo a safety inspection according to the guidelines of a recognized and/or accredited organization with expertise in the safe operation of unmanned vehicles. All faculty/instructors must also successfully complete safety training by a recognized organization with expertise in the safe operation of unmanned vehicles.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

Articulation

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

Program Length

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

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: **Aviation Maintenance Administration**
Career Cluster: **Transportation, Distribution and Logistics**

AS	
CIP Number	1647060700
Program Type	College Credit
Standard Length	60 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students who are seeking employment as a supervisor or frontline manager in the aviation maintenance industry. Some students will be able to obtain opportunities in maintenance and repair facilities, corporate or airline maintenance operations, and similar fields.

The content includes but is not limited to, communications skills; leadership skills; directing, planning, and controlling job tasks; human relations and employability skills; safe and efficient work practices. Students will be provided with information on how to obtain Federal Aviation Administration (FAA) certification as and Aviation Maintenance Technician (AMT).

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

Program Structure

This program is a planned sequence of instruction consisting of 60 credit hours.

Standards

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

01.0 Demonstrate an understanding of basic aviation terminology and history.
02.0 Demonstrate an understanding of aviation operations practices, limitations and procedures.
03.0 Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation.
04.0 Demonstrate an understanding of fundamentals of flight.
05.0 Demonstrate understanding of meteorology.
06.0 Demonstrate an understanding of aviation safety and human factors, including accident prevention.
07.0 Demonstrate the human relations skills necessary for success in supervision.
08.0 Demonstrate a practical approach to job management.
09.0 Demonstrate effective communication skills.
10.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Aviation Maintenance Administration**
CIP Numbers: **1647060700**
Program Length: **60 credit hours**
SOC Code(s): **49-3011**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of basic aviation terminology and history--The student will be able to:
01.01	Explain the overall scope and breadth of the aviation industry including its impact on the economy.
01.02	Distinguish the terms and vocabularies that are used in the aerospace and commercial aviation industry.
01.03	Describe the history of technological, governmental, social and economic developments of aviation.
01.04	Explain the different types and categories of aircraft in use in the industry by distinguishing and identifying: Various wide body, narrow body types and general aviation aircraft.
01.05	Demonstrate an understanding of the oversight role of the Federal Government and its effect on the aviation industry.
02.0	Demonstrate an understanding of aviation operations practices, limitations and procedures--The student will be able to:
02.01	Demonstrate knowledge of aircraft systems as they apply to flight operations, including engines, fuel, electrical, hydraulics, pneumatics, flight controls and avionics.
02.02	Understand the various factors of aircraft performance, including takeoff, enroute and landing limitations and weight and balance.
02.03	Demonstrate knowledge of the function of flight operations, including pilot hiring, training, standards, safety issues, security issues, FAA and TSA regulations, documentation requirements, operations specifications, operating within the ATC system, and crew scheduling as well as flight attendant and aircraft dispatcher requirements.
02.04	Describe maintenance operations and their role and effect on flight operations.
02.05	Demonstrate an understanding of the role of the flight operations professional in aviation economic and planning functions.
02.06	Explain FAA requirements such as flight standards, types of certificates, training and record keeping, surveillance, and investigations, as well as the operator's response and its relationship with the FAA.
02.07	Describe the role of the National Transportation Safety Board in accident investigation, NASA's role in aviation safety reporting systems and research, and industry-specific safety reporting programs.
02.08	Demonstrate knowledge of the application of information technology systems in flight operations as they relate to flight planning systems, flight management systems, satellite communication and navigation systems, weight and balance, maintenance monitoring, and management information systems.
03.0	Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation--The student will be able to:
03.01	Demonstrate knowledge of the history and foundations of the legal and court system in the United States as it pertains to development of aviation law and regulations.

	03.02	Describe the state and federal system of trial, appellate and supreme courts as well as subject matter jurisdiction.
	03.03	Explain the role and function of the U.S. DOT, FAA, TSA, and the NTSB as it relates to their legal responsibilities and authority.
	03.04	Demonstrate knowledge of airmen rights and responsibilities, negligence, FAA enforcement, immunity, and degrees of care.
	03.05	Explain state aviation law relating to airports, fixed based operators, aircraft sales, registration, and taxation issues.
	03.06	Demonstrate knowledge of the legal matters relating to the aircraft manufacturing and airline industry, including warranties, products liability, negligence, accident litigation, labor, and consumer issues.
	03.07	Demonstrate knowledge of international air law, bilateral and multilateral agreements, ICAO, IATA, international jurisdiction, and limits of liability and damages.
	03.08	Demonstrate knowledge of legal issues that relate to aviation security.
04.0	Demonstrate an understanding of fundamentals of flight--The student will be able to:	
	04.01	Name and compare the four forces of flight.
	04.02	Describe an airfoil.
	04.03	Explain how lift is produced.
	04.04	Discuss how and why an airplane stalls and spins.
	04.05	Describe and explain how pitot/static vacuum, pressure and engine instruments work.
	04.06	Explain factors affecting aircraft design, performance, and operation.
05.0	Demonstrate understanding of meteorology--The student will be able to:	
	05.01	Describe the composition, circulation and stability of the atmosphere.
	05.02	Demonstrate an understanding of air mass development, the movement of fronts and their effect on aviation.
	05.03	Demonstrate an awareness of weather hazards to aviation and an understanding of how to avoid them.
	05.04	Demonstrate the ability to access weather information prior to and during flights through a variety of media.
	05.05	Interpret printed reports, forecasts and graphic weather products.
06.0	Demonstrate an understanding of aviation safety and human factors, including accident prevention--The student will be able to:	
	06.01	Describe the nature of human factors and sources of errors.
	06.02	Discuss the issues of fatigue, body rhythms and sleep.
	06.03	Describe the effects of fitness and health on human performance.
	06.04	Discuss how motivation and leadership affects safety in aviation.
	06.05	Discuss the role of training devices and education in reducing errors and increasing safety.
	06.06	Describe how the physical layout of displays and controls and space relate to human factors errors.
	06.07	Explain how documentation problems such as manuals and checklists, maps and charts can cause safety issues.

	06.08	Describe how an aviation safety program is designed to create an environment of safety awareness and accident prevention.
	06.09	Discuss the importance of effective Single-Pilot and Crew Resource Management skills, as well as Dispatcher Resource Management skills.
07.0	Demonstrate the human relations skills necessary for success in supervision--The student will be able to:	
	07.01	Develop and demonstrate the unique human relations skills needed for successful job attainment and progress in supervising others.
	07.02	Identify the legal and social environment for supervision.
	07.03	Discuss pertinent legislation and the role of government intervention.
	07.04	Compare and contrast union and non-union organizations.
08.0	Demonstrate a practical approach to job management--The student will be able to:	
	08.01	Identify techniques and strategies in planning and coordinating resources.
	08.02	Demonstrate effective decision making and problem-solving techniques.
	08.03	Compare and contrast methods of work improvement, including quality assurance techniques.
09.0	Demonstrate effective communication skills--The student will be able to:	
	09.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
	09.02	Read and understand graphs, charts, diagrams and tables commonly used in this industry/occupational area.
	09.03	Read and follow written and oral English instructions.
	09.04	Answer and ask questions coherently and concisely.
	09.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
	09.06	Demonstrate appropriate telephone/communication skills.
	09.07	Demonstrate knowledge and use of appropriate computer skills.
	09.08	Demonstrate effective interpersonal skills.
10.0	Demonstrate employability skills--The student will be able to:	
	10.01	Describe positions available and requirements for careers in aviation administration.
	10.02	Describe qualification and certification requirements for careers in aviation administration.
	10.03	Describe the process of obtaining the FAA Aviation Maintenance Technician - Airframe Certificate
	10.04	Describe the process of obtaining the FAA Aviation Maintenance Technician - Powerplant Certificate

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)

SkillsUSA 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.

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.

Program Length

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

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: **Professional Pilot Technology**
Career Cluster: **Transportation, Distribution and Logistics**

AS	
CIP Number	1649010200
Program Type	College Credit
Standard Length	64 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-2011 – Airline Pilots, Copilots, and Flight Engineers 53-2012 – Commercial Pilots
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students for initial employment with occupational titles as aircraft pilot, airplane pilot, commercial (SOC 53-2012), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes but is not limited to, communications skills, leadership skills, human relations and employability skills, safe and efficient work practices, Federal Aviation Administration (FAA) pilot certification procedures, aircraft systems and components, flight safety, physics and aerodynamics, and instrumentation.

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

Program Structure

This program is a planned sequence of instruction consisting of 64 credit hours.

Standards

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

01.0 Demonstrate an understanding of safe and effective work practices.
02.0 Demonstrate an understanding of fundamentals of flight.
03.0 Understand and explain pertinent Federal Aviation Administration Regulations.
04.0 Demonstrate understanding of meteorology.
05.0 Demonstrate knowledge of aircraft communications equipment.
06.0 Demonstrate knowledge and an understanding of aircraft propulsion, and associated systems.
07.0 Demonstrate an understanding of navigation systems and procedures.
08.0 Demonstrate flight planning skills.
09.0 Demonstrate effective communication skills.
10.0 Demonstrate analytical skills.
11.0 Demonstrate understanding of applied sciences.
12.0 Demonstrate employability skills.
13.0 Demonstrate aircraft operations.

Florida Department of Education
Student Performance Standards

Program Title: **Professional Pilot Technology**
CIP Numbers: **1649010200**
Program Length: **64 credit hours**
SOC Code(s): **53-2011, 53-2012**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of safe and effective work practices--The student will be able to:
01.01	Demonstrate an awareness and understanding of health and safety hazards, prevention and correction of environmental problems and know the solutions unique to the industry.
01.02	Demonstrate an awareness and understanding of fueling operations.
01.03	Demonstrate an understanding of situational awareness related to operational hazards.
01.04	Demonstrate an awareness of fire hazards, and awareness of proper techniques to control and extinguish fires.
01.05	Demonstrate an awareness and understanding for the need of safety devices, controls, guards and equipment.
02.0	Demonstrate an understanding of fundamentals of flight--The student will be able to:
02.01	Name and compare the four forces of flight.
02.02	Describe an airfoil.
02.03	Explain how lift is produced.
02.04	Discuss how and why an airplane stalls and spins.
02.05	Describe and explain how pitot/static, vacuum, pressure, and engine instruments work.
02.06	Explain factors affecting aircraft design, performance, and operation.
02.07	Describe and explain how advanced avionics systems work.
03.0	Understand and explain Federal Aviation Administration Regulations--The student will be able to:
03.01	Explain relevant portions of Parts 1, 61, 91, 110, 119, 121, 135, 141 and NTSB 830 of the Federal Aviation Regulations.
04.0	Demonstrate understanding of meteorology--The student will be able to:
04.01	Describe the composition, circulation and stability of the atmosphere.
04.02	Demonstrate an understanding of air mass development, the movement of fronts and their effect on aviation.
04.03	Demonstrate an awareness of weather hazards to aviation and an understanding of how to avoid them.
04.04	Demonstrate the ability to access weather information prior to and during flights through a variety of media.

	04.05 Interpret printed reports, forecasts and graphic weather products.
05.0	Demonstrate knowledge of aircraft communication equipment--The student will be able to:
	05.01 Use and explain aircraft voice communication equipment.
	05.02 Explain function and use of ELT's, voice recorders, and other emergency communication systems.
	05.03 Demonstrate use of proper phraseology in ATC communications.
	05.04 Discuss uses and limitations of portable transceivers.
	05.05 Demonstrate use of phonetic alphabet.
06.0	Demonstrate knowledge and understanding of aircraft propulsion and associated systems--The student will be able to:
	06.01 Describe and identify reciprocating and turbine engine components.
	06.02 Describe a typical engine lubrication system.
	06.03 Describe a typical magneto ignition system, including proper magneto checks.
	06.04 Describe the difference between a normally aspirated engine and one that is supercharged or turbocharged.
	06.05 Demonstrate basic operation of an aircraft engine, including proper interpretation of instruments and use of appropriate engine controls.
07.0	Demonstrate an understanding of navigation systems and procedures--The student will be able to:
	07.01 Define radio navigation using both conventional and advanced avionics.
	07.02 Explain the magnetic compass.
	07.03 Describe and demonstrate use of VOR equipment and navigation.
	07.04 Describe and demonstrate use of GPS equipment and navigation.
	07.05 Explain DME, GPS, and RNAV principles.
	07.06 Demonstrate the use of a flight computer.
	07.07 Interpret sectional charts.
	07.08 Interpret en route and terminal charts and approach plates.
	07.09 Explain lost communications emergency procedures under VFR and IFR.
	07.10 Read and interpret aircraft performance charts.
	07.11 Plot and explain a cross-country course.
	07.12 Describe the FAA national airspace system.
	07.13 Define DP's and STAR's.
	07.14 Read and interpret instrument approach charts and procedures.

08.0	Demonstrate flight planning skills--The student will be able to:
08.01	Explain relevant portions of Parts 1, 91, 110, 121, 135, and NTSB 830 of the Federal Aviation Regulations.
08.02	Define weight and balance.
08.03	Define center of gravity, moment, datum line, CG envelope, basic empty weight, and gross weight.
08.04	Calculate, compute, and solve given weight and balance problems.
08.05	Determine route of flight.
08.06	Demonstrate acquisition of appropriate weather data.
08.07	Demonstrate proper selection of destination/enroute/alternate airports.
08.08	Explain fuel requirements.
08.09	Calculate aircraft performance.
08.10	Access and analyze NOTAMS.
08.11	Acquire, define, and validate a mission profile.
08.12	Demonstrate the creation of, and explain the effective use of a navigation log.
08.13	Demonstrate methods in VFR/IFR flight planning and demonstrate the ability to make a valid go / no-go decision.
09.0	Demonstrate effective communication skills--The student will be able to:
09.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03	Read and follow written and oral English instructions.
09.04	Answer and ask questions coherently and concisely.
09.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06	Demonstrate telephone/communication skills.
09.07	Demonstrate knowledge and use of appropriate computer skills.
09.08	Demonstrate effective interpersonal skills.
10.0	Demonstrate analytical skills--The student will be able to:
10.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02	Add, subtract, multiply and divide using fractions, decimals, whole numbers, percentages, and ratios.
10.03	Demonstrate understanding and use of the metric system.
11.0	Demonstrate understanding of applied sciences--The student will be able to:

	11.01 Draw conclusions or make inferences from data.
	11.02 Understand pressure measurement in terms of P.S.I., inches of mercury, and metric.
12.0	Demonstrate employability skills--The student will be able to:
	12.01 Explain the process for obtaining an FAA commercial pilot certification, single or multi-engine instrument rating.
13.0	Demonstrate aircraft operations--The student will be able to:
	13.01 Demonstrate the operation of aircraft in accordance with FARs, AFMs, and approved procedures and policies.
	13.02 Identify specific aircraft handling characteristics.
	13.03 Explain and demonstrate effective Single-Pilot and Crew Resource Management skills.
	13.04 Demonstrate proper passenger briefing procedures.
	13.05 Demonstrate completion of post-flight documentation.
	13.06 Demonstrate situational awareness.
	13.07 Demonstrate effective decision-making skills.

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

Prior to beginning flight training, students will be required to obtain an FAA medical certificate and comply with the TSA requirements. Community/State Colleges initiating this program are strongly encouraged to visit existing Florida Community/State Colleges with active programs.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

Articulation

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

Program Length

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

Certificate Programs

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

Commercial Pilot (0649010202) - 24 credit hours

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

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: **Introduction to Transportation, Distribution and Logistics**
Course Type: **Orientation/Exploratory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Middle School	
Course Number	9590350
CIP Number	149590350M
Grade Level	6 - 8
Standard Length	Semester
Teacher Certification	AEROSPACE 7G AUTO MECH @7 7G GASENG RPR @7 7G TEC ED 1 @2 AIR MECH @7 7G DIESEL MECH @7 7G LOG TECH 7G TRANSPORT @4 @7 7G
CTSO	FL-TSA
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the transportation, distribution and logistics career cluster. This includes but is not limited to coherent and rigorous content aligned with the challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the transportation, distribution and logistics career cluster; providing technical skill proficiency, and 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 transportation, distribution and logistics career cluster. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Florida Standards for English Language Development (ELD)

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

English Language Development (ELD) Standards Special Notes:
Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or

interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link: http://www.cpalms.org/uploads/docs/standards/eld/SI.pdf.
For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

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

Program Structure

The length of this course is one semester. This course may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Standards

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

01.0 Demonstrate an understanding of the Transportation Operations career pathway.
02.0 Demonstrate an understanding of the Logistics Planning and Management Services career pathway.
03.0 Demonstrate an understanding of the Warehousing and Distribution Center Operations career pathway.
04.0 Demonstrate an understanding of the Facility and Mobile Equipment Maintenance career pathway.
05.0 Demonstrate an understanding of the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
06.0 Demonstrate an understanding of the Health, Safety and Environmental Management career pathway.
07.0 Demonstrate an understanding of the Sales and Service career pathway.
08.0 Apply leadership and communication skills.
09.0 Describe how information technology is used in the Transportation, Distribution and Logistics career cluster.
10.0 Use information technology tools.

Florida Department of Education
Student Performance Standards

Course Title: **Introduction to Transportation, Distribution and Logistics**
Course Number: **9590350**
Course Length: **Semester**

Course Description:
Beginning with a broad overview of the Transportation, Distribution and Logistics career cluster, students are introduced to the terminology, careers, history, required skills, and technologies associated with each pathway in the Transportation, Distribution and Logistics career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of the Transportation Operations career pathway–The student will be able to:
01.01	Define and use proper terminology associated with the Transportation Operations career pathway.
01.02	Describe some of the careers available in the Transportation Operations career pathway.
01.03	Identify common characteristics of the careers in the Transportation Operations career pathway.
01.04	Research the history of the Transportation Operations career pathway and describe how the associated careers have evolved and impacted society.
01.05	Identify skills required to successfully enter any career in the Transportation Operations career pathway.
01.06	Describe technologies associated in careers within the Transportation Operations career pathway.
02.0	Demonstrate an understanding of the Logistics Planning and Management Services career pathway–The student will be able to:
02.01	Define and use proper terminology associated with the Logistics Planning and Management Services career pathway.
02.02	Describe some of the careers available in the Logistics Planning and Management Services career pathway.
02.03	Identify common characteristics of the careers in the Logistics Planning and Management Services career pathway.
02.04	Research the history of the Logistics Planning and Management Services career pathway and describe how the careers have evolved and impacted society.
02.05	Identify skills required to successfully enter any career in the Logistics Planning and Management Services career pathway.
02.06	Describe technologies associated in careers within the Logistics Planning and Management Services career pathway.
03.0	Demonstrate an understanding of the Warehousing and Distribution Center Operations career pathway–The student will be able to:
03.01	Define and use proper terminology associated with the Warehousing and Distribution Center Operations career pathway.
03.02	Describe some of the careers available in the Warehousing and Distribution Center Operations career pathway.
03.03	Identify common characteristics of the careers in the Warehousing and Distribution Center Operations career pathway.

CTE Standards and Benchmarks	
03.04	Research the history of the Warehousing and Distribution Center Operations career pathway and describe how the careers have evolved and impacted society.
03.05	Identify skills required to successfully enter any career in the Warehousing and Distribution Center Operations career pathway.
03.06	Describe technologies associated in careers within the Warehousing and Distribution Center Operations career pathway.
04.0	Demonstrate an understanding of the Facility and Mobile Equipment Maintenance career pathway–The student will be able to:
04.01	Define and use proper terminology associated with the Facility and Mobile Equipment Maintenance career pathway.
04.02	Describe some of the careers available in the Facility and Mobile Equipment Maintenance career pathway.
04.03	Identify common characteristics of the careers in the Facility and Mobile Equipment Maintenance career pathway.
04.04	Research the history of the Facility and Mobile Equipment Maintenance career pathway and describe how the careers have evolved and impacted society.
04.05	Identify skills required to successfully enter any career in the Facility and Mobile Equipment Maintenance career pathway.
04.06	Describe technologies associated in careers within the Facility and Mobile Equipment Maintenance career pathway.
05.0	Demonstrate an understanding of the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway–The student will be able to:
05.01	Define and use proper terminology associated with the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.02	Describe some of the careers available in the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.03	Identify common characteristics of the careers in the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.04	Research the history of the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway and describe how the careers have evolved and impacted society.
05.05	Identify skills required to successfully enter any career in the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.06	Describe technologies associated in careers within the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
06.0	Demonstrate an understanding of the Health, Safety and Environmental Management career pathway–The student will be able to:
06.01	Define and use proper terminology associated with the Health, Safety and Environmental Management career pathway.
06.02	Describe some of the careers available in the Health, Safety and Environmental Management career pathway.
06.03	Identify common characteristics of the careers in the Health, Safety and Environmental Management career pathway.
06.04	Research the history of the Health, Safety and Environmental Management career pathway and describe how the careers have evolved and impacted society.
06.05	Identify skills required to successfully enter any career in the Health, Safety and Environmental Management career pathway.
06.06	Describe technologies associated in careers within the Health, Safety and Environmental Management career pathway.

CTE Standards and Benchmarks	
07.0	Demonstrate an understanding of the Sales and Service career pathway–The student will be able to:
07.01	Define and use proper terminology associated with the Sales and Service career pathway.
07.02	Describe some of the careers available in the Sales and Service career pathway.
07.03	Identify common characteristics of the careers in the Sales and Service career pathway.
07.04	Research the history of the Sales and Service career pathway and describe how the careers have evolved and impacted society.
07.05	Identify skills required to successfully enter any career in the Sales and Service career pathway.
07.06	Describe technologies associated in careers within the Sales and Service career pathway.
08.0	Apply leadership and communication skills–The student will be able to:
08.01	Discuss the establishment and history of the FL-TSA organization.
08.02	Identify the characteristics and responsibilities of organizational leaders.
08.03	Demonstrate parliamentary procedure skills during a meeting.
08.04	Participate on a committee which has an assigned task and report to the class.
08.05	Demonstrate effective communication skills through delivery of a speech, a slide presentation, or conducting a demonstration.
08.06	Use a computer to assist in the completion of a project related to the Transportation, Distribution and Logistics career cluster.
09.0	Describe how information technology is used in the Transportation, Distribution and Logistics career cluster–The student will be able to:
09.01	Identify information technology (IT) careers in the Transportation, Distribution and Logistics career cluster, including the responsibilities, tasks and skills they require.
09.02	Relate information technology project management concepts and terms to careers in the Transportation, Distribution and Logistics career cluster.
09.03	Manage information technology components typically used in professions of the Transportation, Distribution and Logistics career cluster.
09.04	Identify security-related ethical and legal IT issues faced by professionals in the transportation, distribution and logistics career cluster.
10.0	Use information technology tools–The student will be able to:
10.01	Identify the functions of web browsers, and use them to access the World Wide Web and other computer resources typically used in the transportation, distribution and logistics career cluster.
10.02	Use e-mail clients to send simple messages and files to other Internet users.
10.03	Demonstrate ways to communicate effectively using Internet technology.
10.04	Use different types of web search engines effectively to locate information relevant to the transportation, distribution and logistics career cluster.

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

The length of this course is one semester. This course may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career and Technical Student Organization (CTSO)

The Florida Technology Student Association (FL-TSA) 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.

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.

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: **Introduction to Transportation, Distribution and Logistics and Career Planning**
Course Type: **Orientation/Exploratory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Middle School	
Course Number	9590360
CIP Number	149590360M
Grade Level	6 - 8
Standard Length	Semester
Teacher Certification	AEROSPACE 7G AUTO MECH @7 7G GASENG RPR @7 7G TEC ED 1 @2 AIR MECH @7 7G DIESEL MECH @7 7G LOG TECH 7G TRANSPORT @4 @7 7G
CTSO	FL-TSA
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the transportation, distribution and logistics career cluster. This includes but is not limited to coherent and rigorous content aligned with the challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the transportation, distribution and logistics career cluster; providing technical skill proficiency, and 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 transportation, distribution and logistics career cluster. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Florida Standards for English Language Development (ELD)

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

English Language Development (ELD) Standards Special Notes:
Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or

interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link: http://www.cpalms.org/uploads/docs/standards/eld/SI.pdf.
For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

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

Program Structure

The length of this course is one semester. This course may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Standards

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

01.0 Demonstrate an understanding of the Transportation Operations career pathway.
02.0 Demonstrate an understanding of the Logistics Planning and Management Services career pathway.
03.0 Demonstrate an understanding of the Warehousing and Distribution Center Operations career pathway.
04.0 Demonstrate an understanding of the Facility and Mobile Equipment Maintenance career pathway.
05.0 Demonstrate an understanding of the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
06.0 Demonstrate an understanding of the Health, Safety and Environmental Management career pathway.
07.0 Demonstrate an understanding of the Sales and Service career pathway.
08.0 Apply leadership and communication skills.
09.0 Describe how information technology is used in the Transportation, Distribution and Logistics career cluster.
10.0 Use information technology tools.

Listed below are the standards that must be met to satisfy the requirements of Section 1003.4156, Florida Statutes

11.0 Describe the influences that societal, economic, and technological changes have on employment trends and future training.
12.0 Develop skills to locate, evaluate, and interpret career information.
13.0 Identify and demonstrate processes for making short and long term goals.
14.0 Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.
15.0 Understand the relationship between educational achievement and career choices/postsecondary options.
16.0 Identify a career cluster and related pathways through an interest assessment that match career and education goals.
17.0 Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.
18.0 Demonstrate knowledge of technology and its application in career fields/clusters.

Florida Department of Education
Student Performance Standards

Course Title: **Introduction to Transportation, Distribution and Logistics and Career Planning**
Course Number: **9590360**
Course Length: **Semester**

Course Description:
Beginning with a broad overview of the transportation, distribution and logistics career cluster, students are introduced to the terminology, careers, history, required skills, and technologies associated with each pathway in the Transportation, Distribution and Logistics career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of the Transportation Operations career pathway–The student will be able to:
01.01	Define and use proper terminology associated with the Transportation Operations career pathway.
01.02	Describe some of the careers available in the Transportation Operations career pathway.
01.03	Identify common characteristics of the careers in the Transportation Operations career pathway.
01.04	Research the history of the Transportation Operations career pathway and describe how the associated careers have evolved and impacted society.
01.05	Identify skills required to successfully enter any career in the Transportation Operations career pathway.
01.06	Describe technologies associated in careers within the Transportation Operations career pathway.
02.0	Demonstrate an understanding of the Logistics Planning and Management Services career pathway–The student will be able to:
02.01	Define and use proper terminology associated with the Logistics Planning and Management Services career pathway.
02.02	Describe some of the careers available in the Logistics Planning and Management Services career pathway.
02.03	Identify common characteristics of the careers in the Logistics Planning and Management Services career pathway.
02.04	Research the history of the Logistics Planning and Management Services career pathway and describe how the careers have evolved and impacted society.
02.05	Identify skills required to successfully enter any career in the Logistics Planning and Management Services career pathway.
02.06	Describe technologies associated in careers within the Logistics Planning and Management Services career pathway.
03.0	Demonstrate an understanding of the Warehousing and Distribution Center Operations career pathway–The student will be able to:
03.01	Define and use proper terminology associated with the Warehousing and Distribution Center Operations career pathway.
03.02	Describe some of the careers available in the Warehousing and Distribution Center Operations career pathway.
03.03	Identify common characteristics of the careers in the Warehousing and Distribution Center Operations career pathway.

CTE Standards and Benchmarks	
03.04	Research the history of the Warehousing and Distribution Center Operations career pathway and describe how the careers have evolved and impacted society.
03.05	Identify skills required to successfully enter any career in the Warehousing and Distribution Center Operations career pathway.
03.06	Describe technologies associated in careers within the Warehousing and Distribution Center Operations career pathway.
04.0	Demonstrate an understanding of the Facility and Mobile Equipment Maintenance career pathway–The student will be able to:
04.01	Define and use proper terminology associated with the Facility and Mobile Equipment Maintenance career pathway.
04.02	Describe some of the careers available in the Facility and Mobile Equipment Maintenance career pathway.
04.03	Identify common characteristics of the careers in the Facility and Mobile Equipment Maintenance career pathway.
04.04	Research the history of the Facility and Mobile Equipment Maintenance career pathway and describe how the careers have evolved and impacted society.
04.05	Identify skills required to successfully enter any career in the Facility and Mobile Equipment Maintenance career pathway.
04.06	Describe technologies associated in careers within the Facility and Mobile Equipment Maintenance career pathway.
05.0	Demonstrate an understanding of the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway–The student will be able to:
05.01	Define and use proper terminology associated with the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.02	Describe some of the careers available in the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.03	Identify common characteristics of the careers in the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.04	Research the history of the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway and describe how the careers have evolved and impacted society.
05.05	Identify skills required to successfully enter any career in the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
05.06	Describe technologies associated in careers within the Transportation Systems/Infrastructure Planning, Management and Regulation career pathway.
06.0	Demonstrate an understanding of the Health, Safety and Environmental Management career pathway–The student will be able to:
06.01	Define and use proper terminology associated with the Health, Safety and Environmental Management career pathway.
06.02	Describe some of the careers available in the Health, Safety and Environmental Management career pathway.
06.03	Identify common characteristics of the careers in the Health, Safety and Environmental Management career pathway.
06.04	Research the history of the Health, Safety and Environmental Management career pathway and describe how the careers have evolved and impacted society.
06.05	Identify skills required to successfully enter any career in the Health, Safety and Environmental Management career pathway.
06.06	Describe technologies associated in careers within the Health, Safety and Environmental Management career pathway.

CTE Standards and Benchmarks	
07.0	Demonstrate an understanding of the Sales and Service career pathway–The student will be able to:
07.01	Define and use proper terminology associated with the Sales and Service career pathway.
07.02	Describe some of the careers available in the Sales and Service career pathway.
07.03	Identify common characteristics of the careers in the Sales and Service career pathway.
07.04	Research the history of the Sales and Service career pathway and describe how the careers have evolved and impacted society.
07.05	Identify skills required to successfully enter any career in the Sales and Service career pathway.
07.06	Describe technologies associated in careers within the Sales and Service career pathway.
08.0	Apply leadership and communication skills–The student will be able to:
08.01	Discuss the establishment and history of the FL-TSA organization.
08.02	Identify the characteristics and responsibilities of organizational leaders.
08.03	Demonstrate parliamentary procedure skills during a meeting.
08.04	Participate on a committee which has an assigned task and report to the class.
08.05	Demonstrate effective communication skills through delivery of a speech, a slide presentation, or conducting a demonstration.
08.06	Use a computer to assist in the completion of a project related to the Transportation, Distribution and Logistics career cluster.
09.0	Describe how information technology is used in the Transportation, Distribution and Logistics career cluster–The student will be able to:
09.01	Identify information technology (IT) careers in the Transportation, Distribution and Logistics career cluster, including the responsibilities, tasks and skills they require.
09.02	Relate information technology project management concepts and terms to careers in the Transportation, Distribution and Logistics career cluster.
09.03	Manage information technology components typically used in professions of the Transportation, Distribution and Logistics career cluster.
09.04	Identify security-related ethical and legal IT issues faced by professionals in the Transportation, Distribution and Logistics career cluster.
10.0	Use information technology tools–The student will be able to:
10.01	Identify the functions of web browsers, and use them to access the World Wide Web and other computer resources typically used in the Transportation, Distribution and Logistics career cluster.
10.02	Use e-mail clients to send simple messages and files to other Internet users.
10.03	Demonstrate ways to communicate effectively using Internet technology.
10.04	Use different types of web search engines effectively to locate information relevant to the Transportation, Distribution and Logistics career cluster.
Listed below are the standards that must be met to satisfy the requirements of Section 1003.4156, Florida Statutes--The student will be able to:	

CTE Standards and Benchmarks	
11.0	Describe the influences that societal, economic, and technological changes have on employment trends and future training.
12.0	Develop skills to locate, evaluate, and interpret career information.
13.0	Identify and demonstrate processes for making short and long term goals.
14.0	Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.
15.0	Understand the relationship between educational achievement and career choices/postsecondary options.
16.0	Identify a career cluster and related pathways through an interest assessment that match career and education goals.
17.0	Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.
18.0	Demonstrate knowledge of technology and its application in career fields/clusters.

Additional Information

Laboratory Activities

Laboratory 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

The length of this course is one semester. This course may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career Planning

The requirements of section 1003.4156 (1) (e), Florida Statutes, have been integrated into this course. The statute requires that students take a career and education planning course that must result in a completed personalized academic and career plan for the student; must emphasize the importance of entrepreneurship skills; must emphasize technology or the application of technology in career fields; and, beginning in the 2014-2015 academic year, must provide information from the Department of Economic Opportunity's economic security report as described in section 445.07, Florida Statutes. For additional information on the Middle School Career and Education Planning course requirements, go to http://www.fldoe.org/workforce/ced/.

Career and Technical Student Organization (CTSO)

The Florida Technology Student Association (FL-TSA) 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.

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.

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: **Fundamentals of Transportation**
Course Type: **Orientation/Exploratory**
Career Cluster: **Transportation, Distribution and Logistics**

Secondary – Middle School	
Course Number	9590400
CIP Number	149590400M
Grade Level	6 - 8
Standard Length	Semester
Teacher Certification	AEROSPACE 7G AUTO MECH @7 7G GASENG RPR @7 7G TEC ED 1 @2 AIR MECH @7 7G DIESEL MECH @7 7G LOG TECH 7G TRANSPORT @4 @7 7G
CTSO	FL-TSA
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the transportation, distribution and logistics career cluster. This course provides students with opportunities to become familiar with related careers and develop fundamental technological literacy as they learn about the history, systems, and processes of transportation. In addition, the course will provide an overview of the safe use of tools and equipment used in the industry.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Florida Standards for English Language Development (ELD)

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

English Language Development (ELD) Standards Special Notes:
Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and

teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link: http://www.cpalms.org/uploads/docs/standards/eld/SI.pdf.
For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

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

Standards

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

01.0 Demonstrate an understanding of the societal impact of transportation.
02.0 Research the history of the transportation industry**.**
03.0 Demonstrate knowledge of service publications by selecting the correct source and locating information found in each.
04.0 Demonstrate an understanding of the major components of ground, air and maritime transportation vehicles.
05.0 Demonstrate knowledge of safety, OSHA, EPA issues and procedures.
06.0 Identify and measure fasteners used in the aerospace, ground and maritime transportation industry.
07.0 Identify, select and use the proper tool for a given fastener or job.
08.0 Identify and measure components of an engine used in the aerospace, ground and maritime transportation industry.
09.0 Inspect an aerospace, ground and maritime transportation vehicle for maintenance needed for safe operation.
10.0 Demonstrate an understanding of basic electricity and electronics.
11.0 Demonstrate knowledge of current and alternative fuel sources.
12.0 Use visual and verbal communication to present employment and career opportunities in transportation
13.0 Students will develop leadership and interpersonal problem-solving skills through participation in co-curricular activities.
14.0 Identify components of network systems.
15.0 Describe and use communication features of information technology.

Florida Department of Education
Student Performance Standards

Course Title: **Fundamentals of Transportation**
Course Number: **9590400**
Course Length: **Semester**

Course Description:
This course provides students with opportunities to become familiar with related careers and develop fundamental technological literacy as they learn about the history, systems, and processes of transportation. In addition, the course will provide an overview of the safe use of tools and equipment used in the industry.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of the societal impact of transportation--The student will be able to:
01.01	Track the evolution of transportation and its impact on society.
01.02	Explain the educational requirements and professional expectations associated with a career in transportation.
01.03	Describe the impact of governmental and political systems on transportation.
01.04	Explain the interaction between transportation industries and social change.
01.05	Explain how transportation made the United States a world leader.
01.06	Describe the relationship between transportation and the environment.
01.07	Explain the importance of a technologically literate workforce to the transportation industry.
02.0	Research the history of the transportation industry--The student will be able to:
02.01	Trace the development of transportation in the United States from a historical perspective.
02.02	Explain the economic impact of the transportation industry at the local and national levels.
02.03	Describe the impact of transportation on a global scale.
02.04	Describe the differences and similarities between ground, air, and maritime travels.
03.0	Demonstrate knowledge of service publications by selecting the correct source and locating information found in each--The student will be able to:
03.01	Identify aerospace, ground and maritime service publications such as; owner's manuals, manufacturer's manuals and electronic service publications and Federal Aviation Regulations.
03.02	Read service publications to retrieve desired information.
03.03	Describe the basic types of troubleshooting charts found in service publications.
04.0	Demonstrate an understanding of the major components of ground, air and maritime transportation vehicles--The student will be able to:

CTE Standards and Benchmarks	
	04.01 Identify and locate important parts of ground, air, and maritime transportation vehicles.
	04.02 Describe the purpose of the fundamental transportation systems.
	04.03 Explain how each transportation system works dependent and independently of each other.
	04.04 Describe the Merchant Marine and Marine Transportation System.
05.0	Demonstrate knowledge of safety, OSHA, EPA issues and procedures--The student will be able to:
	05.01 Define OSHA and how it oversees and provides safety guidelines to the transportation industry.
	05.02 Describe the typical layout and sections of a ground, air and maritime transportation lab.
	05.03 List the types of accidents that can occur in a ground, air and maritime transportation lab.
	05.04 Explain how to prevent ground, air and maritime transportation lab accidents.
	05.05 Describe the general rules for the ground, air and maritime transportation lab.
	05.06 Explain federal, state, and local rules and regulations regarding environmental issues related to the work of the ground, air and maritime transportation industry.
06.0	Identify and measure fasteners used in the aerospace, ground and maritime transportation industry--The student will be able to:
	06.01 Identify the different fasteners such as; screws, bolts, washers, nuts, rivets, etc. that are used in the aerospace, ground and maritime transportation industry.
	06.02 Explain the functions and applications of various fasteners.
	06.03 Demonstrate how to measure fasteners.
	06.04 Identify the proper hand tools and safe uses when working with fasteners used in the aerospace, ground, and maritime transportation industry.
07.0	Identify, select and use the proper tool for a given fastener or job--The student will be able to:
	07.01 Identify common ground, air and maritime transportation hand and power tools and proper uses.
	07.02 List safety rules for common ground, air and maritime transportation hand and power tools.
	07.03 Explain how to maintain and store tools properly.
08.0	Identify and measure components of an engine used in the aerospace, ground and maritime transportation industry--The student will be able to:
	08.01 Introduce and explain the major components of an aerospace/transportation engine.
	08.02 Demonstrate how to properly measure each component.
	08.03 Explain the different instruments used for engine measurements.
	08.04 Discuss various propulsion systems for maritime vessels.
09.0	Inspect an aerospace, ground and maritime transportation vehicle for maintenance needed for safe operation--The student will be able to:

CTE Standards and Benchmarks	
	09.01 Explain the importance of vehicle maintenance.
	09.02 Demonstrate how to check fluid levels, belts, hoses, tires, etc.
	09.03 Demonstrate safe practices while working with fluids.
10.0	Demonstrate an understanding of basic electricity and electronics--The student will be able to:
	10.01 Explain the principles of electricity.
	10.02 Describe the basic electrical circuits.
	10.03 Identify basic electrical and electronic terms and components.
	10.04 Calculate and measure voltage, resistance and amperage.
	10.05 Explain different kinds of aerospace/transportation vehicle wiring.
	10.06 Repair and build electrical circuits.
	10.07 Demonstrate fundamental electrical testing.
11.0	Demonstrate knowledge of current and alternative fuel sources--The student will be able to:
	11.01 Summarize how crude oil is converted to gasoline and diesel fuels.
	11.02 Describe properties of gasoline and diesel fuels.
	11.03 Summarize properties of alternative fuels.
	11.04 Compare and contrast benefits of green fuels and energy production.
12.0	Use visual and verbal communication to present employment and career opportunities in transportation--The student will be able to:
	12.01 Present a technical report to an audience regarding a researched transportation related career using multimedia.
	12.02 Prepare and produce a portfolio representing experiences throughout the course of study.
13.0	Students will develop leadership and interpersonal problem-solving skills through participation in co-curricular activities.--The student will be able to:
	13.01 Demonstrate effective communication skills.
	13.02 Participate in teamwork to accomplish specified organizational goals.
	13.03 Demonstrate cooperation and understanding with persons who are ethnically and culturally diverse.
14.0	Identify components of network systems--The student will be able to:
	14.01 Identify structure to access internet, including hardware and software components.
	14.02 Identify and configure user customization features in web browsers, including preferences, caching, and cookies.
	14.03 Recognize essential database concepts.

CTE Standards and Benchmarks	
	14.04 Define and use additional networking and internet services.
15.0	Describe and use communication features of information technology--The student will be able to:
	15.01 Define important internet communications protocols and their roles in delivering basic Internet services.
	15.02 Identify basic principles of the Domain Name System (DNS).
	15.03 Identify security issues related to Internet clients.
	15.04 Identify and use principles of personal information management (PIM), including common applications.
	15.05 Efficiently transmit text and binary files using popular Internet services.
	15.06 Conduct a webcast and related services.
	15.07 Represent technical issues to a non-technical audience.

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

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

Career and Technical Student Organization (CTSO)

The Florida Technology Student Association (FL-TSA) 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.

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.

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: **Aviation Maintenance Management**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been daggered for deletion with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, no new students may be enrolled in this program.** Students already enrolled in the program may continue taking courses in the program until completion. The replacement program is the Aviation Maintenance Administration AS degree (1647060700)

AS	
CIP Number	1649010401
Program Type	College Credit
Standard Length	83 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for a mechanic certificate and rating(s). Instruction is designed to qualify students for Federal Aviation Administration (FAA) examinations for aviation maintenance powerplant and airframe technician certification as prescribed by FAR 147. The program content should also include training in communication, management leadership, human relations, supervisory and employability skills; and safe, efficient work practices.

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 83 credit hours.

Standards

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

01.0 Perform basic electricity skills.
02.0 Perform basic aircraft drawing skills.
03.0 Demonstrate aircraft weight and balance skills.
04.0 Maintain aircraft fluid lines and fittings.
05.0 Perform aircraft materials and process skills.
06.0 Perform ground operations and servicing duties.
07.0 Perform cleaning and corrosion control operations.
08.0 Demonstrate mathematics skills.
09.0 Maintain forms and records.
10.0 Apply principles of basic physics.
11.0 Demonstrate the use of maintenance publications.
12.0 Interpret mechanic privileges.
13.0 Perform basic reciprocating engine skills.
14.0 Perform basic turbine engine skills.
15.0 Perform engine inspection.
16.0 Maintain engine instrument systems.
17.0 Maintain engine fire protection systems.
18.0 Maintain engine electrical systems.
19.0 Maintain lubrication systems.
20.0 Maintain ignition systems.
21.0 Maintain fuel metering systems.
22.0 Maintain engine fuel systems.
23.0 Maintain induction and engine airflow systems.
24.0 Maintain engine cooling systems.
25.0 Maintain engine exhaust systems.
26.0 Maintain aircraft propellers.
27.0 Maintain unducted fans.
28.0 Maintain auxiliary power units
29.0 Maintain wood structures.
30.0 Perform aircraft covering.
31.0 Apply aircraft finishes.
32.0 Repair sheetmetal structures.
33.0 Perform aircraft welding.
34.0 Perform airframe assembly and rigging.
35.0 Perform airframe inspection.
36.0 Maintain aircraft landing gear systems.
37.0 Maintain hydraulic and pneumatic power systems.
38.0 Maintain cabin atmosphere control systems.

39.0 Maintain aircraft instrument systems.
40.0 Maintain communication and navigation systems.
41.0 Inspect and repair aircraft fuel systems.
42.0 Inspect or repair aircraft electrical systems.
43.0 Inspect and repair position and warning systems.
44.0 Maintain ice and rain control systems.
45.0 Inspect and repair aircraft fire protection systems.
46.0 Demonstrate knowledge of FAA aircraft mechanic licensing requirements.
47.0 Demonstrate the human relations skills necessary for success in supervision.
48.0 Demonstrate knowledge of skills and attitudes the supervisor needs for effective performance.
49.0 Demonstrate a practical approach to job management.
50.0 Demonstrate appropriate communication skills.
51.0 Demonstrate employability skills.
52.0 Demonstrate an understanding of computer skills.

Florida Department of Education
Student Performance Standards

Program Title: **Aviation Maintenance Management**
CIP Numbers: **1649010401**
Program Length: **83 credit hours**
SOC Code(s): **49-3011**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:		**FAA FAR Part 147**
01.0	Perform basic electricity skills--The student will be able to:	
01.01	Calculate and measure capacitance and inductance.	App. B, A, 1. Level 2
01.02	Calculate and measure electrical power.	App. B, A, 2. Level 2
01.03	Measure voltage, current, resistance, and continuity.	App. B, A, 3. Level 3
01.04	Determine the relationship of voltage, current, and resistance in electrical circuits.	App. B, A, 4. Level 3
01.05	Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.	App. B, A, 5. Level 3
01.06	Inspect and service batteries.	App. B, A, 6. Level 3
01.07	Utilize proper electrical safety procedures.	
01.08	Troubleshoot electrical systems.	
02.0	Perform basic aircraft drawing skills--The student will be able to:	
02.01	Use aircraft drawings, symbols, and system schematics.	App. B, B, 7. Level 2
02.02	Draw sketches of repairs and alterations.	App. B, B, 8. Level 3
02.03	Use blueprint information.	App. B, B, 9. Level 3
02.04	Use graphs and charts.	App. B, B, 10. Level 3
03.0	Demonstrate aircraft weight and balance skills--The student will be able to:	
03.01	Weigh aircraft.	App. B, C, 11. Level 2
03.02	Perform complete weight-and-balance check and record data.	App. B, C, 12. Level 3
04.0	Maintain aircraft fluid lines and fittings--The student will be able to:	
04.01	Fabricate and install rigid and flexible fluid lines and fittings.	App. B, D, 13. Level 3
05.0	Perform aircraft materials and processes skills--The student will be able to:	

	05.01 Identify and select appropriate nondestructive testing methods.	App. B, E, 14. Level 1
	05.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.	App. B, E, 15. Level 2
	05.03 Perform basic heat-treating processes.	App. B, E, 16. Level 1
	05.04 Identify and select aircraft hardware and materials.	App. B, E, 17. Level 3
	05.05 Inspect and check welds.	App. B, E, 18. Level 3
	05.06 Perform precision measurements.	App. B, E, 19. Level 3
	05.07 Perform safety wiring techniques.	
06.0	Perform ground operations and servicing duties--The student will be able to:	
	06.01 Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards.	App. B, F, 20. Level 2
	06.02 Identify and select fuels.	App. B, F, 21. Level 2
	06.03 Comply with prescribed shop and personal safety procedures.	
07.0	Perform cleaning and corrosion control operations--The student will be able to:	
	07.01 Identify and select cleaning materials.	App. B, G, 22. Level 3
	07.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning.	App. B, G, 23. Level 3
	07.03 Identify and utilize appropriate equipment for cleaning and corrosion control.	
	07.04 Observe appropriate personal safety procedures for corrosive chemicals.	
08.0	Demonstrate mathematical skills--The student will be able to:	
	08.01 Extract roots and raise numbers to a given power.	App. B, H, 24. Level 3
	08.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.	App. B, H, 25. Level 3
	08.03 Solve ratio, proportion, and percentage problems.	App. B, H, 26. Level 3
	08.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	App. B, H, 27. Level 3
	08.05 Solve linear inequalities in one variable and applied problems.	
	08.06 Factor polynomials.	
	08.07 Simplify algebraic fractions, complex fractions and solve rational and literal equations and applied problems.	
	08.08 Determine areas and volumes of various geometrical shapes.	
	08.09 Solve ratio, proportion, and percentage problems.	
	08.10 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	

	08.11 Graph linear equations and inequalities in two variables and solve graph systems of linear equations and inequalities in two variables.	
	08.12 Solve and graph quadratic equations and inequalities with real solutions and solve related word problems.	
	08.13 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.	
	08.14 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.	
	08.15 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.	
	08.16 Determine the correct purchase price, to include sales tax, for a materials list containing a minimum of six items.	
	08.17 Demonstrate an understanding of federal, state and local taxes and their computation.	
09.0	Maintain forms and records--The student will be able to:	
	09.01 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.	App. B, I, 28. Level 3
	09.02 Complete required maintenance forms, records, and inspection reports.	App. B, I, 29. Level 3
10.0	Apply principles of basic physics--The student will be able to:	
	10.01 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.	App. B, J, 30. Level 2
	10.02 Understand molecular action as a result of temperature extremes, chemical reactions, and moisture content.	
	10.03 Draw conclusions or make inferences from data.	
	10.04 Identify health-related problems which may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.	
	10.05 Understand pressure measurement in terms of P.S.I., inches of mercury and K.P.A.	
11.0	Demonstrate the use of maintenance publications--The student will be able to:	
	11.01 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.	App. B, K, 31. Level 3
	11.02 Read technical data.	App. B, K, 32. Level 3
12.0	Interpret mechanic privileges--The student will be able to:	
	12.01 Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.	App. B, L, 33. Level 3
13.0	Perform basic reciprocating engine skills--The student will be able to:	
	13.01 Inspect and repair a radial engine.	App. D, I, A, 1. Level 1
	13.02 Overhaul reciprocating engine.	App. D, I, A, 2. Level 2

	13.03 Inspect, check, service, and repair reciprocating engines and engine installations.	App. D, I, A, 3. Level 3
	13.04 Install, troubleshoot, and remove reciprocating engines.	App. D, I, A, 4. Level 3
14.0	Perform basic turbine engine skills--The student will be able to:	
	14.01 Overhaul turbine engine.	App. D, I, B, 5. Level 2
	14.02 Inspect, check, service, and repair turbine engines and turbine engine installations.	App. D, I, B, 6. Level 3
	14.03 Install, troubleshoot, and remove turbine engines.	App. D, I, B, 7. Level 3
15.0	Perform engine inspection--The student will be able to:	
	15.01 Perform powerplant conformity and air worthiness inspections.	App. D, I, C, 8. Level 3
16.0	Maintain engine instrument systems--The student will be able to:	
	16.01 Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.	App. D, II, A, 9. Level 2
	16.02 Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and r.p.m. indicating systems.	App. D, II, A, 10. Level 2
17.0	Maintain engine fire protection systems--The student will be able to:	
	17.01 Inspect, check service, troubleshoot, and repair engine fire detection and extinguishing systems.	App. D, II, B, 11. Level 3
18.0	Maintain engine electrical systems--The student will be able to:	
	18.01 Repair engine electrical system components.	App. D, II, C, 12. Level 2
	18.02 Install, check and service engine electrical wiring, controls, indicators, and protective devices.	App. D, II, C, 13. Level 3
19.0	Maintain lubrication systems--The student will be able to:	
	19.01 Identify and select lubricants.	App. D, II, D, 14. Level 2
	19.02 Repair engine lubrication system components.	App. D, II, D, 15. Level 2
	19.03 Inspect, check, service, troubleshoot, and repair engine lubrication system.	App. D, II, D, 16. Level 3
20.0	Maintain ignition systems--The student will be able to:	
	20.01 Overhaul magneto and ignition harness.	App. D, II, E, 17. Level 2
	20.02 Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.	App. D, II, E, 18. Level 2
	20.03 Inspect, service, troubleshoot, and repair turbine engine electrical starting systems.	App. D, II, E, 19a. Level 3
21.0	Maintain fuel metering systems--The student will be able to:	
	21.01 Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls.	App. D, II, F, 20. Level 1
	21.02 Overhaul carburetor.	App. D, II, F, 21. Level 1
	21.03 Repair engine fuel metering system components.	App. D, II, F, 22. Level 2

	21.04 Inspect, check, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.	App. D, II, F, 23. Level 3
22.0	Maintain engine fuel systems--The student will be able to:	
	22.01 Repair engine fuel system components.	App. D, II, G, 24. Level 2
	22.02 Inspect, check, service, troubleshoot, and repair engine fuel systems.	App. D, II, G, 25. Level 3
23.0	Maintain induction and engine airflow systems --The student will be able to:	
	23.01 Inspect, check, troubleshoot, service and repair engine ice and rain control systems.	App. D, II, H, 26. Level 2
	23.02 Inspect, check, service, troubleshoot and repair heat exchangers, superchargers and turbine engine airflow and temperature control systems.	App. D, II, H, 27. Level 1
	23.03 Inspect, check, service, and repair carburetor air intake and induction manifolds.	App. D, II, H, 28. Level 3
24.0	Maintain engine cooling systems--The student will be able to:	
	24.01 Repair engine cooling system components.	App. D, II, I, 29. Level 2
	24.02 Inspect, check, troubleshoot, service and repair engine cooling systems.	App. D, II, I, 30. Level 3
25.0	Maintain engine exhaust systems--The student will be able to:	
	25.01 Repair engine exhaust system components.	App. D, II, J, 31. Level 2
	25.02 Inspect, check, troubleshoot, service and repair engine exhaust systems.	App. D, II, J, 32a. Level 3
	25.03 Troubleshoot and repair engine thrust reverser systems and related components.	App. D, II, J, 32b. Level 1
26.0	Maintain aircraft propellers--The student will be able to:	
	26.01 Inspect, check, service and repair propeller synchronizing and ice control systems.	App. D, II, K, 33. Level 1
	26.02 Identify and select propeller lubricants.	App. D, II, K, 34. Level 2
	26.03 Balance propellers.	App. D, II, K, 35. Level 1
	26.04 Repair propeller control system components.	App. D, II, K, 36. Level 2
	26.05 Inspect, check, service, and repair fixed-pitch, constant-speed, and feathering propellers, and propeller governing systems.	App. D, II, K, 37. Level 3
	26.06 Install, troubleshoot and remove propellers.	App. D, II, K, 38. Level 3
	26.07 Repair aluminum alloy propeller blades.	App. D, II, K, 39. Level 3
27.0	Maintain Unducted Fans-The student will be able to:	
	27.01 Inspect and troubleshoot unducted fan systems and components.	App. D, II, L, 40. Level 1
28.0	Maintain Auxiliary Power Units-The student will be able to:	
	28.01 Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.	
29.0	Maintain wood structures--The student will be able to:	

	29.01 Service and repair wood structures.	App. C, I, A, 1. Level 1
	29.02 Identify wood defects.	App. C, I, A, 2. Level 1
	29.03 Inspect wood structures.	App. C, I, A, 3. Level 1
30.0	Perform aircraft covering--The student will be able to:	
	30.01 Select and apply fabric and fiberglass covering materials.	App. C, I, B, 4. Level 1
	30.02 Inspect, test and repair fabric and fiberglass.	App. C, I, B, 5. Level 1
31.0	Apply aircraft finishes--The student will be able to:	
	31.01 Apply trim, letters and touch-up paint.	App. C, I, C, 6. Level 1
	31.02 Identify and select aircraft finishing materials.	App. C, I, C, 7. Level 2
	31.03 Apply finishing materials.	App. C, I, C, 8. Level 2
	31.04 Inspect finishes and identify defects.	App. C, I, C, 9. Level 2
	31.05 Demonstrate an understanding of common safety practices dealing with paints and solvents.	
32.0	Repair sheet metal structures--The student will be able to:	
	32.01 Select, install, and remove special fasteners for metallic, bonded, and composite structures.	App. C, I, D, 10. Level 2
	32.02 Inspect bonded structures.	App. C, I, D, 11. Level 2
	32.03 Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.	App. C, I, D, 12. Level 2
	32.04 Inspect, check, service, and repair windows, doors, and interior furnishings.	App. C, I, D, 13. Level 2
	32.05 Inspect and repair sheet-metal structures.	App. C, I, D, 14. Level 3
	32.06 Install conventional rivets.	App. C, I, D, 15. Level 3
	32.07 Form, lay out, and bend sheet metal.	App. C, I, D, 16. Level 3
33.0	Perform aircraft welding--The student will be able to:	
	33.01 Weld magnesium and titanium.	App. C, I, E, 17. Level 1
	33.02 Solder stainless steel.	App. C, I, E, 18. Level 1
	33.03 Fabricate tubular structures.	App. C, I, E, 19. Level 1
	33.04 Solder, braze, gas-weld and arc-weld steel.	App. C, I, E, 20. Level 2
	33.05 Weld aluminum and stainless steel.	App. C, I, E, 21. Level 1
34.0	Perform airframe assembly and rigging--The student will be able to:	
	34.01 Rig rotary-wing aircraft.	App. C, I, F, 22. Level 1

	34.02 Rig fixed-wing aircraft.	App. C, I, F, 23. Level 2
	34.03 Check alignment of structures.	App. C, I, F, 24. Level 2
	34.04 Assemble aircraft components, including flight control surfaces.	App. C, I, F, 25. Level 3
	34.05 Balance, rig, and inspect movable primary and secondary flight control surfaces.	App. C, I, F, 26. Level 3
	34.06 Jack aircraft.	App. C, I, F, 27. Level 3
35.0	Perform airframe inspection--The student will be able to:	
	35.01 Perform conformity and airworthiness inspections.	App. C, I, G, 28. Level 3
36.0	Maintain aircraft landing gear systems--The student will be able to:	
	36.01 Inspect, check, service, and repair landing gear, retraction systems, shock struts, bakes, wheels, tires, and steering systems.	App. C, II, A, 29. Level 3
	36.02 Utilize proper safety procedures and equipment when working on aircraft with electrical or hydraulic power on.	
	36.03 Utilize proper safety procedures when working on landing gear struts or wheel and tire assemblies.	
37.0	Maintain hydraulic and pneumatic power systems--The student will be able to:	
	37.01 Repair hydraulic and pneumatic power system components.	App. C, II, B, 30. Level 2
	37.02 Identify and select hydraulic fluids.	App. C, II, B, 31. Level 3
	37.03 Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.	App. C, II, B, 32. Level 3
38.0	Maintain cabin atmosphere control systems--The student will be able to:	
	38.01 Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, pressurization systems, and air cycle machines.	App. C, II, C 33. Level 1
	38.02 Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, and pressurization systems.	App. C, II, C 34. Level 1
	38.03 Inspect, check, troubleshoot, service and repair oxygen systems.	App. C, II, C 35. Level 2
39.0	Maintain aircraft instrument systems--The student will be able to:	
	39.01 Inspect, check, service, troubleshoot and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure , and position indicating systems to include the use of built-in test equipment.	App. C, II, D, 36. Level 1
	39.02 Install instruments and perform a static pressure system leak test	App. C, II, D, 37. Level 2
40.0	Maintain communication and navigation systems--The student will be able to:	
	40.01 Inspect, check, and troubleshoot autopilot servos and approach coupling systems.	App. C, II, E, 38. Level 1
	40.02 Inspect, check, and service aircraft electronic communications and navigation systems, including VHF, ILS, LORAN, Radar beacon transponders, flight management computers, and GPWS.	App. C, II, E, 39. Level 1
	40.03 Inspect and repair antenna and electronic equipment installations.	App. C, II, E, 40. Level 2

41.0	Inspect and repair aircraft fuel systems--The student will be able to:	
	41.01 Check and service fuel dump systems.	App. C, II, F, 41. Level 1
	41.02 Perform fuel management, transfer and defueling.	App. C, II, F, 42. Level 1
	41.03 Inspect, check and repair pressure fueling systems.	App. C, II, F, 43. Level 1
	41.04 Repair aircraft fuel system components.	App. C, II, F, 44. Level 2
	41.05 Inspect and repair fluid quantity indicating systems.	App. C, II, F, 45. Level 2
	41.06 Troubleshoot, service and repair fluid and temperature warning systems.	App. C, II, F, 46. Level 2
	41.07 Inspect, check, service, troubleshoot and repair aircraft fuel systems.	App. C, II, F, 47. Level 3
42.0	Inspect and repair aircraft electrical systems--The student will be able to:	
	42.01 Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors.	App. C, II, G, 48. Level 2
	42.02 Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.	App. C, II, G, 49. Level 2
	42.03 Inspect, check, troubleshoot, service and repair alternating and direct current electrical systems.	App. C, II, G, 50a. Level 3
	42.04 Inspect, check, and troubleshoot constant speed and integrated speed drive generators.	App. C, II, G, 50b. Level 1
43.0	Inspect and repair position and warning systems--The student will be able to:	
	43.01 Inspect, check, and service speed and configuration warning systems, electrical brake controls, and anti-skid systems.	App. C, II, H, 51. Level 2
	43.02 Inspect, check, troubleshoot, and service landing gear position indicating and warning systems.	App. C, II, H, 52. Level 3
44.0	Maintain ice and rain control systems--The student will be able to:	
	44.01 Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.	App. C, II, I, 53. Level 2
45.0	Inspect and repair aircraft fire protection systems--The student will be able to:	
	45.01 Inspect, check and service smoke and carbon monoxide detection systems.	App. C, II, J, 54. Level 1
	45.02 Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.	App. C, II, J, 55. Level 3
46.0	Demonstrate knowledge of FAA aircraft mechanic licensing requirements--The student will be able to:	
	46.01 Successfully complete the FAA powerplant written, oral and practical examinations.	
	46.02 Display an FAA powerplant Mechanic's certificate.	
	46.03 Successfully complete the FAA airframe written, oral and practical examinations.	
	46.04 Display an FAA airframe mechanic's certificate.	
47.0	Demonstrate the human relations skills necessary for success in supervision--The student will be able to:	

	47.01 Exhibit the ability to get along with others.	
	47.02 Discuss the importance of human relations.	
	47.03 Develop and demonstrate the unique human relations skills needed for successful job attainment and progress in supervising others.	
48.0	Demonstrate knowledge of skills and attitudes the supervisor needs for effective performance--The student will be able to:	
	48.01 Describe leadership theory and its complexity.	
	48.02 Discuss how a new supervisor is introduced to leadership responsibilities.	
	48.03 Identify the legal and social environment for supervision.	
	48.04 Discuss pertinent legislation and the role of government intervention.	
	48.05 Describe problems in union and non-union organizations.	
49.0	Demonstrate a practical approach to job management--The student will be able to:	
	49.01 Assume responsibility in planning and coordinating resources.	
	49.02 Demonstrate effective decision making and problem-solving techniques.	
	49.03 Implement methods of work improvement.	
50.0	Demonstrate appropriate communication skills--The student will be able to:	
	50.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.	
	50.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.	
	50.03 Read and follow written and oral instructions.	
	50.04 Answer and ask questions coherently and concisely.	
	50.05 Read critically by recognizing assumptions and implications and by evaluating ideas.	
	50.06 Demonstrate appropriate telephone/communication skills.	
	50.07 Describe the importance of clear and concise writing.	
	50.08 Demonstrate proficiency in the effective use of speech and vocabulary.	
	50.09 Explain the importance of good listening skills.	
	50.10 Discuss the role communication plays in management.	
	50.11 Demonstrate the components of the communication process.	
	50.12 Demonstrate effective written communication skills.	
	50.13 Demonstrate effective oral communication skills.	

	50.14 Write technical reports.	
51.0	Demonstrate employability skills--The student will be able to:	
	51.01 Conduct a job search.	
	51.02 Secure information about a job.	
	51.03 Identify documents which may be required when applying for a job.	
	51.04 Complete a job application form correctly.	
	51.05 Demonstrate competence in job interview techniques.	
	51.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.	
	51.07 Identify acceptable work habits.	
	51.08 Demonstrate knowledge of how to make appropriate job changes.	
	51.09 Demonstrate acceptable employee health and grooming habits.	
	51.10 Exhibit punctuality, initiative, courtesy, loyalty and honesty.	
	51.11 Demonstrate knowledge of the “Right-T0-Know Law” as recorded in 29 CFR-1910, 1200.	
52.0	Demonstrate an understanding of computer skills--The student will be able to:	
	52.01 Demonstrate use of spreadsheets, databases and word processing.	
	52.02 Demonstrate use of Internet including locating information, copying and printing web-based information.	
	52.03 Demonstrate general knowledge of computer components.	
	52.04 Demonstrate the location and use of antivirus capability.	
	52.05 Demonstrate the ability to communicate by e-mail.	

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

The purpose of this program is to prepare students for employment as aircraft mechanics (SOC 49-3011), aircraft maintenance supervisors, or aviation maintenance managers. Graduates will be eligible to pursue FAA certification as airframe and powerplant mechanics and will be trained to troubleshoot maintenance problems and supervise mechanics in the aviation industry. This program also provides supplemental training for persons previously or currently employed in this occupation.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Aviation industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues. Since 83 credit hours are required in this curriculum, two summer terms will probably be required to complete the program within two years. Consideration should be given to making one or both summer terms a hands-on cooperative work experience for 5 credit hours.

An important note to consider is that each FAR PART 147 school must be approved by the FAA before any students can be placed in the program.

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147:

For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation. All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:
Common hand tools, portable tools, precision tools, machine tools, torsion tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment.

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician School shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

Articulation

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

Program Length

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. The standard length of this program is 83 credit hours according to Rule 6A-14.030, F.A.C.

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: **Aviation Administration (60)**
Career Cluster: **Transportation, Distribution and Logistics**

AS	
CIP Number	1649010403
Program Type	College Credit
Standard Length	60 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-2022 – Airfield Operations Specialists 53-2021 – Air Traffic Controllers 53-1011 – Aircraft Cargo Handling Supervisors 43-4051 – Customer Service Representatives
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students who are seeking employment in the aviation/airline/airport fields. Some of the students will able to obtain opportunities in the federal, state and local government aviation fields, while others will find opportunities in airline fields, such as initial entry level jobs in customer service and operations and air cargo as well as lower to middle level management positions. Others will find positions in supporting aviation entities, such as suppliers and service providers to airlines, government aviation agencies, air traffic control, and aircraft dispatch.

The aviation-specific content covered by this framework includes, but is no limited to airport facility equipment, ground equipment; aircraft operating requirements/limitations, navigational equipment, aviation weather reports and conditions, air traffic control equipment/procedures; customer service information technology tools, Federal Aviation Administration regulations, and air cargo ground handling equipment and procedures.

The general administrative content covered in this framework includes but is not limited to, communication skills, leadership skills, directing, planning and controlling, human relations and employability skills, safe and efficient work practices, technical skills such as aircraft and ground equipment operations and terminology, records management, security 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 60 credit hours.

Standards

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

01.0 Demonstrate an understanding of basic aviation terminology and history.
02.0 Demonstrate effective communication skills.
03.0 Demonstrate an understanding of aviation operations practices, limitations and procedures.
04.0 Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation.
05.0 Demonstrate an understanding of aviation and airport management practices.
06.0 Demonstrate an understanding of aviation security.
07.0 Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing.
08.0 Demonstrate an understanding of fundamentals of flight.
09.0 Demonstrate an understanding of meteorology.
10.0 Demonstrate an understanding of aviation safety and human factors, including accident prevention.
11.0 Demonstrate an understanding of air traffic control procedures and policies.
12.0 Demonstrate an understanding of air cargo operations and procedures.
13.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Aviation Administration**
CIP Numbers: **1649010403**
Program Length: **60 credit hours**
SOC Code(s): **53-2022, 53-2021, 53-1011, 43-4051**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of basic aviation terminology and history--The student will be able to:
01.01	Explain the overall scope and breadth of the aviation industry including its impact on the economy.
01.02	Distinguish the terms and vocabularies that are used in the aerospace and commercial aviation industry.
01.03	Describe the history of technological, governmental, social and economic developments of aviation.
01.04	Explain the different types and categories of aircraft in use in the industry by distinguishing and identifying: Various wide body, narrow body types and general aviation aircraft.
01.05	Demonstrate an understanding of the oversight role of the Federal Government and its effect on the aviation industry.
02.0	Demonstrate effective communication skills--The student will be able to:
02.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
02.02	Read and understand graphs, charts, diagrams and tables commonly used in this industry/occupational area.
02.03	Read and follow written and oral English instructions.
02.04	Answer and ask questions coherently and concisely.
02.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
02.06	Demonstrate appropriate telephone/communications skills.
02.07	Demonstrate knowledge and use of appropriate computer skills.
02.08	Demonstrate effective interpersonal skills.
03.0	Demonstrate an understanding of aviation operations practices, limitations and procedures--The student will be able to:
03.01	Demonstrate knowledge of aircraft systems as they apply to flight operations, including engines, fuel, electrical, hydraulics, pneumatics, flight controls and avionics.
03.02	Understand the various factors of aircraft performance, including takeoff, enroute and landing limitations and weight and balance.
03.03	Demonstrate knowledge of the function of flight operations, including pilot hiring, training, standards, safety issues, security issues, FAA and TSA regulations, documentation requirements, operations specifications, operating within the ATC system, and crew scheduling as well as flight attendant and aircraft dispatcher requirements.

	03.04	Describe maintenance operations and their role and effect on flight operations.
	03.05	Demonstrate an understanding of the role of the flight operations professional in the economic and planning functions.
	03.06	Explain FAA requirements such as flight standards, types of certificates, training and record keeping, surveillance, and investigations, as well as the operator's response and its relationship with the FAA.
	03.07	Describe the role of the National Transportation Safety Board in accident investigation, NASA's role in aviation safety reporting systems and research, and industry-specific safety reporting programs.
	03.08	Demonstrate knowledge of the application of information technology systems in flight operations as they relate to flight planning systems, flight management systems, satellite communication and navigation systems, weight and balance, maintenance monitoring, and management information systems.
04.0	Demonstrate an understanding of federal, state and other governmental laws, rules and policies as they relate to aviation--The student will be able to:	
	04.01	Demonstrate knowledge of the history and foundations of the legal and court system in the United States as it pertains to development of aviation law and regulations.
	04.02	Explain the role and function of the U.S. DOT, FAA, TSA, and the NTSB as it relates to their legal responsibilities and authority.
	04.03	Demonstrate knowledge of airmen rights and responsibilities, negligence, FAA enforcement, immunity, and degrees of care.
	04.04	Explain state aviation law, relating to airports, fixed based operators, aircraft sales, registration, and taxation issues.
	04.05	Demonstrate knowledge of the legal matters relating to the aircraft manufacturing and airline industry, including warranties, products liability, negligence, accident litigation, labor, and consumer issues.
	04.06	Demonstrate knowledge of international air law, bilateral and multilateral agreements, international jurisdiction, and limits of liability and damages.
	04.07	Demonstrate knowledge of legal issues that relate to aviation security.
05.0	Demonstrate an understanding of aviation and airport management practices--The student will be able to:	
	05.01	Describe how historical and current changes in competition, social factors, government policies, and technology affect aviation and airport management.
	05.02	Demonstrate understanding of organizational design and functional areas of an aviation business.
	05.03	Demonstrate understanding of the various functions of an airport, including airside and landside operations and management, financial planning, airport master plans, environmental issues, and land use.
	05.04	Describe the factors of effective communication, leadership styles, and motivating employees in an aviation environment with an emphasis on individual performance.
	05.05	Demonstrate an understanding of labor relations contract negotiations, and the grievance process in an aviation environment, including issues specific to airline labor relations.
	05.06	Explain how strategic planning and control processes are used in the aviation industry.
06.0	Demonstrate an understanding of aviation security--The student will be able to:	
	06.01	Describe aviation security threats and responses.
	06.02	Discuss aspects of aviation security, such the Aviation Safety and Security Act of 2001, and FAR Parts 108 and 109.

	06.03	Describe the components of a layered aviation security system, including personnel selection and training, and performance of security personnel.
	06.04	Explain the importance of planning for security threats, and having contingency plans and responsive measures.
	06.05	Explain the ground security measures and technology, including restricted access, inspections of personnel, baggage and goods, and effective screening techniques.
	06.06	Discuss inflight threats and security procedures.
07.0	Demonstrate an understanding of aviation/airline marketing, customer service/sales, and reservations/ticketing--The student will be able to:	
	07.01	Explain the Marketing Concept and how it differs from the Product and Sales Concepts.
	07.02	Analyze the various environmental factors that affect aviation/airline marketing.
	07.03	Demonstrate an understanding of market demographics, segmentation, methods of market research and analysis, and pricing strategies.
	07.04	Analyze why a customer buys a particular product or service.
	07.05	Explain the advantages and disadvantages of the media available for aviation industry advertising and promotion.
	07.06	Describe the factors of delivering quality customer service, why companies lose customer, and how to salvage a bad customer experience.
	07.07	Explain the principles of reservations, ticketing, internet sales, e-ticketing, and travel agency functions.
08.0	Demonstrate an understanding of fundamentals of flight--The student will be able to:	
	08.01	Name and compare the four forces of flight.
	08.02	Describe an airfoil.
	08.03	Explain how lift is produced.
	08.04	Discuss how and why an airplane stalls and spins.
	08.05	Describe and explain how pitot/static vacuum, pressure and engine instruments work.
	08.06	Explain factors affecting aircraft design, performance, and operation.
09.0	Demonstrate understanding of meteorology--The student will be able to:	
	09.01	Describe the composition, circulation and stability of the atmosphere.
	09.02	Demonstrate an understanding of air mass development, the movement of fronts and their effect on aviation.
	09.03	Demonstrate an awareness of weather hazards to aviation and an understanding of how to avoid them.
	09.04	Demonstrate the ability to access weather information prior to and during flights through a variety of media.
	09.05	Interpret printed reports, forecasts and graphic weather products.
10.0	Demonstrate an understanding of aviation safety and human factors, including accident prevention--The student will be able to:	
	10.01	Describe the nature of human factors and sources of errors.

	10.02	Discuss the issues of fatigue, body rhythms and sleep.
	10.03	Describe the effects of fitness and health on human performance.
	10.04	Discuss how motivation and leadership affects safety in aviation.
	10.05	Discuss the role of training devices and education in reducing errors and increasing safety.
	10.06	Describe how the physical layout of displays and controls and space relate to human factors errors.
	10.07	Explain how documentation problems such as manuals and checklists, maps and charts can cause safety issues.
	10.08	Describe how an aviation safety program is designed to create an environment of safety awareness and accident prevention.
	10.09	Describe the importance of effective single-pilot and crew resource management skills, as well as dispatcher resource management skills.
11.0	Demonstrate an understanding of air traffic control procedures and policies--The student will be able to:	
	11.01	Discuss the basic terminology and communications phraseology that is used in air traffic control.
	11.02	Describe airspace classifications that are used in air traffic control.
	11.03	Discuss separation of aircraft requirements.
	11.04	Demonstrate an understanding of the Federal Aviation Regulations that apply to air traffic control.
	11.05	Explain aircraft characteristics and recognition.
	11.06	Describe instrument procedures, for departure, arrival and for IFR flight plans.
	11.07	Discuss the weather hazards to aircraft, including wake turbulence, downbursts and restrictions to visibility.
	11.08	Review ATC Clearances, including their purpose and the different types of ATC clearances, the appropriate sequence and pilot responsibilities for compliance.
	11.09	Describe the fundamentals of radar, including information about primary and secondary radar systems.
	11.10	Explain strip marking (radar and non-radar), including the basic outline for strip marking and the associated symbologies for En Route, Terminal, and Flight Service Options.
	11.11	Explain non-radar procedures, including horizontal and vertical separation, timed approaches.
12.0	Demonstrate an understanding of air cargo operations and procedures--The student will be able to:	
	12.01	Describe the importance of air cargo to the economy.
	12.02	Describe air cargo customers, freight forwarders, customs brokers, and how marketing is done in the air cargo industry.
	12.03	Explain the different classes of air cargo, and the required documentation of each.
	12.04	Describe and discuss cargo packaging and how cargo is loaded on an aircraft.
	12.05	Describe HAZMAT classification, labeling, packaging, shipping requirements, and related incident/accident procedures and required reports.
	12.06	Describe the security requirements for air cargo personnel, facilities, and aircraft.

13.0	Demonstrate employability skills--The student will be able to:
	13.01 Describe positions available and requirements for careers in aviation administration.
	13.02 Describe qualification and certification requirements for careers in aviation administration.

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)

SkillsUSA 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.

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.

Articulation

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

Program Length

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

Certificate Programs

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

Airline/Aviation Management (0649010403) – 16 credit hours
Air Cargo Management (0649010404) – 16 credit hours
Airport Management (0649010405) – 16 credit hours
Passenger Agent (0649010406) – 16 credit hours

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

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: **Aviation Operations (60)**
Career Cluster: **Transportation, Distribution and Logistics**

AS	
CIP Number	1649010404
Program Type	College Credit
Standard Length	60 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-2022 – Airfield Operations Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, technical writing, records management, security, Federal Aviation Administration regulations, data processing, and air cargo transportation.

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

Program Structure

This program is a planned sequence of instruction consisting of 60 credit hours.

Standards

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

01.0 Demonstrate understanding of safe and efficient work practices.
02.0 Demonstrate understanding of federal and state security procedures.
03.0 Demonstrate appropriate math skills.
04.0 Demonstrate understanding of Federal Aviation Administration, state and other governmental laws, rules and policies.
05.0 Demonstrate understanding of business law and management pertaining to aviation operations.
06.0 Demonstrate understanding of personnel management.
07.0 Demonstrate understanding of aviation safety and accident prevention and investigation.
08.0 Demonstrate appropriate communication skills.
09.0 Prepare, analyze and evaluate technical reports and data.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
Student Performance Standards

Program Title: **Aviation Operations**
CIP Numbers: **1649010400**
Program Length: **60 credit hours**
SOC Code(s): **53-2022**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of safe and efficient work practices--The student will be able to:
01.01	Demonstrate an awareness and understanding of health and safety hazards, prevention and correction of ecological problems and know the solutions unique to the industry.
01.02	Demonstrate an awareness and understanding of fueling hazards.
01.03	Demonstrate an awareness and understanding of physical hazards.
01.04	Demonstrate an awareness and understanding of fire hazards.
01.05	Demonstrate an awareness of the proper techniques to control and extinguish fires.
01.06	Demonstrate an awareness and understanding of the need for safety devices, controls, guards and equipment.
01.07	Demonstrate full awareness and understanding of personal protective equipment (PPE).
02.0	Demonstrate understanding of federal and state security procedures--The student will be able to:
02.01	Describe passenger security systems in use.
02.02	Describe and define federal security laws.
02.03	Identify the role of local law enforcement agencies.
02.04	List known security risk features.
02.05	Describe standard cargo theft precautions used at airports and related facilities.
02.06	Describe the International Air Transport Association.
02.07	List the more common labels found in the Restricted Articles Regulations; as published in bulletins by IATA.
03.0	Demonstrate appropriate math skills--The student will be able to:
03.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
03.02	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
03.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

04.0	Demonstrate understanding of federal aviation administration, state and other governmental laws, rules and policies--The student will be able to:
04.01	Describe the economic, social and political importance of commercial aviation, general aviation and aircraft manufacturing in the United States.
04.02	Describe the function, basic organization and responsibility of the National Transportation Safety Board.
04.03	Explain major portions of relevant Parts of Federal Aviation Regulations and ICAO standards.
04.04	List and describe the federal statutes pertaining to the economic regulation of the airline industry.
04.05	Demonstrate an understanding of federal, state and local taxes.
04.06	List and describe the major federal statutes pertaining to the regulation of aviation safety.
04.07	Describe the historical and current relationship between the U.S. Post Office and the aviation industry.
04.08	List and describe six categories of general aviation.
04.09	Describe the development of aviation laws and their analogy to the Law of the Sea.
04.10	Describe how aviation is affected by state departments of transportation, including aircraft sales, maintenance, and passenger transport.
04.11	Describe and explain Title II (Safety and Pilot training improvement) of the Airline Safety and Federal Aviation Administration Extension Act of 2010.
05.0	Demonstrate understanding of business law and management pertaining to aviation operations--The student will be able to:
05.01	Describe and identify in what manner and under what conditions an airport may be exposed to a lawsuit.
05.02	Identify and discuss fundamental aspects of business law that relate to aviation operations.
05.03	Explain how an employee's action or inaction may subject an aviation organization to a lawsuit.
05.04	Describe the classification of airports and their economic role as well as management issues facing airport systems.
05.05	Discuss the importance of integrating airport planning with federal, state and local interests in developing airport systems.
05.06	Describe the major components that go into the overall operating and capital expenditure programs related to aviation operations including revenue sources.
06.0	Demonstrate understanding of personnel management--The student will be able to:
06.01	Name and describe the basic guides in personnel management.
06.02	Discuss governmental relations in personnel management.
06.03	Explain the general nature of personnel problems, and approaches to problem solving.
06.04	Demonstrate knowledge of the minimum standard for work practices.
06.05	Describe training, education, and professional development available to personnel.
06.06	Calculate the staff necessary to attain goals; and equipment and resources they will require.
06.07	Explain how the requirements to attain stated goals will necessitate the allocation of stated budgets.

	06.08	Name and describe the rules/regulations associated with Americans with Disabilities Act.
07.0	Demonstrate understanding of aviation safety, accident prevention and investigation–The student will be able to:	
	07.01	State and discuss the portion of the Federal Aviation Act of 1958 as amended, which is generally described as Title VI, Safety Regulations of Civil Aeronautics.
	07.02	Demonstrate knowledge of the minimum standards governing design, materials workmanship, performance of aircraft, inspection, servicing, overhaul of aircraft, and parts and appliances, equipment and facilities, as required by section 601(a) of Federal Aviation Act of 1958 Section 601(a).
	07.03	Discuss the maximum hours of service for airmen and other employees, and other practices, methods, and procedures as required by Section 601(a) of the Federal Aviation Act of 1958.
	07.04	Explain the Federal Aviation Regulations (FAR's) promulgated by the Administrator to implement the authority granted by the Federal Aviation Act of 1958, in the area of safety, and to prevent accidents.
	07.05	Demonstrate full knowledge of 14 CFR 830 and be able to explain the notification and reporting criteria of aircraft accidents or incidents.
	07.06	Identify health-related problems, which may result from exposure to work-related chemicals and hazardous materials, and know the use of Safety Data Sheets (SDS) and the proper precautions required for handling such materials.
08.0	Demonstrate appropriate communication skills--The student will be able to:	
	08.01	Write logical and understandable statements, or phrases, to complete with accuracy the forms/invoices commonly used in business and industry.
	08.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
	08.03	Read and follow written and oral instructions.
	08.04	Answer and ask questions coherently and concisely.
	08.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
	08.06	Demonstrate appropriate verbal and electronic communication skills.
09.0	Prepare, analyze and evaluate technical reports and data--The student will be able to:	
	09.01	State the five basic guidelines for preparation of technical reports.
	09.02	Compare the difference between technical and literary description.
	09.03	Describe the techniques used in technical report writing.
	09.04	Discuss the arrangement of the technical written report – such as: cause and effect, inductive and deductive, enumeration and classification, problems and solution.
	09.05	Explain the preparatory work or stages in the process, such as the writing, the drafts, use of the library, and polishing style.
	09.06	List types of reports, and describe use of illustrations.
	09.07	Discuss the steps in developing an oral presentation.
10.0	Demonstrate appropriate understanding of basic science--The student will be able to:	
	10.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

	10.02	Draw conclusions or make inferences from data.
	10.03	Identify health-related problems, which may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	10.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
11.0	Demonstrate employability skills--The student will be able to:	
	11.01	Conduct a job search.
	11.02	Secure information about a job.
	11.03	Identify documents which may be required when applying for a job interview.
	11.04	Complete a job application form correctly.
	11.05	Demonstrate competence in job interview techniques.
	11.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	11.07	Identify acceptable work habits.
	11.08	Demonstrate knowledge of how to make appropriate job changes.
	11.09	Demonstrate acceptable employee health habits.
	11.10	Demonstrate knowledge of the “Federal Right-To-Know Law” as recorded in Federal Statutes 29 CFR-1910, 1200.
12.0	Demonstrate an understanding of entrepreneurship--The student will be able to:	
	12.01	Define entrepreneurship.
	12.02	Describe the importance of entrepreneurship to the American economy.
	12.03	List the advantages and disadvantages of business ownership.
	12.04	Identify the risks involved in ownership of a business.
	12.05	Identify the necessary personal characteristics of a successful entrepreneur.
	12.06	Identify the business skills needed to operate a small business efficiently and effectively.

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

The purpose of this program is to prepare students for initial employment as communication, transportation, utility management, air station managers or provide supplemental training for persons previously or currently employed in these occupations.

Engineering/architecture scale, friction measurement equipment, compass, weather equipment, UNICOM/radio equipment, fuel equipment (mobile and fixed), fire extinguishing equipment, firearms, aircraft tug, personal protective equipment, aeronautical charts and adverse weather gear.

The American Association of Airport Executives, National Air Transportation Association (NATA), National Association of State Aviation Officials (NASAO), and Florida Department of Transportation – Aviation Office (FDOT) are additional organizations for providing leadership training and for reinforcing specific skills. Organizations for students such as those mentioned, when provided shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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.

Articulation

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

Program Length

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

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: **Transportation and Logistics**
Career Cluster: **Transportation, Distribution and Logistics**

AS	
CIP Number	1652020301
Program Type	College Credit
Standard Length	64 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	11-3071 – Transportation, Storage and Distribution Managers 13-1081 – Logisticians 43-5011 – Cargo and Freight Agents 43-5071 – Shipping, Receiving and Traffic Clerks 53-1011 – Aircraft Cargo Handling Supervisors 53-1031 – First-Line Supervisors of Transportation and Material Moving Machine and Vehicle Operators
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 students for further education and careers in the Transportation, Distribution, and Logistics 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 Transportation, Distribution, and Logistics career cluster.

The content includes, but is not limited to, related business, accounting, and financial practices such as standard policies and operating procedures, negotiation techniques, planning, organizing, purchasing and inventory control theory. Emphasis is placed on planning and scheduling skills associated with transportation operations.

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

Program Structure

This program is a planned sequence of instruction consisting of 64 credit hours.

Standards

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

01.0 Demonstrate an understanding of the basic concepts and terms used in transportation and logistics
02.0 Demonstrate an understanding of the transportation and logistics regulatory environment
03.0 Identify risks and safety and security measures in transportation and logistics
04.0 Demonstrate the ability to use technology as it relates to transportation and logistics
05.0 Demonstrate knowledge of management
06.0 Demonstrate an understanding of accounting and finance
07.0 Demonstrate an understanding of economics
08.0 Demonstrate knowledge of contemporary issues in transportation and logistics
09.0 Demonstrate knowledge of documentation (domestic, international, and customs) related to transportation and logistics
10.0 Demonstrate the ability to manipulate quantitative data including international weights and measures, as it relates to the movement of goods
11.0 Demonstrate an understanding of reverse logistics
12.0 Demonstrate knowledge of border security
13.0 Identify characteristics and benefits of intermodal transportation
14.0 Demonstrate knowledge of procurement, contracts and contract administration as it applies to transportation and logistics
15.0 Demonstrate knowledge of performance and quality measurements
16.0 Demonstrate knowledge of human resources and labor relations
17.0 Demonstrate knowledge and basic skills in project management
18.0 Demonstrate public speaking skills
19.0 Demonstrate knowledge of geography, culture, customs, and language in international trade
20.0 Demonstrate knowledge of professional development and networking
21.0 Demonstrate knowledge of supply chain management
22.0 Demonstrate knowledge of pricing as it relates to shipping methods
23.0 Demonstrate knowledge of market research
24.0 Demonstrate knowledge of the air, sea, truck, and rail operations in the movement of freight
25.0 Describe the various control processes in freight movement
26.0 Distinguish the difference between domestic and international freight movements
27.0 Demonstrate knowledge of the Port freight operations
28.0 Demonstrate knowledge of rail freight operations
29.0 Demonstrate knowledge of trucking operations
30.0 Demonstrate knowledge of air cargo operations

Florida Department of Education
Student Performance Standards

Program Title: **Transportation and Logistics**
CIP Numbers: **1652020301**
Program Length: **64 Credits**
SOC Code(s): **11-3071; 13-1081; 43-5011.00; 43-5071; 53-1011; 53-1031**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of the basic concepts and terms used in transportation and logistics--The student will be able to:
01.01	Compare various shipping options
01.02	Analyze types of goods and products and impact on logistics
01.03	Identify the characteristics of a full-service transportation organization
01.04	Demonstrate an understanding of intermodalism
01.05	Demonstrate knowledge of mode-specific logistics
01.06	Demonstrate knowledge of Incoterms versus Uniform Commercial Code (UCC)
01.07	Demonstrate knowledge of how goods move through freight forwarder and customs broker
01.08	Demonstrate knowledge of inventory and warehousing concepts
01.09	Explain the relevance of Just-in-Time (JIT) logistics
01.10	Demonstrate knowledge of shipment process for perishables
01.11	Demonstrate knowledge of packaging and labeling requirements
01.12	Demonstrate knowledge of the advantages and disadvantages of combining given modes of transportation air/sea/land)
01.13	Identify the various governmental regulatory agencies by their names and initials
01.14	Demonstrate the ability to read, write, and conduct a conversation using common terms of freight movement by transportation mode
02.0	Demonstrate an understanding of the transportation and logistics regulatory environment--The student will be able to:
02.01	Demonstrate knowledge of the “alphabet soup” of regulatory agencies
02.02	Identify which agency (ies) have jurisdiction over a given transportation system
02.03	Demonstrate knowledge of DOT regulations
02.04	Identify who has regulatory authority over a given project
02.05	Identify regulatory requirements

	02.06	Identify permits needed for a given project
	02.07	Identify consequences of violations of regulatory requirements
	02.08	Identify policy issues and political factors in a regulatory environment
	02.09	Demonstrate skill in regulatory research
	02.10	Demonstrate knowledge of labor laws
03.0	Identify risks and safety and security measures in transportation and logistics--The student will be able to:	
	03.01	Establish an emergency management plan
	03.02	Identify the need for security background check requirements
	03.03	Demonstrate knowledge of OSHA and all agencies involved in the movement of goods including Customs and Border Protection, Transportation and Security Administration, U.S. Department of Agriculture
	03.04	Demonstrate knowledge of the impact of technology on countering threats to transportation systems and border security
	03.05	Identify differences in dealing with security threats for passenger versus freight/cargo transportation systems including the impact on supply chain logistics
	03.06	Outline the primary federal, state, and local agencies in the U.S. that are affiliated with border security and transportation security
	03.07	Identify the ethical parameters in which border security agencies operate
	03.08	Identify the difference in safety and security threats as they relate to rail, seaport, trucking, and aviation
	03.09	Identify the cost/benefit analysis of various safety and security measures
	03.10	Implement a schedule
	03.11	Analyze system performance
	03.12	Develop process maps
	03.13	Develop knowledge of process analysis
04.0	Demonstrate the ability to use technology as it relates to transportation and logistics--The student will be able to:	
	04.01	Demonstrate the ability to use spreadsheet, word processing, and presentation software
	04.02	Demonstrate the ability to use scheduling/planning software
	04.03	Identify the electronic systems used in a modern transportation system
	04.04	Utilize Internet resources
	04.05	Demonstrate ability to use logistics software for bookings, shipments, consolidations, and shipment verifications
05.0	Demonstrate knowledge of management --The student will be able to:	
	05.01	Explain management concepts
	05.02	Assess and manage human resources and integrated teams

05.03	Provide leadership to procurement, acquisition, logistic, and supply chain management employees
05.04	Apply sound decision-making strategies
05.05	Identify ethical and social responsibility issues
06.0	Demonstrate an understanding of accounting and finance--The student will be able to:
06.01	Conduct R.O.I. analysis
06.02	Develop a departmental budget
06.03	Monitor a departmental budget
06.04	Demonstrate an understanding of fund accounting
06.05	Demonstrate a basic understanding of cost (managerial) accounting
06.06	Demonstrate an understanding of resource development in a public transportation system
06.07	Conduct cost/benefit analysis
06.08	Conduct post cost analysis
06.09	Identify various revenue streams
06.10	Demonstrate knowledge of financial and credit processes in international shipping
06.11	Demonstrate knowledge of currency exchange methods
06.12	Demonstrate grant writing ability
06.13	Demonstrate grants administration and accounting skills
06.14	Demonstrate understanding of fund accounting
06.15	Demonstrate knowledge of managerial (cost) accounting
06.16	Demonstrate knowledge of an “enterprise fund”
07.0	Demonstrate an understanding of economics--The student will be able to:
07.01	Compare basic features of different economic systems
07.02	Explain importance of resources to the economy
07.03	Explain concept of organized labor and business
07.04	Apply business economic concepts
07.05	Analyze economic indicators and trends
07.06	Explain measures used to analyze economic conditions
07.07	Explain the nature of international trade
07.08	Explain the impact of cultural and social environments on world trade

	07.09 Compare/contrast influences on a nation's ability to trade
08.0	Demonstrate knowledge of contemporary issues in transportation and logistics--The student will be able to:
	08.01 Identify the factors that influence changes in costs among the various modes of transportation
	08.02 Demonstrate an understanding of current trends in containerized shipping
	08.03 Identify current security issues among the various modes of transportation
	08.04 Demonstrate knowledge of the effect of current technology on intermodal transportation systems
	08.05 Describe the pros and cons of free trade agreements
	08.06 Describe "push" versus "pull" logistics
	08.07 Demonstrate knowledge of current trends in currency exchange rates
	08.08 Demonstrate knowledge of advantages and disadvantages of logistics centers, intermodal container transfer facilities and intermodal rail yards
09.0	Demonstrate knowledge of documentation (domestic, international, and customs) related to transportation and logistics --The student will be able to:
	09.01 Identify basic documents used in freight forwarding and customs brokering
	09.02 Prepare an airway bill
	09.03 Demonstrate knowledge of letters of credit
	09.04 Identify components of a bill of lading.
10.0	Demonstrate the ability to manipulate quantitative data including international weights and measures, as it relates to the movement of goods--The student will be able to:
	10.01 Convert standard weights and measures to metric and vice versa
	10.02 Conduct currency exchange calculations
	10.03 Demonstrate skill in practical math for transportation
	10.04 Develop quantitative methods for assessing transportation loads
11.0	Demonstrate an understanding of reverse logistics--The student will be able to:
	11.01 Assess the nature and scope of reverse logistics
	11.02 Explain the waste management process
12.0	Demonstrate knowledge of border security--The student will be able to:
	12.01 Identify the various agencies affiliated with border security
	12.02 Construct a historical timeline reflecting significant transportation-related terrorist threats and events involving border security
	12.03 Demonstrate an understanding of the social and cultural issues involved in border security

	12.04 Classify the roles, functions, and interdependency between local, federal, and international law enforcement and military agencies to foster border security
13.0	Identify characteristics and benefits of intermodal transportation--The student will be able to:
	13.01 Compare various shipping options
	13.02 Analyze types of goods and products and impact on logistics
	13.03 Identify the characteristics of a full-service transportation organization
	13.04 Demonstrate knowledge of mode-specific logistics
	13.05 Demonstrate knowledge of contemporary issues in intermodal transportation
	13.06 Demonstrate knowledge of Incoterms versus Uniform Commercial Codes (UCC)
	13.07 Demonstrate knowledge of how goods move through freight forwarder and customs broker
	13.08 Demonstrate knowledge of warehousing
	13.09 Demonstrate knowledge of packaging and labeling requirements
	13.10 Demonstrate knowledge of the advantages and disadvantages of combining given modes of transportation (air/sea/truck/rail)
14.0	Demonstrate knowledge of procurement, contracts and contract administration as it applies to transportation and logistics--The student will be able to:
	14.01 Identify the basic components of a contract
	14.02 Identify the difference between “void” and “voidable” contracts
	14.03 Demonstrate an understanding of the importance of being in compliance with the terms of a contract
	14.04 Determine appropriate methods of procurement
	14.05 Explain competitive bids, quotations, and proposals
	14.06 Evaluate competitive bids to determine the best offer
	14.07 Manage contracts and purchase orders from award to completion
	14.08 Resolve contract and/or purchase order differences with suppliers
	14.09 Explain payment problems with suppliers and user departments
	14.10 Discuss the scope of compliance requirements
	14.11 Conduct a negotiation
15.0	Demonstrate knowledge of performance and quality measurements--The student will be able to:
	15.01 Develop/track performance measures
	15.02 Analyze system performance
	15.03 Develop contingency plans

	15.04 Demonstrate knowledge of process analysis
	15.05 Identify various quality initiatives (ISO, Six Sigma, etc.)
16.0	Demonstrate knowledge of human resources and labor relations--The student will be able to:
	16.01 Demonstrate knowledge of labor contracts
	16.02 Conduct conflict resolution
	16.03 Identify training needs
	16.04 Monitor employee performance
	16.05 Evaluate employee performance
	16.06 Ensure necessary training
	16.07 Identify workload issues
	16.08 Identify necessary tools and resources
	16.09 Identify need for security/background checks
	16.10 Identify impact of union/labor agreements
	16.11 Demonstrate knowledge of labor laws
	16.12 Demonstrate effective supervisory techniques
17.0	Demonstrate knowledge and skill in project management--The student will be able to:
	17.01 Utilize project management software
	17.02 Identify planning/scheduling techniques such as PERT and Critical Path Method
	17.03 Develop a project management plan
	17.04 Coordinate a project
	17.05 Demonstrate an understanding of the connection between time and money
18.0	Demonstrate public speaking skills--The student will be able to:
	18.01 Use public speaking skills to conduct media relations
	18.02 Use public speaking skills to conduct public relations
	18.03 Use public speaking skills to make a presentation
	18.04 Use presentation software to deliver a presentation
19.0	Demonstrate knowledge of geography, culture, customs, and language in international trade--The student will be able to:
	19.01 Demonstrate an understanding of world geography
	19.02 Demonstrate knowledge of various cultural customs as it relates to conducting business

	19.03 Abstain from the use of idioms when dealing with foreign customers and colleagues
	19.04 Demonstrate knowledge of time and date differences in international trade
	19.05 Identify customer service techniques that account for cultural differences when working with international clients
20.0	Demonstrate knowledge of professional development and networking--The student will be able to:
	20.01 Create a professional network
	20.02 Read industry journals
	20.03 Join appropriate professional organizations
	20.04 Attend industry/trade shows
	20.05 Establish global networks
21.0	Demonstrate knowledge of supply chain management--The student will be able to:
	21.01 Characterize the nature of business
	21.02 Explain the nature and scope of logistics
	21.03 Explain the importance of inventory
	21.04 Explain inventory management methods
	21.05 Analyze just in time (JIT) inventory process
	21.06 Analyze the Materials Requirement Planning (MRP) system
	21.07 Explain the dangers of single-vendor supplier
22.0	Demonstrate knowledge of pricing as it relates to shipping methods--The student will be able to:
	22.01 Identify the importance of time in a given shipment
	22.02 Identify issues such as perishability, weight, fragility, and packing method
	22.03 Identify best combination of shipping methods given knowledge of product and customer’s requirements
	22.04 Describe pricing strategies
23.0	Demonstrate knowledge of market research--The student will be able to:
	23.01 Describe market research
	23.02 Differentiate between basic market research tools
	23.03 Use online market research tools
	23.04 Use data collection methods
	23.05 Analyze information from various sources
	23.06 Analyze and conduct research

	23.07 Analyze customer feedback surveys
24.0	Demonstrate knowledge of the air, sea, truck and rail operations for the movement of freight--The student will be able to:
	24.01 Describe the knowledge of the organizational structure for each mode of transportation relative to the movement of freight
	24.02 Describe the basic function of each mode
	24.03 Identify the important markets for the each mode
	24.04 Identify the major companies in each mode
	24.05 Compare the various key specializations within an intermodal cargo operation
25.0	Describe the various control processes in freight movement--The student will be able to:
	25.01 Demonstrate knowledge of budgeting and auditing
	25.02 Demonstrate knowledge of quality measurements such as on-time performance
	25.03 Demonstrate knowledge of customer complaints and quality issues
26.0	Distinguish the difference between domestic and international freight movements--The student will be able to:
	26.01 Describe how legal standards vary
	26.02 Describe how safety rules vary
	26.03 Distinguish the cultural, political, and geographic effects on the international cargo operations
	26.04 Describe the use of a foreign (free) trade zone its advantages
27.0	Demonstrate knowledge of the Port freight operations--The student will be able to:
	27.01 Describe the different types of Ports including seaports, waterway ports and inland ports
	27.02 Identify the types of water-borne and inland freight and the types of cargo documentation required
	27.03 Describe Port facilities for processing domestic and international cargo
	27.04 Describe the types and functions of intermodal facilities at a Port
	27.05 Describe the typical organizational structure of a Port and its operations
	27.06 Define the role and impact of government and other regulatory agencies in this industry
	27.07 Define various terms and abbreviations used in Port freight operations
	27.08 Identify the types of hazardous materials moved through Ports and the rules governing this type of shipment
	27.09 Describe process for movement of perishable goods
28.0	Demonstrate knowledge of rail freight operations--The student will be able to:
	28.01 Demonstrate knowledge of scheduling shipments and documentation procedures required
	28.02 Identify the railroad companies serving the state and what areas their lines serve

	28.03	Describe the function of intermodal rail yards, on-Port rail facilities, and intermodal container facilities
	28.04	Identify the types of cargo moved by rail and the types of documentation required
	28.05	Identify the types of hazardous materials moved by rail and the rules governing this type of shipment
	28.06	Describe the role of rail at logistics centers
	28.07	Describe the typical organizations structure of a railroad company and its operations
	28.08	Describe the role and impact of government and other regulatory agencies in the rail industry
	28.09	Define various terms and abbreviations used in the rail industry
	28.10	Describe process for movement of perishable goods
29.0	Demonstrate knowledge of trucking operations--The student will be able to:	
	29.01	Identify the advantages and disadvantages of trucking company versus owner-operator
	29.02	Demonstrate knowledge of processing truck shipments and the driver scheduling issues
	29.03	Identify the types of carriers and equipment
	29.04	Demonstrate knowledge of weight and load distribution.
	29.05	Identify the types of cargo moved by truck and the types of cargo documentation required
	29.06	Describe the role of trucking at logistics centers
	29.07	Identify the types of hazardous materials moved by truck and the rules governing this type of shipment
	29.08	Demonstrate knowledge of intrastate, interstate and international trucking operations
	29.09	Define the role and impact of government and other regulatory agencies in the trucking industry
	29.10	Define various terms and abbreviations used in the trucking industry
	29.11	Describe process for movement of perishable goods
30.0	Demonstrate knowledge of air cargo operations--The student will be able to:	
	30.01	Demonstrate knowledge of intrastate, interstate and international air cargo operations
	30.02	Describe the air industry as it is found today: the different types of cargo, the different types of carriers, the major players, upstarts, and the future of the industry
	30.03	Identify sales and marketing ideals used in the industry, the various rates, and the various tariffs in the air cargo industry
	30.04	Differentiate the various types of terminal facilities and equipment, including aircraft, used by the air cargo companies to run an operation
	30.05	Define the role and impact of the government and other regulatory agencies in the air cargo industry
	30.06	Define various terms and abbreviations used in the air cargo industry
	30.07	Categorize the various types of cargo and its major classifications

30.08	Identify the types of hazardous materials moved by air and the regulations governing this type shipment
30.09	Describe the process for movement of perishable goods

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)

SkillsUSA 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.

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.

Articulation

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

Program Length

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

Certificate Programs

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

Intermodal Freight Transportation (0652020303) – 18 credit hours
International Freight Transportation (0652020302) – 15 credit hours

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

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: **Supply Chain Management (60)**
Career Cluster: **Transportation, Distribution and Logistics**

AS	
CIP Number	1652020901
Program Type	College Credit
Standard Length	60 credit hours
CTSO	SkillsUSA
SOC Codes (all applicable)	53-1031 – First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators 11-3071 – Transportation, Storage, and Distribution Managers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml

Purpose

The purpose of this program is to prepare students for further education and employment in the Transportation, Distribution and Logistics career cluster. The program is designed to develop the student's general employability by improving their work attitudes, communication, critical thinking, technical skills, problem-solving skills and occupation-specific skills relative to supply chain management.

The program content is broad-based to reflect the cross-functional relationships prevalent in supply chain management. Students are exposed to related business practices such as standard operating procedures, negotiation techniques, planning, organizing, and accounting concepts, purchasing, sustainability, warehousing, project management, quality control, import/export, and asset management theory. Emphasis is placed on understanding the planning, acquisition, flow, and distribution of goods and services while managing the complexity of operational linkages in a fast-paced global supply chain. Learning is promoted via team work, case studies, practitioner guest lectures, and visits to work sites.

This program prepares students for employment in roles such as: Integrated Logistics Planner, Purchasing Analyst, Cargo Scheduler, International Logistics Clerk, Quality Associate, Inventory Control Manager, Logistics Analyst, Junior Buyer, Customer Service Associate, Materials Analyst, Material Manager, Supply Manager, Dispatcher, Supply Technician, Operations Supervisor, Order Fulfillment Associate, Transportation Coordinator, Distribution Planning Analyst, Packing Supervisor, Transportation Clerk, Cargo Sales, Receiving/Shipping Supervisor, Transportation Specialist, Procurement Clerk, Product Tracing and Tracking Clerk, Warehouse Shift Supervisor, Import/Export Clerk, and Purchasing Agent.

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

Program Structure

This program is a planned sequence of instruction consisting of 60 credit hours.

Standards

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

01.0 Demonstrate an understanding of personal development and professional networking.
02.0 Demonstrate an understanding of professional effectiveness.
03.0 Demonstrate an understanding of logistics, and supply chain management basics.
04.0 Demonstrate an understanding of transportation systems.
05.0 Demonstrate an understanding of warehousing and materials handling.
06.0 Demonstrate an understanding of packaging.
07.0 Demonstrate an understanding of inventory and supply planning.
08.0 Demonstrate an understanding of reverse logistics.
09.0 Demonstrate an understanding of procurement/contracting.
10.0 Demonstrate an understanding of production.
11.0 Demonstrate an understanding of product management.
12.0 Demonstrate an understanding of pricing.
13.0 Demonstrate an understanding of customer relationship management.
14.0 Demonstrate an understanding of appropriate finance skills.
15.0 Demonstrate an understanding of management practices.
16.0 Demonstrate an understanding of supply chain risk management.
17.0 Demonstrate an understanding of project and quality management.
18.0 Demonstrate an understanding of business law, ethics and legal issues.
19.0 Demonstrate an understanding of economics.
20.0 Demonstrate an understanding of supply chain information management.
21.0 Demonstrate an understanding of market research for procurement decisions.
22.0 Demonstrate an understanding of writing and presenting documentation.
23.0 Demonstrate an understanding of demand planning.
24.0 Demonstrate an understanding of the differences between a manufacturing and a services supply chain.

Florida Department of Education
Student Performance Standards

Program Title: **Supply Chain Management**
CIP Numbers: **1652020901**
Program Length: **60 credit hours**
SOC Code(s): **53-1031; 11-3071**

The AS degree requires the inclusion of a minimum of 15 credits of general education coursework according to SACS, and it must be transferable according to Rule 6A-14.030 (2), F.A.C. At the completion of this program, the student will be able to:	
01.0	Demonstrate an understanding of personal development and professional networking--The student will be able to:
01.01	Explore career pathways in supply chain management.
01.02	Explore professional development opportunities for a supply chain management professional.
01.03	Prepare for career advancement in supply chain management.
02.0	Demonstrate an understanding of professional effectiveness--The student will be able to:
02.01	Explain professional responsibilities in supply chain management.
02.02	Develop self-management skills.
02.03	Demonstrate appropriate work ethics as they apply to supply chain management.
02.04	Apply problem-solving techniques.
02.05	Manage stressful situations.
02.06	Build professional communication skills.
02.07	Disseminate information.
02.08	Develop and achieve goals.
02.09	Manage change.
02.10	Identify time-management skills.
03.0	Demonstrate an understanding of logistics, and supply chain management basics--The student will be able to:
03.01	Define and characterize supply chain management and logistics.
03.02	Describe the role of other business functional areas in supply chain management.
04.0	Demonstrate an understanding of transportation systems--The student will be able to:
04.01	Assess the importance of the transportation system.
04.02	Explain the scope of the domestic and global transportation system.

04.03	Describe various services in the transportation industry and how these services are coordinated.
04.04	Explain the infrastructure and equipment used by the various modes of transportation.
04.05	Determine the costs/benefits of company-owned versus for-hire transportation.
04.06	Explain the scope of international transportation.
04.07	Explain the complexities of international transportation.
04.08	Explain the general costs included in transportation rates.
04.09	Analyze rate structures.
04.10	Determine multimodal rates.
04.11	Explain common transportation documents.
04.12	Explain procedures to expedite deliveries and conduct follow-up procedures as needed.
05.0	Demonstrate an understanding of warehousing and materials handling--The student will be able to:
05.01	Explain the reasons for maintaining warehousing.
05.02	Explain the functions of warehouses.
05.03	Compare and contrast public and private warehouses.
05.04	Explain common warehouse documents.
05.05	Describe materials handling functions.
05.06	Explain the elements that influence space layout in warehousing (e.g. productivity, damage, safety, security, etc.)
05.07	Create a cost-benefit analysis.
05.08	Explain the product characteristics that impact logistics.
05.09	Explain order fulfillment procedures.
05.10	Analyze rate structures.
06.0	Demonstrate an understanding of packaging--The student will be able to:
06.01	Assess types of packaging.
06.02	Explain the functions of packaging.
06.03	Explain how packaging influences other logistic activities.
07.0	Demonstrate an understanding of inventory and supply planning--The student will be able to:
07.01	Explain the importance of inventory.
07.02	Explain how inventory management is measured.
07.03	Analyze just-in time (JIT) inventory process.

	07.04 Understand the use and output of a MRP system.
	07.05 Analyze types of inventory management tools and their impact on logistics.
08.0	Demonstrate an understanding of reverse logistics--The student will be able to:
	08.01 Assess the nature and scope of reverse logistics.
	08.02 Explain the waste management process.
	08.03 Explain the disposition of assets.
09.0	Demonstrate an understanding of procurement/contracting--The student will be able to:
	09.01 Develop a procurement/acquisition plan.
	09.02 Analyze organizational requirements for procurement requisitions.
	09.03 Determine appropriate methods of procurement.
	09.04 Work collaboratively to develop and review specifications, statements of work, performance terms, and/or acceptance criteria.
	09.05 Identify and select potential sources of materials or services.
	09.06 Explain competitive bids, quotations, and proposals.
	09.07 Prepare and solicit competitive bids, quotations, and proposals.
	09.08 Evaluate competitive bids to determine the best offer.
	09.09 Conduct supplier visits and/or evaluations to determine suitability when needed.
	09.10 Analyze elements of contracts.
	09.11 Issue contracts.
	09.12 Review legal implications of contracting.
	09.13 Manage contracts and purchase orders from award to completion.
	09.14 Resolve contract and/or purchase order differences with suppliers.
	09.15 Explain payment problems with suppliers and user departments.
	09.16 Discuss the scope of compliance requirements.
	09.17 Conduct a negotiation.
10.0	Demonstrate an understanding of production--The student will be able to:
	10.01 Explain the relationship between manufacturing, purchasing, and logistics.
	10.02 Explain the concept of production.
	10.03 Plan production.
	10.04 Apply best practices for production operations.

	10.05 Explain impact of new production technology for profitability.
	10.06 Analyze job costing using appropriate application software.
11.0	Demonstrate an understanding of product management--The student will be able to:
	11.01 Describe the factors involved in product/service operations.
	11.02 Plan product/service management strategies.
	11.03 Explain types of products and their impact on logistics.
	11.04 Explain the impact of packaging on product/service management.
	11.05 Explain the impact of product promotions within supply chain and logistics.
12.0	Demonstrate an understanding of pricing--The student will be able to:
	12.01 Explain pricing fundamentals.
	12.02 Evaluate pricing fundamentals.
	12.03 Explain how logistics cost can influence pricing decisions.
	12.04 Determine prices for products/services.
13.0	Demonstrate an understanding of customer relationship management--The student will be able to:
	13.01 Explain basic customer relationship management (CRM) concepts.
	13.02 Demonstrate quality customer service focus.
	13.03 Describe the concept of order cycle time.
	13.04 Explain the importance of logistic performance on customer service in generating revenue.
	13.05 Explain the role of technology in order processing, tracking, and customer research.
	13.06 Process orders and returns.
14.0	Demonstrate an understanding of appropriate finance skills--The student will be able to:
	14.01 Explain how logistic costs impact net profit.
	14.02 Utilize various inventory valuation methods.
	14.03 Explain how an income statement and a balance sheet are derived.
15.0	Demonstrate an understanding of management practices--The student will be able to:
	15.01 Explain basic management concepts.
	15.02 Assess and manage human resources and integrated teams.
	15.03 Provide leadership to procurement, acquisition, logistic, and supply chain management employees.
	15.04 Apply sound decision-making strategies.

16.0	Demonstrate an understanding of supply chain risk management--The student will be able to:
	16.01 Explain types of risk.
	16.02 Explain risk management.
	16.03 Analyze safety/security risks.
17.0	Demonstrate an understanding of project and quality management--The student will be able to:
	17.01 Plan and coordinate the diverse components of a project.
	17.02 Assess and manage a project.
	17.03 Build interpersonal skills with individuals and teams.
	17.04 Explain quality assurance.
	17.05 Select and employ quality tools.
	17.06 Examine quality cost implications.
18.0	Demonstrate an understanding of business law, ethics and legal issues--The student will be able to:
	18.01 Review and discuss current legal and ethical considerations as they relate to supply chain management.
	18.02 Evaluate policies for managing privacy and ethical issues.
19.0	Demonstrate an understanding of economics--The student will be able to:
	19.01 Compare basic features of different economic systems.
	19.02 Explain importance of resources to the economy.
	19.03 Explain concept of organized labor and business.
	19.04 Apply business economic concepts.
	19.05 Analyze economic indicators and trends.
	19.06 Explain measures used to analyze economic conditions.
	19.07 Explain the nature of international trade and global supply networks.
	19.08 Explain the impact of cultural and social environments on world trade.
	19.09 Compare/contrast influences on a nation’s ability to trade.
20.0	Demonstrate an understanding of supply chain information management--The student will be able to:
	20.01 Explain supply chain management information management.
	20.02 Explain and demonstrate use of databases in organizing supply chain data.
	20.03 Examine data using common statistical procedures.
21.0	Demonstrate an understanding of market research for procurement decisions--The student will be able to:

	21.01 Describe market research.
	21.02 Differentiate between basic market research resources.
	21.03 Use online market research portals.
	21.04 Use data collection methods.
	21.05 Analyze information from various sources.
	21.06 Evaluate and conduct research.
22.0	Demonstrate an understanding of writing and presenting documentation--The student will be able to:
	22.01 Assess report writing requirements.
	22.02 Create, write, and present reports using APA format.
23.0	Demonstrate an understanding of demand planning--The student will be able to:
	23.01 Interpret the general concept of demand planning.
	23.02 Explain the seasonal influences on forecasts.
	23.03 Contrast balancing supply and demand.
	23.04 Forecast demand.
24.0	Demonstrate an understanding of the differences between a manufacturing and a services supply chain--The student will be able to:
	24.01 Describe the basic concepts of manufacturing and service operations and their role in meeting customer needs.
	24.02 Define the key elements and processes in manufacturing and service operations.
	24.03 Describe how to assess the performance of manufacturing and service operations.

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)

SkillsUSA 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.

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.

Articulation

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

Program Length

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

Certificate Programs

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

Logistics and Transportation Specialist (0652020901) – 18 credit hours

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

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: **Avionics**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Avionics Systems Technician (T400310).

PSAV – Career Preparatory	
Program Number	I470199
CIP Number	0647060903
Grade Level	30, 31
Standard Length	2120 hours
Teacher Certification	AVIONICS @7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2091 – Avionics Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to, troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

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 eight 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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	EEV0010	Electronics Assembler	250 hours	49-2091
B	EEV0100	Electronics Tester	400 hours	49-2091
C	EEV0616	Electronics Technician	375 hours	49-2091
D	EEV0500	Electronics Equipment Repairer	375 hours	49-2091
E	AVS0090	Avionics Technical Publications Technician	180 hours	49-2091
F	AVS0091	Avionics Installer	180 hours	49-2091
G	AVS0092	Avionics Communications System Technician	180 hours	49-2091
H	AVS0093	Avionics Technician	180 hours	49-2091

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Avionics program can be found using the following links:

www.faa.gov/
www.eta-i.org/

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate proficiency in soldering and basic laboratory practices.
02.0 Demonstrate proficiency in basic DC circuits.
03.0 Demonstrate proficiency in advanced DC circuits.
04.0 Demonstrate proficiency in AC circuits.
05.0 Demonstrate proficiency in solid state devices.
06.0 Demonstrate skills in technical recording utilizing industry recognized computer application software.
07.0 Demonstrate proficiency in analog circuits.
08.0 Demonstrate proficiency in digital circuits.
09.0 Demonstrate proficiency in fundamental micro-processors.
10.0 Demonstrate proficiency in avionics radio repair station regulations and procedures.
11.0 Demonstrate proficiency in aircraft electrical systems and ground safety
12.0 Demonstrate proficiency in line and bench maintenance of airborne communication systems.
13.0 Demonstrate proficiency in installing avionics systems.
14.0 Demonstrate proficiency in the usage and adjustment of test equipment
15.0 Demonstrate proficiency in AM and FM transmitters.
16.0 Demonstrate proficiency in AM and FM receivers.
17.0 Demonstrate proficiency in AM and FM transceivers.
18.0 Demonstrate proficiency in electromagnetic wave emissions.
19.0 Demonstrate proficiency in line and bench maintenance of airborne radio navigation systems and equipment.
20.0 Demonstrate proficiency in line and bench maintenance of airborne radar systems.
21.0 Demonstrate proficiency in the principles of operation of area navigation (R-NAV) systems.
22.0 Demonstrate proficiency in the principles of Global Positioning Systems.

Florida Department of Education
Student Performance Standards

Program Title: **Avionics**
PSAV Number: **I470199**

Course Number: EEV0010
Occupational Completion Point: A
Electronics Assembler – 250 Hours – SOC Code 49-2091

Course Description:
The Electronics Assembler course prepares students for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study basic laboratory practices, and direct current (DC) circuitry.

CTE Standards and Benchmarks	
01.0	Demonstrate proficiency in soldering basic laboratory practices--The student will be able to:
01.01	Apply proper Occupational Safety Health Administration (OSHA) safety standards.
01.02	Make electrical connections.
01.03	Identify and use hand tools properly.
01.04	Identify and use power tools properly.
01.05	Apply recognized industry accepted standard soldering techniques.
01.06	Apply recognized industry accepted standard desoldering techniques.
01.07	Apply recognized industry accepted standard electrostatic discharge (ESD) safety procedures.
01.08	Design and/or construct printed circuit boards (PCB's) to industry accepted standards.
01.09	Explain the theoretical concepts of industry accepted soldering techniques.
01.10	Apply recognized industry accepted standard techniques for rework and repair.
02.0	Demonstrate proficiency in basic DC circuits--The student will be able to:
02.01	Demonstrate proficiency in basic DC circuits.
02.02	Solve problems in electronic units utilizing metric prefixes.
02.03	Identify sources of electricity.
02.04	Define voltage, current, resistance, power and energy.
02.05	Apply Ohm's law and power formulas.

CTE Standards and Benchmarks	
02.06	Read and interpret color codes and symbols to identify electrical components and values.
02.07	Measure properties of a circuit using a digital multi-meter (DMM).
02.08	Compute conductance and compute and measure resistance of conductors and insulators.
02.09	Apply Ohm's law to series circuits.
02.10	Construct and verify operation of series circuits.
02.11	Analyze and troubleshoot series circuits.
02.12	Apply Ohm's law to parallel circuits.
02.13	Construct and verify the operation of parallel circuits.
02.14	Analyze and troubleshoot parallel circuits.

Florida Department of Education
Student Performance Standards

Course Number: EEV0100
Occupational Completion Point: B
Electronics Tester – 400 Hours – SOC Code 49-2091

Course Description:
The Electronics Tester course is designed to build on the skills and knowledge students learned in the Electronics Assembler course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study advanced direct current (DC) circuitry, alternating current (AC) circuitry, and solid state circuitry.

CTE Standards and Benchmarks	
03.0	Demonstrate proficiency in advanced DC circuits--The student will be able to:
03.01	Solve algebraic problems to include exponentials to DC.
03.02	Describe the relationship of DC electricity to the nature of matter.
03.03	Apply Ohm's law to series-parallel and parallel-series circuits.
03.04	Construct and verify the operation of series-parallel and parallel-series and bridge circuits.
03.05	Troubleshoot series-parallel and parallel-series and bridge circuits.
03.06	Identify and define voltage divider circuits (loaded and unloaded).
03.07	Construct and verify the operation of voltage divider circuits (loaded and unloaded).
03.08	Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
03.09	Apply maximum power transfer theorem.
03.10	Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
03.11	Describe magnetic properties of circuits and devices.
03.12	Determine the physical and electrical characteristics of capacitors and inductors.
03.13	Define resistor-capacitor (R-C) and resistor-inductor (R-L) time constants and classify the output of differentiators and integrators.
03.14	Set up and operate power supplies for DC circuits.
03.15	Explain the theory of DC motor operation.
03.16	Identify the practical applications for the use of a DC motor.
04.0	Demonstrate proficiency in AC circuits--The student will be able to:

CTE Standards and Benchmarks	
04.01	Solve basic trigonometric problem as applicable to electronics.
04.02	Define the characteristics of AC capacitive circuits.
04.03	Construct and verify the operation of AC capacitive circuits.
04.04	Analyze and troubleshoot AC capacitive circuits.
04.05	Define the characteristics of AC inductive circuits.
04.06	Construct and verify the operation of AC inductive circuits.
04.07	Analyze and troubleshoot AC inductive circuits.
04.08	Define and apply the principles of transformers to AC circuits.
04.09	Construct and verify the operation of AC circuits utilizing transformers.
04.10	Analyze and troubleshoot AC circuits utilizing transformers.
04.11	Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
04.12	Analyze and troubleshoot differentiator and integrator circuits.
04.13	Define the characteristics of Resistive, Inductive, and Capacitive (RLC) circuits (series, parallel and complex).
04.14	Construct and verify the operation of series and parallel resonant circuits.
04.15	Define the characteristics of series and parallel resonant circuits.
04.16	Construct and verify the operation of series and parallel resonant circuits.
04.17	Analyze and troubleshoot R-C, R-L, and RLC circuits.
04.18	Define the characteristics of frequency selective filter circuits.
04.19	Construct and verify the operation of frequency selective filter circuits.
04.20	Analyze and troubleshoot frequency selective filter circuits.
04.21	Define the characteristics of polyphase circuits.
04.22	Define basic motor theory and operation.
04.23	Define basic generator theory and operation.
04.24	Set up and operate power supplies for AC circuits.
04.25	Set up and operate oscilloscopes for AC circuits.
04.26	Set up and operate function generators for AC circuits.
04.27	Analyze and measure power in AC circuits.

CTE Standards and Benchmarks	
	04.28 Set up and operate capacitor and inductor analyzers for AC circuits.
	04.29 Explain the theory of AC motor operation.
	04.30 Identify the practical applications for the use of an AC motor.
05.0	Demonstrate proficiency in solid state devices--The student will be able to:
	05.01 Identify and define properties of semiconductor materials.
	05.02 Identify and define operating characteristics and applications of junction diodes.
	05.03 Identify and define operating characteristics and applications of special diodes, ex. Zener diodes.
	05.04 Construct diode circuits.
	05.05 Analyze and troubleshoot diode circuits.
	05.06 Identify and define operating characteristics and applications of bipolar transistors,
	05.07 Identify and define operating characteristics and applications of field effect transistors.
	05.08 Identify and define operating characteristics and applications of single-stage amplifiers.
	05.09 Construct single-stage amplifiers.
	05.10 Analyze and troubleshoot single-stage amplifiers.
	05.11 Construct thyristor circuitry.
	05.12 Analyze and troubleshoot thyristor circuitry.
	05.13 Set up and operate power supplies for solid-state devices.
	05.14 Set up and operate oscilloscopes for solid-state devices.
	05.15 Set up and operate function generators for solid-state devices.
	05.16 Set up and operate capacitor and inductor analyzers for solid-state devices.
	05.17 Set up and operate curve tracers.
	05.18 Set up and operate transistor testers.

Florida Department of Education
Student Performance Standards

Course Number: EEV0616
Occupational Completion Point: C
Electronics Technician – 375 Hours – SOC Code 49-2091

Course Description:
The Electronics Technician course is designed to build on the skills and knowledge students learned in the Electronics Tester course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study analog circuitry, and technical writing.

CTE Standards and Benchmarks	
06.0	Demonstrate skills in technical recording utilizing industry recognized computer application software--The student will be able to:
06.01	Draw and interpret electronic schematics.
06.02	Record data and design curves and graphs.
06.03	Write reports and make oral presentations.
06.04	Maintain test logs.
06.05	Make equipment failure reports.
06.06	Specify and requisition simple electronic components.
06.07	Compose technical letters and memoranda.
06.08	Write formal reports of laboratory experiences.
06.09	Draft preventive maintenance and calibration procedures.
07.0	Demonstrate proficiency in analog circuits--The student will be able to:
07.01	Identify and define operational characteristics and applications of multistage amplifiers.
07.02	Construct multistage amplifiers.
07.03	Analyze and troubleshoot multistage amplifiers.
07.04	Identify and define operating characteristics and applications of linear integrated circuits.
07.05	Identify and define operating characteristics and applications of basic power supplies and filters.
07.06	Construct basic power supplies and filters.
07.07	Identify and define operating characteristics and applications of differential and operational amplifiers.

CTE Standards and Benchmarks	
07.08	Construct differential and operational amplifier circuits.
07.09	Analyze and troubleshoot differential and operational amplifier circuits.
07.10	Identify and define operating characteristics of audio power amplifiers.
07.11	Construct audio power amplifiers.
07.12	Analyze and troubleshoot audio power amplifiers.
07.13	Identify and define operating characteristics and applications of power supply regulator circuits.
07.14	Construct power supply regulator circuits.
07.15	Analyze and troubleshoot power supply regulator circuits.
07.16	Identify and define operating characteristics and applications of active filters.
07.17	Construct active filter circuits.
07.18	Analyze and troubleshoot active filter circuits.
07.19	Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
07.20	Construct oscillator circuits.
07.21	Analyze and troubleshoot oscillator circuits.
07.22	Identify and define operating characteristics and applications of Liquid Crystal Display (LCD), Light Emitting Diode (LED), and Three Dimensional (3D) technologies.
07.23	Identify and define operating characteristics and applications of optoelectronic devices.
07.24	Set up and operate measuring instruments for analog circuits.

Florida Department of Education
Student Performance Standards

Course Number: EEV0500
Occupational Completion Point: D
Electronics Equipment Repairer – 375 Hours – SOC Code 49-2091

Course Description:
The Electronics Equipment Repairer course is designed to build on the skills and knowledge students learned in the Electronics Technician course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study digital circuitry, and micro-processors.

CTE Standards and Benchmarks	
08.0	Demonstrate proficiency in digital circuits--The student will be able to:
08.01	Define and apply numbering systems to codes and arithmetic operations.
08.02	Analyze and minimize logic circuits using Boolean operations.
08.03	Set up and operate logic probes for digital circuits.
08.04	Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
08.05	Set up and operate pulsers for digital circuits.
08.06	Set up and operate oscilloscopes for digital circuits.
08.07	Set up and operate logic analyzers for digital circuits.
08.08	Set up and operate pulse generators for digital circuits.
08.09	Identify types of logic gates and their truth tables.
08.10	Construct combinational logic circuits using integrated circuits.
08.11	Troubleshoot logic circuits.
08.12	Analyze types of flip-flops and their truth tables.
08.13	Construct flip-flops using integrated circuits.
08.14	Troubleshoot flip-flops.
08.15	Identify, define and measure characteristics of integrated circuit (IC) logic families.
08.16	Identify types of registers and counters.
08.17	Construct registers and counters using flip-flops and logic gates.

CTE Standards and Benchmarks	
08.18	Troubleshoot registers and counters.
08.19	Analyze clock and timing circuits.
08.20	Construct clock and timing circuits.
08.21	Troubleshoot clock and timing circuits.
08.22	Identify types of arithmetic-logic circuits.
08.23	Construct arithmetic-logic circuits.
08.24	Troubleshoot arithmetic-logic circuits.
08.25	Identify types of encoding and decoding devices.
08.26	Construct encoders and decoders.
08.27	Troubleshoot encoders and decoders.
08.28	Identify types of multiplexer and demultiplexer circuits.
08.29	Construct multiplexer and demultiplexer circuits using integrated circuits.
08.30	Troubleshoot multiplexer and demultiplexer circuits.
08.31	Identify types of memory circuits.
08.32	Relate the uses of digital-to-analog and analog-to-digital conversions.
08.33	Construct digital-to-analog and analog-to-digital circuits.
08.34	Troubleshoot digital-to-analog and analog-to-digital circuits.
08.35	Identify types of digital displays.
08.36	Construct digital display circuits.
08.37	Troubleshoot digital display circuits.
09.0	Demonstrate proficiency in fundamental micro-processors--The student will be able to:
09.01	Identify central processing unit (CPU) building blocks and their uses (architecture).
09.02	Safely install and remove a CPU without damaging.
09.03	Analyze bus concepts.
09.04	Analyze various memory schemes.
09.05	Use memory devices in circuits.
09.06	Troubleshoot memory device circuits.

CTE Standards and Benchmarks	
09.07	Set up and operate oscilloscopes for microprocessor systems.
09.08	Set up and operate logic-data analyzers to troubleshoot microprocessor systems.
09.09	Identify types of input and output devices and peripherals.
09.10	Interface input and output ports to peripherals.
09.11	Analyze and troubleshoot input and output ports.
09.12	Compare and contrast macro processor programming language types.
09.13	Diagram the macro processor programming sequence using a flow chart.

Florida Department of Education
Student Performance Standards

Course Number: AVS0090
Occupational Completion Point: E
Avionics Technical Publications Technician – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Technical Publications Technician course is designed to build on the skills and knowledge students learned in the Electronics Equipment Repairer course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study avionics radio station regulations and procedures.

CTE Standards and Benchmarks	
10.0	Demonstrate proficiency in avionics radio station regulations and procedures--The student will be able to:
10.01	Define repair station related regulatory and standardization agencies and their purposes.
10.02	Define repair station certification requirements.
10.03	Define requirements for certification of radio repairmen.
10.04	Practice proper station operation procedures.
10.05	Prepare repair station reports and documentation.

Florida Department of Education
Student Performance Standards

Course Number: AVS0091
Occupational Completion Point: F
Avionics Installer – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Installer course is designed to build on the skills and knowledge students learned in the Avionics Technical Publications Technician course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study aircraft electrical systems, airborne communication systems, avionics installation, and test equipment.

CTE Standards and Benchmarks	
11.0	Demonstrate proficiency in aircraft electrical systems and ground safety--The student will be able to:
11.01	Define standard aircraft bus voltage.
11.02	Analyze aircraft electrical power generation and charging systems.
11.03	Analyze aircraft electrical power control and distribution systems.
11.04	Analyze aircraft electrical warning systems.
11.05	Analyze aircraft ground handling safety.
11.06	Describe and practice aircraft ground handling safety procedures pertaining to avionics maintenance.
12.0	Demonstrate proficiency in line and bench maintenance of airborne communication systems--The student will be able to:
12.01	Describe theory of operation of air to ground communication systems.
12.02	Determine serviceability through performance checks of avionics communication systems.
12.03	Troubleshoot to the component/module level malfunctioning communication systems/equipment.
12.04	Repair and return to service air to ground communication systems/equipment.
12.05	Analyze and troubleshoot communication transmitter switching and audio distribution circuits and equipment.
12.06	Describe the theory of operation of emergency locator transmitters (ELTs).
12.07	Perform preventative and regulatory maintenance and performance tests of ELTs.
12.08	Troubleshoot defective ELTs, repair and return to service.
13.0	Demonstrate proficiency in installing avionics systems--The student will be able to:
13.01	Draw an interconnecting diagram and interconnect an IFR Avionics system for a single engine or light twin aircraft using acceptable methods, techniques and practices.

CTE Standards and Benchmarks	
	13.02 Determine proper placement of the various antennas required for an IFR Avionics package on a light twin or single engine aircraft.
	13.03 Describe the effects of precipitation static on aircraft radios and standard methods of reduction.
	13.04 Compute the dimensions of an ADF Sense antenna for a typical installation.
	13.05 Apply the formula for weight and balance computation.
14.0	Demonstrate proficiency in the usage and adjustment of test equipment--The student will be able to:
	14.01 Describe the regulatory requirements for repair station test equipment calibration.
	14.02 Use and adjust frequency counters/meters.
	14.03 Use and adjust general-purpose multimeters.
	14.04 Use and adjust RF voltmeters.
	14.05 Use and adjust RF power meters, wattmeters, loads and attenuators.
	14.06 Use and adjust audio signal generators and power meters.
	14.07 Use and adjust oscilloscopes.
	14.08 Use and adjust power supplies.
	14.09 Use and adjust RF signal generators.
	14.10 Use and adjust special purpose test sets normally used in an Avionics Repair Station.

Florida Department of Education
Student Performance Standards

Course Number: AVS0092
Occupational Completion Point: G
Avionics Communication System Technician – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Communication System Technician course is designed to build on the skills and knowledge students learned in the Avionics Installer course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study AM and FM transmitters, receivers, transceivers, and electromagnetic wave emissions.

CTE Standards and Benchmarks	
15.0	Demonstrate proficiency in AM and FM transmitters--The student will be able to:
15.01	Define DSB, SSB and FM modulation.
15.02	Draw, analyze and troubleshoot AM and FM RF oscillator circuits.
15.03	Draw, analyze and troubleshoot buffer and multiplier circuits.
15.04	Draw, analyze and troubleshoot RF power amplifier circuits.
15.05	Draw, analyze and troubleshoot AM and FM modulation circuits.
15.06	Draw, analyze and troubleshoot microphone circuits.
15.07	Draw, analyze and troubleshoot balanced modulators and SSB filter circuits.
15.08	Draw, analyze and troubleshoot AM and FM power supply circuits.
15.09	Make power, frequency and modulation measurements of AM and FM transmitters.
15.10	Align and troubleshoot AM and FM transmitters.
15.11	Describe FCC rules pertaining to AM and FM transmitter maintenance and operation.
16.0	Demonstrate proficiency in AM and FM receivers--The student will be able to:
16.01	Draw, analyze and troubleshoot receiver audio voltage and power amplifiers and speaker/headphone circuits.
16.02	Draw, analyze and troubleshoot AM and FM detector circuits.
16.03	Draw, analyze and troubleshoot AM IF amplifier circuits.
16.04	Draw, analyze and troubleshoot FM IF amplifier and limited circuits.
16.05	Draw, analyze and troubleshoot receiver oscillator and AFC circuits.

CTE Standards and Benchmarks	
	16.06 Draw, analyze and troubleshoot RF mixer/hetrodyne circuits.
	16.07 Draw, analyze and troubleshoot receiver RF amplifier circuits.
	16.08 Draw, analyze and troubleshoot AVC/AGC circuits.
	16.09 Draw, analyze and troubleshoot receiver power supplies.
	16.10 Make receiver sensitivity, selectivity, bandwidth, image rejection and adjacent channel rejection measurements.
	16.11 Align and troubleshoot AM and FM receivers.
17.0	Demonstrate proficiency in AM and FM transceivers--The student will be able to:
	17.01 Analyze and troubleshoot transceiver control, metering and switching circuits.
	17.02 Analyze and troubleshoot transceiver frequency synthesizers and phase locked loop circuits.
	17.03 Analyze and troubleshoot squelch circuits.
	17.04 Align and troubleshoot transceivers.
18.0	Demonstrate proficiency in electromagnetic wave emissions--The student will be able to:
	18.01 Define the radio frequency spectrum.
	18.02 Define types and classification of RF emissions.
	18.03 Define the characteristics of radio waves.
	18.04 Define radio wave propagation method.
	18.05 Define the basic types of antennas.
	18.06 Draw the voltage and current relationships and radiation patterns for the basic types of antennas.
	18.07 Solve signal strength problems and measure signal strength.
	18.08 Solve problems pertaining to antenna length, propagation velocity and frequency.
	18.09 Define methods for antenna tuning, gain and directivity.
	18.10 Define transmission lines in terms of electrical and physical properties.
	18.11 Define standing waves, cause and effect, and measure standing wave ratios.
	18.12 Define tuned transmission lines and describe applications.
	18.13 Draw voltage, current and impedance relationships for tuned transmission lines.
	18.14 Compute transmission line losses.
	18.15 Construct transmission lines.

CTE Standards and Benchmarks
18.16 Define waveguides, resonant cavities and their applications.

Florida Department of Education
Student Performance Standards

Course Number: AVS0093
Occupational Completion Point: H
Avionics Technician – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Technician course is designed to build on the skills and knowledge students learned in the Avionics Communication System Technician course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study airborne radio navigation systems, radar systems, R-NAV systems, and Global Positioning Systems.

CTE Standards and Benchmarks	
19.0	Demonstrate proficiency in line and bench maintenance of airborne radio navigation systems and equipment--The student will be able to:
19.01	Describe the principles and theory of operation of VHF omnirange receivers, converters and indicators.
19.02	Determine through performance checks, the serviceability of VHF omnirange systems.
19.03	Troubleshoot to the component/module level malfunctioning omnirange systems.
19.04	Repair and return to service omnirange systems equipment.
19.05	Describe the principles and theory of operation of instrument landing systems (ILS).
19.06	Determine through performance checks the serviceability of localizer, glideslope and marker beacon receivers, converters and indicators.
19.07	Troubleshoot to the component/module level malfunctioning ILS systems and equipment.
19.08	Repair and return to service ILS systems and equipment.
19.09	Describe the principles of operation of microwave landing systems.
19.10	Describe the principles and theory of operation of Automatic Direction Finders (ADF).
19.11	Determine through performance checks the serviceability of ADF systems.
19.12	Troubleshoot to the component/module level malfunctioning ADF systems.
19.13	Repair and return to service ADF systems.
19.14	Describe radio navigation systems/equipment interface with other aircraft instruments and systems.
20.0	Demonstrate proficiency in line and bench maintenance of airborne radar systems--The student will be able to:
20.01	Describe the principles and theory of operation of Air Traffic Control (ATC) transporters and altitude encoders.
20.02	Determine through performance checks the serviceability of ATC transponders and altitude encoders.

CTE Standards and Benchmarks	
	20.03 Troubleshoot to the component/module level ATC transponders.
	20.04 Repair and return to service ATC transponders.
	20.05 Describe the principles and theory of operation and Distance Measurements Equipment (DME).
	20.06 Determine through performance checks the serviceability of DME systems.
	20.07 Troubleshoot to the component/module level malfunctioning DME systems.
	20.08 Repair and return to service DME transponders.
	20.09 Describe the principles and basic theory of operation of weather radar systems.
	20.10 Describe the basic principles of operation of the 3M/RYAN Stormscope.
21.0	Demonstrate proficiency in the principles of operation of area navigation (R-NAV) systems--The student will be able to:
	21.01 Describe the principles of operation of VHF R-NAV systems (VOR-DME).
	21.02 Describe the principles of operation of Hyperbolic R-NAV systems (Loran C), (Omega/VAF) and Global Positioning Systems.
22.0	Demonstrate proficiency in the principles of Global Positioning Systems--The student will be able to:
	22.01 Describe the principles and basic theory of operation of Global Positioning Systems

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

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Electronic Technology and/or Electronic Engineering Technology and/or equipment training and/or work experience are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Automotive Collision Repair and Refinishing**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	I470603
CIP Number	0647060300
Grade Level	30, 31
Standard Length	1400 hours
Teacher Certification	AUTO BODY @7 7G AUTO IND @7 %7 %G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3021- Automotive Body and Related Repairers
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to basic trade skills; refinishing skills; sheetmetal repair skills; frame and unibody squaring and aligning; use of fillers; paint systems and undercoats; related welding skills; related mechanical skills; trim-hardware maintenance; glass servicing; and other miscellaneous repairs. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 five 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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	ARR0210 ARR0213	Paint and Body Helper Paint and Body Assistant	250 hours 250 hours	49-3021
B	ARR0020	Auto Collision Estimator	100 hours	49-3021
C	ARR0313	Frame and Body Repairman	150 hours	49-3021
D	ARR0127	Automotive Refinishing	325 hours	49-3021
E	ARR0240	Automobile Body Repairer	325 hours	49-3021

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks the Automotive Collision Repair and Refinishing program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate vehicle and industry knowledge, business management, and shop and occupational safety skills.
02.0 Prepare vehicles for repair and refinishing by applying creative techniques.
03.0 Creatively repair, replace and adjust outer body panels.
04.0 Perform welding operations that apply creativity and interpretation.
05.0 Evaluate and prepare surfaces for refinishing.
06.0 Select and apply appropriate polishing compounds and detail techniques.
07.0 Setup vehicle for measuring and pulling.
08.0 Calculate, measure and repair unibody vehicles.
09.0 Inspect and creatively repair frame type vehicle bodies.
10.0 Maintain and operate spray equipment.
11.0 Finish defects, causes and cures.
12.0 Prepare metal parts and panels for creative finishing.
13.0 Prepare and apply body fillers.
14.0 Perform miscellaneous repairs.
15.0 Repair fiberglass and plastic components.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Collision Repair and Refinishing**
PSAV Number: **I470603**

Course Number: ARR0210
Occupational Completion Point: A (1 of 2)
Paint and Body Helper – 250 Hours – SOC Code 49-3021

Course Description:
The Paint and Body Helper course prepares students for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study vehicle and industry knowledge, business management, occupational safety, vehicle preparation, and outer body panels.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:
01.01	Comply with safety rules established by OSHA, NIOSH, EPA, and DER regarding chemicals and hazardous materials.
01.02	Comply with safety rules established by OSHA and NIOSH regarding personal clothing and devices.
01.03	Comply with safety rules regarding hand tools and power equipment and use them properly, including fire extinguishers.
01.04	Comply with locally developed shop safety rules and regulations.
01.05	Identify sources of airborne contamination and other hazards.
01.06	Select proper spray mask; inspect the spray mask to insure proper fit and operation; inspect the condition of the mask filters and other components.
01.07	Explain the "Right to Know Law" as applicable to auto body repair occupations.
01.08	Identify vehicle parts by name, location and function.
01.09	Read and explain damage reports.
02.0	Prepare vehicles for repair and refinishing by applying creative techniques--The student will be able to:
02.01	Remove, replace and align damaged outside trim and moldings.
02.02	Remove, replace and align damaged or necessary inside trim and moldings.
02.03	Remove, replace and align damaged, non-structural body panels and components that may interfere with or be damaged during repair.
02.04	Protect panels and parts adjacent to repair area to prevent damage.
02.05	Remove dirt, grease and wax from those areas to be repaired.

CTE Standards and Benchmarks	
	02.06 Remove dirt, corrosion, under coatings, sealers, and/or other protective coatings necessary to perform repairs to structural areas.
	02.07 Remove, replace, and align repairable plastics and other parts that are recommended for off-car repair.
	02.08 Locate, read and interpret automobile manufacturers' data plates.
03.0	Creatively repair, replace and adjust outer body panels--The student will be able to:
	03.01 Remove, replace and adjust a bolted panel or panel assembly.
	03.02 Remove, replace and align hoods, hood hinges and hood latches.
	03.03 Remove, replace and align deck lids, lid hinges and lid latches.
	03.04 Remove, replace and align doors, tailgates, and hatches, lift gates and hinges.
	03.05 Remove and replace bumpers, reinforcements, guards, isolators, and mounting hardware (release pressure from gas- and oil-filled energy-absorbing-type bumper isolators that are being discarded).
	03.06 Check door hinge condition, replace hinge pins and bushings as needed, check door frames, check and adjust door clearances (where adjustable) along quarter panels, doors, rocker panels, fenders and tops.
	03.07 Check and adjust latch assemblies on all hinged components.

Course Number: ARR0213
Occupational Completion Point: A (2 of 2)
Paint and Body Assistant – 250 Hours – SOC Code 49-3021

Course Description:
The Paint and Body Assistant course is designed to build on the skills and knowledge students learned in the Paint and Body Helper course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study welding operations, surface evaluation and preparation, polishing and detail techniques.

CTE Standards and Benchmarks	
04.0	Perform welding operations that apply creativity and interpretation--The student will be able to:
	04.01 Demonstrate welding safety procedures.
05.0	Evaluate and prepare surfaces for refinishing--The student will be able to:
	05.01 Inspect and identify types of finishes and surface conditions and develop a plan for refinishing using one paint system from start to finish in conformance with paint system manufacturer specifications.
	05.02 Gain access to, remove and store trim and molding.
	05.03 Remove dirt, wax and road grime from areas to be refinished and adjacent surfaces including complete washing of the vehicle.
	05.04 Mask and protect other areas that will not be refinished.

CTE Standards and Benchmarks	
05.05	Mix primer, primer surfacer or primer sealer and spray onto the surface of repaired areas including two components and self-etching primers.
05.06	Apply glazing putty to minor surface imperfections.
05.07	Select proper abrasives and dry or wet sand area to which primer-surfacer and glazing putty have been applied.
05.08	Compound around the edges of repaired areas to be refinished.
05.09	Remove dust from areas to be refinished including cracks or moldings of adjacent areas.
05.10	Clean area to be refinished with a proper solution.
05.11	Remove, with a tack rag, any dust or lint particles from the areas to be refinished.
06.0	Select and apply appropriate polishing compounds and detail techniques--The student will be able to:
06.01	Sand, buff and polish finishes.
06.02	Clean and detail a vehicle after completion of refinishing.

Florida Department of Education
Student Performance Standards

Course Number: ARR0020
Occupational Completion Point: B
Auto Collision Estimator – 100 Hours – SOC Code 49-3021

Course Description:
The Auto Collision Estimator course is designed to build on the skills and knowledge students learned in the Paint and Body Assistant course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study industry knowledge, business management, occupational safety, and vehicle preparation.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management, and shop and occupational safety skills--The student will be able to:
01.10	Operate basic office machines.
01.11	Demonstrate basic keyboarding skills and computer usage.
01.12	Determine acceptable parts to use: new, used or aftermarket.
01.13	Prepare damage reports manually to industry standards.
01.14	Prepare damage reports to industry standards using a computer.
02.0	Prepare vehicles for repair and refinishing by applying creative techniques--The student will be able to:
02.09	Use specification and crash manuals including "P" pages.

Florida Department of Education
Student Performance Standards

Course Number: ARR0313
Occupational Completion Point: C
Frame and Body Repairman – 150 Hours – SOC Code 49-3021

Course Description:
The Frame and Body Repairman course is designed to build on the skills and knowledge students learned in the Auto Collision Estimator course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study industry knowledge, business management, occupational safety, outer body panel adjustment, measuring, pulling, unibody vehicle repair, and frame repair.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:
01.15	Perform structural damage analysis and determine repair procedures.
03.0	Creatively repair, replace and adjust outer body panels--The student will be able to:
03.08	Determine the extent of damage to structural body panels; repair, weld, or replace in accordance with manufacturers' specifications.
07.0	Setup vehicle for measuring and pulling--The student will be able to:
07.01	Determine and plan methods and order of repair.
07.02	Mount vehicle on anchoring equipment.
07.03	Measure vehicle damage using manufacturers' specifications.
07.04	Attach pulling equipment, pull and re-measure.
08.0	Calculate, measure and repair unibody vehicles--The student will be able to:
08.01	Precisely measure unibody vehicles.
08.02	Diagnose and measure unibody damage using self-centering and tram gauges.
08.03	Diagnose and measure unibody damage using a datum plane.
08.04	Determine the location of all suspension, steering and power train component attaching point to the body.
08.05	Clean, prime and apply protective coat to repaired unibody structural areas.
08.06	Determine the extent of the direct and indirect damage and the direction of impact and plan the method and order of repair.
08.07	Precisely measure unibody vehicles, check and adjust suspension mount points that effect four-wheel alignment.

CTE Standards and Benchmarks	
08.08	Diagnose and measure unibody damage using a dedicated (fixture) measuring system.
08.09	Diagnose and measure unibody damage using a universal measuring system or a laser.
08.10	Attach proper body anchoring devices.
08.11	Identify procedures to straighten and align cowl assemblies.
08.12	Identify procedures to straighten and align roof pillars and roof panels.
08.13	Identify procedures to straighten and align doorposts, sills, floor pans and rocker panels.
08.14	Identify procedures to straighten and align quarter panels, wheel-housing assemblies and rear body sections (including rail, suspension and power train panels).
08.15	Identify procedures to straighten/align front-end sections (aprons, strut towers, upper/lower rails, steering, suspension and power train mounting points).
08.16	Recognize the limitations of applying heat to high strength steel structural components, use proper heat stress relief methods on high strength steel and weld in accordance with manufacturers' specifications.
08.17	Use proper cold stress relief methods.
08.18	Remove folds, curves, creases and dents using power tools and hand tools to restore damaged areas to proper contours and dimensions.
08.19	Determine the extent of damage to structural steel body panels and repair, weld or replace them in accordance with manufacturers' specifications.
08.20	Determine the extent of damage to structural aluminum body panels in accordance with manufacturers' specifications.
08.21	Cut out damaged sections of structural steel body panels and weld in new and/or used replacement in accordance with accepted industry standards.
08.22	Recheck panel contour and alignment after pulling and correct or adjust as necessary.
09.0	Inspect and creatively repair frame type vehicle bodies--The student will be able to:
09.01	Diagnose and measure frame damage using self-centering and tram gauge.
09.02	Determine the extent of direct and indirect damage and the direction of impact and plan methods and order of repairs.
09.03	Clean, prime and protective coat repaired frame areas.
09.04	Identify procedures to straighten and align mash damage.
09.05	Identify procedures to straighten and align sag damage.
09.06	Identify procedures to straighten and align side sway damage.
09.07	Identify procedures to straighten and align twist damage.
09.08	Identify procedures to straighten and align kickup damage.
09.09	Identify procedures to straighten and align broadside damage.

CTE Standards and Benchmarks	
09.10	Identify procedures to straighten and align diamond frame damage.
09.11	Identify procedures to remove and replace damaged frame horns, side rails, cross members and front or rear frame sections and weld cracks in frame members.
09.12	Repair, reinforce or replace weakened frame members in accordance with vehicle manufacturers' recommendations.

Florida Department of Education
Student Performance Standards

Course Number: ARR0127
Occupational Completion Point: D
Automotive Refinishing – 325 Hours – SOC Code 49-3021

Course Description:
The Automotive Refinishing course is designed to build on the skills and knowledge students learned in the Frame and Body Repairman course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study industry knowledge, business management, occupational safety, surface evaluation and preparation, polishing, detail techniques, spray equipment, and finishing.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:
01.16	Inspect air makeup and exhaust systems (including intake filters, exhaust filters, fans and other mechanical components of the system) to insure proper filtering and ventilation.
05.0	Evaluate and prepare surfaces for refinishing--The student will be able to:
05.12	Inspect and identify type of substrate, and surface condition; develop a plan for refinishing.
05.13	Chemically, and mechanically safely remove paint finishes.
05.14	Dry and wet sand areas to be refinished.
05.15	Artistically featheredge broken areas to be refinished.
05.16	Determine when sealing is needed or desirable and apply suitable sealer to the area being refinished.
05.17	Creatively scuff sand to remove nibs or overspray from a sealer.
05.18	Apply adhesion promoter over areas to be painted and blend into adjacent areas.
05.19	Apply stone chip resistant coating.
05.20	Restore corrosion resistant coatings, caulking and seam sealers to repaired areas.
06.0	Select and apply appropriate polishing compounds and detail techniques--The student will be able to:
06.03	Select the proper spray mask, inspect the spray mask to insure proper fit and operation, and inspect the condition of the mask filters and other components.
06.04	Interpret the type and color of paint already on a vehicle and identify alternates.
06.05	Measure, shake, stir, thin or reduce, and strain paint.

CTE Standards and Benchmarks	
06.06	Verify color match before applying and adjust if needed.
06.07	Creatively apply urethane enamel for spot, panel and overall refinishing.
06.08	Creatively apply urethane clear coat for spot, panel and overall repairs.
06.09	Apply decals, transfers, tapes, wood-grains, pinstripes (painted and taped), etc.
06.10	Properly dispose of hazardous waste.
06.11	Identify the types of plastic parts to be finished and determine the proper refinishing procedure.
06.12	Apply a finish coat to plastic parts.
06.13	Clean, condition and refinish vinyl (e.g. upholstery, dashes and tops).
06.14	Apply a tri-coat paint system using visual and artistic techniques.
10.0	Maintain and operate spray equipment--The student will be able to:
10.01	Explain, adjust and use a variety of spray guns including siphon feed, pressure feed, gravity feed and HVLP.
10.02	Check and adjust air pressure at the spray gun.
10.03	Adjust spray gun fluid and pattern control valves.
10.04	Appropriately use creative and artistic spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.
10.05	Inspect, clean and determine the condition and adequacy of spray guns and related equipment (air hoses, regulators, airlines, air sources and spray environment).
10.06	Maintain and properly use the spray booth.
11.0	Finish defects, causes and cures--The student will be able to:
11.01	Check for rust spots; determine the cause(s) and correct the condition.
11.02	Identify and interpret paint cracking (crowsfeet or line-checking, micro checking, etc); correct the condition.
11.03	Identify poor adhesion; determine the cause(s) and correct the condition.
11.04	Identify blistering appearance in the paint surface; determine the cause(s) and correct the condition.
11.05	Identify water spotting on paint surface, interpret and correct the condition.
11.06	Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.
11.07	Identify finish damage caused by airborne contaminants (acids, soot, and other industrial-related causes); correct the condition.
11.08	Identify die-back conditions (dulling of the paint film showing haziness and/or film distortion showing shrinking); correct the condition.
11.09	Identify chalking (oxidation); correct the condition.
11.10	Identify body filler bleed-through; correct the condition.

CTE Standards and Benchmarks
11.11 Identify pin holing; correct the condition.

Florida Department of Education
Student Performance Standards

Course Number: ARR0240
Occupational Completion Point: E
Automobile Body Repairer – 325 Hours – SOC Code 49-3021

Course Description:
The Automobile Body Repairer course is designed to build on the skills and knowledge students learned in the Automotive Refinishing course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study repair and refinishing techniques, outer body panel adjustment, welding operations, metal preparation, body fillers, miscellaneous repair techniques, fiberglass, and plastics.

CTE Standards and Benchmarks	
02.0	Prepare vehicles for repair and refinishing by applying creative techniques--The student will be able to:
02.10	Diagnose and analyze damage to determine appropriate methods for overall repair.
02.11	Locate, remove and replace to specifications, those vehicle electrical/electronic devices that might be damaged during repair.
02.12	Explain proper air bag operation and passive restraint handling.
03.0	Creatively repair, replace and adjust outer body panels--The student will be able to:
03.09	Remove, replace and align a welded (non-structural) steel panel or panel assembly.
03.10	Straighten roughed out contours of damaged panels to a surface condition for body filling or metal finishing.
03.11	Weld cracked or torn steel body panels; reweld broken welds.
03.12	Apply protective coatings and sealants to structural panels.
03.13	Heat shrink stretched panel areas back to contour.
03.14	Cold shrink stretched panel areas back to contour.
03.15	Repair or replace door skins and intrusion beams.
04.0	Perform welding operations that apply creativity and interpretation--The student will be able to:
04.02	Identify metal types prior to welding.
04.03	Setup, operate and maintain metal inert gas (MIG) welding equipment.
04.04	Creatively perform various welds with MIG equipment including plug, butt and lap.
04.05	Setup and maintain oxyacetylene welding equipment.

CTE Standards and Benchmarks	
04.06	Explain various welding, cutting and heating techniques with oxyacetylene equipment.
04.07	Describe plasma cutting.
04.08	Remove, replace and align damaged, structural body panels and components that may interfere with or be damaged during repairing.
04.09	Identify procedures to Weld aluminum.
04.10	Explain electric compression spot welding.
04.11	Set up and perform plasma-cutting operations.
12.0	Prepare metal parts and panels for creative finishing--The student will be able to:
12.01	Identify specification(s) of metals used in automobiles.
12.02	Identify heat effects on metals.
12.03	Identify the importance of maintaining the structural integrity of an vehicle body.
12.04	Remove the paint from the damaged area of a body panel.
12.05	Pick and file the damaged area of a body panel to eliminate surface irregularities.
12.06	Disc sand the repaired body panel to produce final smoothness.
13.0	Prepare and apply body fillers--The student will be able to:
13.01	Mix plastic filler.
13.02	Creatively apply plastic body filler and cheese grate during curing.
13.03	Block sand cured plastic body fillers to creatively and artistically contour and then finish sand.
14.0	Perform miscellaneous repairs--The student will be able to:
14.01	Align headlamps.
14.02	Apply rust repair methods including grinding, sandblasting and metal preparation.
14.03	Remove and replace headliners, carpets, seats and other interior components and trim.
14.04	Inspect, repair or replace weather stripping.
14.05	Identify procedures to perform two- and four- wheel alignments.
14.06	Diagnose and repair water leaks, dust leaks and wind noises.
14.07	Identify procedures to remove and replace all stationary glass (including windshield, back lights, etc.) using manufacturers' recommended installation materials and procedures including electrically heated glass.
14.08	Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanism and related controls.
14.09	Repair/replace all power driven accessories and related controls.

CTE Standards and Benchmarks	
14.10	Inspect, repair or replace and adjust removable manually operated or electrically operated roof panels, hinges, latches, guides, handles, retainers and controls of sunroof.
14.11	Diagnose and repair damaged circuits, wires and electrical components.
14.12	Remove, replace and cap off air conditioner components.
14.13	Evacuate, recycle and recharge air conditioning systems.
14.14	Identify procedures to remove and replace engines and mounts.
14.15	Identify procedures to remove and replace transmissions and mounts.
14.16	Identify procedures to remove and replace suspension parts.
14.17	Identify procedures to remove and replace brake parts.
14.18	Identify procedures to bleed brakes.
14.19	Identify procedures to remove and replace fuel system components.
14.20	Demonstrate an understanding of ABS braking systems.
14.21	Inspect, adjust or repair steering, suspension and power-train components that affect four-wheel alignment.
15.0	Repair fiberglass and plastic components--The student will be able to:
15.01	Differentiate between fiberglass and sheet molded compound (SMC) to be repaired and the appropriate creative repair procedures (including plastic welding, chemical bonding and the use of structural adhesives).
15.02	Creatively repair deep gouges and cracks in fiberglass panels and sheet molded compound (SMC).
15.03	Repair holes in fiberglass panels and SMC.
15.04	Repair fiberglass body panels and straighten/align panel supports.
15.05	Remove damaged areas from fiberglass panels and SMC and repair with partial panel installation.
15.06	Prepare the surfaces of and repair damage to, thermoplastic parts.
15.07	Prepare the surfaces of and repair damage to thermosetting-plastic parts.

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)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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 Automotive Technology/ New Name 2017-2018, Advanced Automotive Service Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	I470604
CIP Number	0647060406
Grade Level	30, 31
Standard Length	2400 hours
Teacher Certification	AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 nine occupational completion points.

NOTE: It is recommended that students complete **OCP-A (Automotive Maintenance Technician)** and/or demonstrate mastery of the outcomes in **OCP-A (Automotive Maintenance Technician)** prior to enrolling in additional Advanced Automotive Service Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automotive Maintenance Technician), is at the discretion of the instructor.**

For institutions using this framework, the National Automotive Technicians Education Foundation (NATEF) highly recommends the Master Automotive Service Technology (MAST) program Certification/Accreditation. Florida Statute (F.S.) 1004.925 – Automotive service technology education programs; certification. – requires all automotive service technology education programs shall be industry certified in accordance with rules adopted by the State Board of Education.

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

When offered at the postsecondary adult career and technical level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0011	Automotive Maintenance Technician	400 hours	49-3023
B	AER0118	Advanced Engine Repair Technician	200 hours	49-3023
C	AER0258	Advanced Automatic Transmission and Transaxle Technician	200 hours	49-3023
D	AER0275	Advanced Manual Drivetrain and Axle Technician	200 hours	49-3023
E	AER0459	Advanced Automotive Suspension and Steering Technician	200 hours	49-3023
F	AER0419	Advanced Automotive Brake System Technician	200 hours	49-3023
G	AER0319	Advanced Automotive Electrical/Electronic System Technician	400 hours	49-3023
H	AER0173	Advanced Automotive Heating and Air Conditioning Technician	200 hours	49-3023
I	AER0506	Advanced Automotive Engine Performance Technician	400 hours	49-3023

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Advanced Automotive Technology program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry.
02.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry.
03.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
04.0 Explain and apply proficiently engine theory, diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems
05.0 Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles.
06.0 Explain and apply proficiently the operation, assembly, diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive.
07.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires.
08.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems.
09.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.
10.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling.
11.0 Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems.

Florida Department of Education
Student Performance Standards

Program Title: **Advanced Automotive Technology**
PSAV Number: **I470604**

Course Number: AER0011
Occupational Completion Point: A
Automotive Maintenance Technician – 400 Hours – SOC Code 49-3023

Course Description:
The Automotive Maintenance Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop and personal safety skills, tools and equipment, pre/post maintenance, and customer service.

Abbreviations:
ASE = Required Supplemental Tasks

For every task in Automotive Maintenance Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks		Priority Number
01.0	Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry--The student will be able to:	
01.01	Identify and apply general shop safety rules and procedures, EPA and OSHA standards	ASE
01.02	Identify and use appropriate emergency first aid procedures.	
01.03	Identify and use proper placement of floor jacks and jack stands.	ASE
01.04	Identify and use proper procedures for safe lift operation.	ASE
01.05	Utilize proper ventilation procedures for working within the lab/shop area.	ASE
01.06	Identify and use proper procedures for safe pit usage.	
01.07	Identify marked safety areas.	ASE
01.08	Identify the location and the types of fire extinguishers and other fire safety equipment.	ASE
01.09	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.	ASE

CTE Standards and Benchmarks		Priority Number
01.10	Identify the location and use of eye wash stations.	ASE
01.11	Identify the location of the posted evacuation routes.	ASE
01.12	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE
01.13	Secure hair and jewelry for lab/shop activities.	ASE
01.14	Use proper handling procedures for automotive fluids.	
01.15	Identify and describe the proper procedure to apply and remove automotive fasteners, including thread inserts.	
01.16	Identify and wear appropriate clothing for lab/shop activities.	ASE
01.17	Identify and describe typical automotive lubricants and lubricant properties.	
01.18	Research, identify, and interpret the Federal 'Workers Right To Know Law'.	
01.19	Identify and describe typical automotive seals and gaskets.	
01.20	Explain the effects of chemical/substance abuse.	
01.21	Identify principles of stress management.	
01.22	Identify and define career opportunities in the automotive service industry.	
01.23	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)	ASE
01.24	Locate and demonstrate knowledge of Safety Data Sheets (SDS).	ASE
01.25	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.	
01.26	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE
01.27	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.	
02.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry --The student will be able to:	
02.01	Utilize and demonstrate safe procedures for handling of tools and equipment.	ASE
02.02	Identify and use standard and metric measurement skills and designation.	ASE
02.03	Identify tools and equipment and their appropriate usage in automotive applications.	ASE
02.04	Demonstrate proper use of precision-measuring tools (i.e. micrometer, digital/dial-indicator, digital/dial-caliper) and torque methods.	ASE
02.05	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE
02.06	Identify and use the proper procedures required for cutting tubing and double and ISO flaring.	

CTE Standards and Benchmarks		Priority Number
03.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services --The student will be able to:	
03.01	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.	
03.02	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).	
03.03	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE
03.04	Review vehicle service history.	ASE
03.05	Identify information needed and the service requested on a repair order.	ASE
03.06	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.	ASE
03.07	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE
03.08	Use computer and operate keyboard to perform tasks typically required at a dealership.	
03.09	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).	ASE
03.10	Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.	
03.11	Document observed damage, unusual conditions, and concerns.	
03.12	Demonstrate retrieving stored diagnostic trouble codes.	
03.13	Reset product specific service indicator.	
03.14	Identify acceptable customer relations.	
03.15	Identify and demonstrate proper customer relations skills.	
03.16	Identify and define payroll deductions (taxes, insurance, social security) employee benefits and pay systems.	
03.17	Identify principles of time management.	
03.18	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.	
03.19	Locate and use technical service bulletins (TSBs).	
03.20	Use proper chemicals for cleaning and lubrication.	
03.21	Determine the presence of a Tire Pressure Monitoring System (TPMS).	
03.22	Identify service considerations when equipped with a Tire Pressure Monitoring System (TPMS).	
03.23	Determine the presence of wheel locks.	
03.24	Determine the presence of an air suspension system.	

CTE Standards and Benchmarks	Priority Number
03.25 Check operation and status of instrument panel warning lights and gauges.	
03.26 Inspect underhood area for leaks, damage, and unusual conditions.	
03.27 Inspect undercar area for leaks, damage, and unusual conditions.	
03.28 Inspect engine assembly for fuel, oil, coolant, and other leaks.	
03.29 Determine fluid type requirements and identify fluid.	
03.30 Check engine oil level and condition; service as required.	
03.31 Change engine oil and filter.	
03.32 Check engine coolant level and condition; service as required.	
03.33 Inspect cooling system pipes and hoses for wear, damage, and proper routing.	
03.34 Inspect manual and power steering fluid levels and condition; service as required.	
03.35 Lubricate driveline, suspension and steering systems.	
03.36 Inspect and replace power steering hoses and fittings.	
03.37 Inspect struts, springs, and related components; service as required.	
03.38 Inspect stabilizer bar, bushings, brackets, and links; service as required.	
03.39 Inspect springs, torsion bars, and related components; service as required.	
03.40 Inspect, remove, and replace shock absorbers.	
03.41 Check windshield washer fluid level and condition; service as required.	
03.42 Check automatic transmission fluid level and condition; service as required.	
03.43 Check differential/transfer case fluid level; note unusual conditions; service as required.	
03.44 Check manual transmission fluid level; note unusual conditions; service as required.	
03.45 Service transmission; perform visual inspection; replace fluids and filters.	
03.46 Check hydraulic clutch fluid and condition; service as required.	
03.47 Check rear axle drive assembly seals and vents; check lube level.	
03.48 Inspect constant velocity (CV) axle shaft boots; service as required.	
03.49 Remove, inspect, and service front and rear wheel bearings on non-drive axles.	
03.50 Check wheel bearings for play and other signs of wear.	
03.51 Inspect, replace and adjust drive belts; inspect tensioners and pulleys.	

CTE Standards and Benchmarks		Priority Number
03.52	Inspect and replace air filter.	
03.53	Inspect and replace cabin air filter.	
03.54	Inspect tires, diagnose tire wear patterns, inspect spare and mounting system; check and adjust tire pressure.	
03.55	Rotate tires according to manufacturer's recommendations; install wheels, torque lug nuts.	
03.56	Balance wheel and tire assembly (static and dynamic).	
03.57	Dismount, inspect, repair, and remount tire on wheel.	
03.58	Repair tire according to industry standards.	
03.59	Identify nitrogen-filled tires.	
03.60	Reinstall wheel; torque wheel fasteners to specification.	
03.61	Perform a visual inspection of a brake drum system.	
03.62	Perform a visual inspection of a disc brake system.	
03.63	Check parking brake operation; check parking brake components for unusual conditions.	
03.64	Check master cylinder for internal and external leaks and proper operation.	
03.65	Fill master cylinder with recommended fluid and seat pads.	
03.66	Select, handle, store, and install brake fluids to proper level.	
03.67	Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports.	
03.68	Inspect flexible brake hoses for leaks, kinks, cracks, bulging or wear; tighten loose fittings and supports.	
03.69	Inspect fuel tank, fuel cap and seal; inspect and replace fuel lines, fittings, and hoses.	
03.70	Inspect and replace fuel filters as applicable.	
03.71	Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.	
03.72	Inspect, test head lamps, tail lamps and stop lamps. Aim headlights.	
03.73	Inspect and replace exterior and courtesy lamps.	
03.74	Check wiper blades, inserts, and arms; replace wiper blades or inserts.	
03.75	Lubricate door latches and hinges.	
03.76	Perform slow/fast battery charge.	
03.77	Inspect, clean, fill, and replace battery.	
03.78	Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.	

CTE Standards and Benchmarks		Priority Number
03.79	Perform battery, starting, and charging system tests using appropriate tester.	
03.80	Perform battery capacity (load, high-rate discharge) test; determine needed service.	
03.81	Start a vehicle using jumper cables using a battery auxiliary power supply.	
03.82	Measure and diagnose the cause(s) of abnormal key-off battery drain.	
03.83	Perform starter current draw and circuit voltage drop test; determine necessary action.	
03.84	Remove and replace/reinstall starter.	
03.85	Remove, inspect, and replace/reinstall alternator.	
03.86	Observe dash warning lamps during bulb check.	
03.87	Practice recommended precautions when handling static sensitive devices.	
03.88	Check 12 volt non-computer electrical circuits with a test light; determine necessary action.	
03.89	Check voltage and voltage drop in electrical circuits using a digital multimeter (DMM).	
03.90	Obtain and interpret digital multimeter (DMM) readings.	
03.91	Check current flow in electrical/electronic circuits and components using an ammeter.	
03.92	Check electrical circuits using jumper wires.	
03.93	Inspect and test fusible links, circuit breakers, and fuses; confirm proper circuit operation; replace as needed.	
03.94	Maintain or restore electronic memory functions if required.	
03.95	Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.	
03.96	Adjust valves on engines with mechanical lifters.	
03.97	Remove and replace valve cover gaskets.	
03.98	Return cores for rebuilt and exchange items.	
03.99	Inspect driver and passenger restraint system, repair if needed.	
03.100	Demonstrate knowledge of manufacturer policies and procedures.	
03.101	Perform product specific service procedures.	
03.102	Identify and maintain product specific engine systems.	
03.103	Identify and maintain product specific automatic transmission systems.	
03.104	Identify and maintain product specific manual transmission systems.	
03.105	Identify and maintain product specific electrical and electronic systems.	

CTE Standards and Benchmarks	Priority Number
03.106 Identify and maintain product specific heating and A/C systems.	
03.107 Identify and maintain product specific steering and suspension systems.	
03.108 Identify and maintain product specific brake systems.	
03.109 Identify and maintain product specific audio systems.	
03.110 Identify and maintain product specific safety systems.	
03.111 Identify and maintain product specific accessories.	

Florida Department of Education
Student Performance Standards

Course Number: AER0018
Occupational Completion Point: B
Advanced Engine Repair Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Engine Repair Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine theory and repair, cylinder heads, valve trains, engine blocks, lubrication, and cooling systems.

Abbreviations:
ER = Engine Repair

For every task in Advanced Engine Repair Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

ER Task List:	
P-1 =	23
P-2 =	17
P-3 =	11
Total	51

CTE Standards and Benchmarks			Priority Number
04.0		Explain and apply proficiently engine theory, diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems --The student will be able to:	
	04.01	Service product specific engine systems.	
	04.02	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1
	04.03	Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.	P-1
	04.04	Verify operation of the instrument panel engine warning indicator.	P-1
	04.05	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	P-1
	04.06	Remove and replace timing belt; verify correct camshaft timing.	P-1
	04.07	Remove and reinstall engine in an OBDII or newer vehicle; reconnect all attaching components and restore the vehicle to running condition.	P-3
	04.08	Install engine covers using gaskets, seals and sealers as required.	P-1

CTE Standards and Benchmarks		Priority Number
04.09	Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.	P-1
04.10	Inspect, remove and replace engine mounts.	P-2
04.11	Identify hybrid vehicle internal combustion engine service precautions.	P-3
04.12	Diagnose engine noises and vibrations; determine necessary action.	
04.13	Diagnose the cause of excessive oil consumption, coolant consumption, unusual engine exhaust color and odor; determine necessary action.	
04.14	Perform engine vacuum tests; determine necessary action.	
04.15	Locate and interpret vehicle and major component identification numbers.	
04.16	Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.	P-1
04.17	Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.	P-1
04.18	Inspect valve springs for squareness and free height comparison; determine necessary action.	P-3
04.19	Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action.	P-3
04.20	Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action.	P-3
04.21	Inspect valves and valve seats; determine necessary action.	P-3
04.22	Check valve spring assembled height and valve stem height; determine necessary action.	P-3
04.23	Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action.	P-2
04.24	Inspect valve lifters; determine necessary action.	P-2
04.25	Adjust valves (mechanical or hydraulic lifters).	P-1
04.26	Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing.	P-1
04.27	Inspect and/or measure camshaft for run out, journal wear and lobe wear.	P-2
04.28	Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
04.29	Establish camshaft position sensor indexing.	P-1
04.30	Service product specific cam drive systems.	
04.31	Perform product specific valve adjustments.	
04.32	Perform cylinder power balance tests; determine necessary action.	

CTE Standards and Benchmarks		Priority Number
04.33	Perform cylinder cranking and running compression tests; determine necessary action.	
04.34	Perform cylinder leakage tests; determine necessary action.	
04.35	Remove, inspect, or replace crankshaft vibration damper (harmonic balancer).	P-2
04.36	Disassemble engine block; clean and prepare components for inspection and reassembly.	P-1
04.37	Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action.	P-2
04.38	Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action.	P-2
04.39	Deglaze and clean cylinder walls.	P-2
04.40	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
04.41	Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action.	P-1
04.42	Inspect main and connecting rod bearings for damage and wear; determine necessary action.	P-2
04.43	Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action.	P-3
04.44	Inspect and measure piston skirts and ring lands; determine necessary action.	P-2
04.45	Determine piston-to-bore clearance.	P-2
04.46	Inspect, measure, and install piston rings.	P-2
04.47	Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.	P-2
04.48	Assemble engine block.	P-1
04.49	Remove and replace piston pin.	
04.50	Perform oil pressure tests; determine necessary action.	P-1
04.51	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.	P-2
04.52	Perform cooling system pressure and dye test to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and gallery plugs; determine necessary action.	P-1
04.53	Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1
04.54	Remove, inspect, and replace thermostat and gasket/seal.	P-1
04.55	Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	P-1

CTE Standards and Benchmarks	Priority Number
04.56 Inspect, remove and replace water pump.	P-2
04.57 Remove and replace radiator.	P-2
04.58 Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.	P-1
04.59 Inspect auxiliary coolers; determine necessary action.	P-3
04.60 Inspect, test, and replace oil temperature and pressure switches and sensors.	P-2
04.61 Perform engine oil and filter change.	P-1
04.62 Identify causes of engine overheating.	P-1
04.63 Inspect and replace engine cooling and heater system hoses.	
04.64 Service product specific water pumps.	
04.65 Service product specific belt drive and tensioner systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0258
Occupational Completion Point: C
Advanced Automatic Transmission and Transaxle Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automatic Transmission and Transaxle Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study automatic transmission/transaxle diagnosis, service, and repair.

Abbreviations:
AT = Automatic Transmission/Transaxle

For every task in Advanced Automatic Transmission and Transaxle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

AT Task List:	
P-1	**15**
P-2	**20**
P-3	**4**
Total	**39**

CTE Standards and Benchmarks		**Priority Number**
05.0	Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles --The student will be able to:	
05.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
05.02	Identify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action.	P-1
05.03	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.	P-1
05.04	Locate and interpret vehicle and major component identification numbers.	
05.05	Diagnose fluid loss and condition concerns; determine necessary action.	P-1
05.06	Check fluid level in a transmission or a transaxle equipped with a dipstick.	P-1
05.07	Check fluid level in a transmission or a transaxle not equipped with a dipstick.	P-1
05.08	Perform pressure tests (including transmissions/transaxles equipped with electronic pressure control); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
05.09	Perform stall test; determine necessary action.	P-3
05.10	Perform lock-up converter system tests; determine necessary action.	P-3
05.11	Diagnose noise and vibration concerns; determine necessary action.	P-2
05.12	Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.	P-1
05.13	Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law).	P-2
05.14	Diagnose electronic transmission/transaxle control systems using appropriate test equipment and service information.	P-1
05.15	Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.	P-2
05.16	Inspect for leakage; replace external seals, gaskets, and bushings.	P-2
05.17	Inspect, test, adjust, repair, or replace electrical/electronic components and circuits, including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses.	P-1
05.18	Inspect, replace, and align powertrain mounts.	P-2
05.19	Drain and replace fluids and filter(s).	P-1
05.20	Diagnose electronic transmission control systems using a scan tool; determine necessary action.	
05.21	Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces.	P-1
05.22	Disassemble, clean, and inspect transmission/transaxle.	P-2
05.23	Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, sleeves, retainers, brackets, check valves/balls, screens, spacers, and gaskets).	P-2
05.24	Inspect servo and accumulator bores, pistons, seals, pins, springs, and retainers; determine necessary action.	P-2
05.25	Assemble transmission/transaxle.	P-2
05.26	Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings.	P-1
05.27	Inspect converter flex (drive) plate, converter attaching bolts, converter pilot, converter pump drive surfaces, converter end play, and crankshaft pilot bore.	P-2
05.28	Inspect, measure, and reseal oil pump assembly and components.	P-2
05.29	Measure transmission/transaxle end play or preload; determine necessary action.	P-1
05.30	Inspect, measure, and replace thrust washers and bearings.	P-2
05.31	Inspect oil delivery circuits, including seal rings, ring grooves, and sealing surface areas, feed pipes, orifices, and check valves/balls.	P-2
05.32	Inspect bushings; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
05.33	Inspect and measure planetary gear assembly components; determine necessary action.	P-2
05.34	Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action.	P-2
05.35	Diagnose and inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action.	P-2
05.36	Inspect, measure, repair, adjust or replace transaxle final drive components.	P-2
05.37	Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; determine necessary action.	P-2
05.38	Measure clutch pack clearance; determine necessary action.	P-1
05.39	Air test operation of clutch and servo assemblies.	P-1
05.40	Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; determine necessary action.	P-2
05.41	Describe the operational characteristics of a continuously variable transmission (CVT).	P-3
05.42	Describe the operational characteristics of a hybrid vehicle drive train.	P-3
05.43	Install and seat torque converter to engage drive/splines.	
05.44	Inspect bands and drums; determine necessary action.	

Florida Department of Education
Student Performance Standards

Course Number: AER0275
Occupational Completion Point: D
Advanced Manual Drivetrain and Axle Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Manual Drivetrain and Axle Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study manual drivetrain, clutch, transmission/transaxle, drive and half-shaft universals, constant velocity joints, rear axle differential, limited slip, four-wheel drive, all-wheel drive operation, assembly, diagnosis, service and repair.

Abbreviations:
MD = Manual Drivetrain and Axles

For every task in Advanced Manual Drivetrain and Axle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

MD Task List:	
P-1	**17**
P-2	**12**
P-3	**20**
Total	**49**

CTE Standards and Benchmarks		Priority Number
06.0	Explain and apply proficiently the operation, assembly, diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive--The student will be able to:	
06.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
06.02	Identify and interpret drive train concern; determine necessary action.	P-1
06.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
06.04	Check fluid condition; check for leaks; determine necessary action.	P-1
06.05	Locate and interpret vehicle and major component identification numbers.	
06.06	Diagnose fluid loss, level, and condition concerns; determine necessary action.	
06.07	Drain and refill manual transmission/transaxle and final drive unit.	P-1
06.08	Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
06.09	Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action.	P-1
06.10	Inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action.	
06.11	Check and adjust clutch master cylinder fluid level; check for leaks.	P-1
06.12	Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable).	P-1
06.13	Bleed clutch hydraulic system.	P-1
06.14	Inspect flywheel and ring gear for wear and cracks; determine necessary action.	P-1
06.15	Inspect engine block, core plugs, rear main engine oil seal, clutch (bell) housing, transmission/transaxle case mating surfaces, and alignment dowels; determine necessary action.	
06.16	Measure flywheel run out and crankshaft end play; determine necessary action.	P-2
06.17	Remove and reinstall transmission/transaxle.	
06.18	Disassemble, inspect, clean, and reassemble internal transmission/transaxle components.	P-3
06.19	Inspect transmission/transaxle case, extension housing, case mating surfaces, bores, bushings, and vents; perform necessary action.	
06.20	Diagnose noise concerns through the application of transmission/transaxle powerflow principles.	P-2
06.21	Diagnose hard shifting and jumping out of gear concerns; determine necessary action.	P-2
06.22	Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers.	P-2
06.23	Inspect, replace, and align powertrain mounts.	
06.24	Inspect and replace gaskets, seals, and sealants; inspect sealing surfaces.	
06.25	Remove and replace transaxle final drive.	
06.26	Inspect, adjust, and reinstall shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.	
06.27	Measure end play or preload (shim or spacer selection procedure) on transmission/transaxle shafts; perform necessary action.	
06.28	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.	
06.29	Diagnose transaxle final drive assembly noise and vibration concerns; determine necessary action.	P-3
06.30	Remove, inspect, measure, adjust, and reinstall transaxle final drive pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.	
06.31	Inspect lubrication devices (oil pump or slingers); perform necessary action.	
06.32	Inspect, test, and replace transmission/transaxle sensors and switches.	
06.33	Describe the operational characteristics of an electronically controlled manual transmission/transaxle.	P-3

CTE Standards and Benchmarks		Priority Number
06.34	Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action.	P-1
06.35	Diagnose universal joint noise and vibration concerns; perform necessary action.	P-2
06.36	Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.	P-1
06.37	Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.	P-1
06.38	Inspect, service, and replace shaft center support bearings.	
06.39	Check shaft balance and phasing; measure shaft run out; measure and adjust driveline angles.	P-2
06.40	Diagnose noise and vibration concerns; determine necessary action.	
06.41	Inspect and replace companion flange and pinion seal; measure companion flange run out.	P-2
06.42	Inspect ring gear and measure run out; determine necessary action.	P-3
06.43	Remove, inspect, and reinstall drive pinion and ring gear, spacers, sleeves, and bearings.	P-3
06.44	Measure and adjust drive pinion depth.	P-3
06.45	Measure and adjust drive pinion bearing preload.	P-3
06.46	Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup or shim types).	P-3
06.47	Check ring and pinion tooth contact patterns; perform necessary action.	P-3
06.48	Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.	P-3
06.49	Reassemble and reinstall differential case assembly; measure run out; determine necessary action.	P-3
06.50	Diagnose noise, slippage, and chatter concerns; determine necessary action.	P-3
06.51	Clean and inspect differential housing; check for leaks; inspect housing vent.	P-2
06.52	Check and adjust differential housing fluid level.	P-1
06.53	Drain and refill differential housing.	P-1
06.54	Inspect and reinstall limited slip differential components.	
06.55	Measure rotating torque; determine necessary action.	P-3
06.56	Diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leakage concerns; determine necessary action.	P-2
06.57	Inspect and replace drive axle wheel studs.	P-1
06.58	Remove and replace drive axle shafts.	P-1
06.59	Inspect and replace drive axle shaft seals, bearings, and retainers.	P-2

CTE Standards and Benchmarks		Priority Number
06.60	Measure drive axle flange run out and shaft end play; determine necessary action.	P-2
06.61	Diagnose noise and vibration concerns; determine necessary action.	P-2
06.62	Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.	P-3
06.63	Remove and reinstall transfer case.	
06.64	Disassemble, service, and reassemble transfer case and components.	P-3
06.65	Inspect front-wheel bearings and locking hubs; perform necessary action(s).	P-3
06.66	Check for leaks at drive assembly seals; check vents; check lube level.	P-3
06.67	Diagnose, test, adjust, and replace electrical/electronic components of four-wheel drive systems.	P-3
06.68	Diagnose noise, vibration, and unusual steering concerns; determine necessary action.	P-3
06.69	Identify concerns related to variations in tire circumference and/or final drive ratios.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0459
Occupational Completion Point: E
Advanced Automotive Suspension and Steering Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Suspension and Steering Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study front and rear suspension systems, wheel alignment, wheels and tire, diagnosis, service, and repair.

Abbreviations:
SS = Suspension and Steering

For every task in Advanced Automotive Suspension and Steering Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

SS Task List:	
P-1	**23**
P-2	**22**
P-3	**12**
Total	**57**

CTE Standards and Benchmarks		**Priority Number**
07.0	Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires --The student will be able to:	
07.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
07.02	Identify and interpret suspension and steering system concerns; determine necessary action.	P-1
07.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
07.04	Locate and interpret vehicle and major component identification numbers.	
07.05	Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
07.06	Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
07.07	Inspect, remove, and install upper and lower control arms, bushings, shafts, and rebound and jounce bumpers.	P-3
07.08	Inspect, remove and install strut rods and bushings.	P-3

CTE Standards and Benchmarks		Priority Number
07.09	Inspect, remove and install upper and/or lower ball joints (with or without wear indicators).	P-2
07.10	Inspect, remove and install steering knuckle assemblies.	P-3
07.11	Inspect, remove and install short and long arm suspension system coil springs and spring insulators.	P-3
07.12	Inspect, remove and install torsion bars and mounts.	P-3
07.13	Inspect, remove and install front stabilizer bar (sway bar) bushings, brackets, and links.	P-3
07.14	Inspect, remove and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	P-3
07.15	Inspect, remove and install track bar, strut rods/radius arms and related mounts and bushings.	P-3
07.16	Inspect rear suspension system leaf spring(s), bushings, center pins/bolts and mounts.	P-1
07.17	Inspect, remove, and replace shock absorbers; inspect mounts and bushings.	P-1
07.18	Remove, inspect, and service or replace front and rear wheel bearings.	P-1
07.19	Describe the function of the power steering pressure switch.	P-3
07.20	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concern; determine necessary action.	P-1
07.21	Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	P-1
07.22	Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber and toe as required; center steering wheel.	P-1
07.23	Check toe-out-on-turns (turning radius); determine necessary action.	P-2
07.24	Check SAI (steering axis inclination) and included angle; determine necessary action.	P-2
07.25	Check rear wheel thrust angle; determine necessary action.	P-1
07.26	Check for front wheel setback; determine necessary action.	P-2
07.27	Check front and/or rear cradle (sub-frame) alignment; determine necessary action.	P-3
07.28	Reset steering angle sensor.	P-2
07.29	Disable and enable supplemental restraint system (SRS).	P-1
07.30	Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).	P-1
07.31	Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.	P-2
07.32	Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action.	P-2
07.33	Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; perform necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
07.34	Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.	P-2
07.35	Adjust non-rack and pinion worm bearing preload and sector lash.	
07.36	Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.	P-2
07.37	Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed.	P-2
07.38	Determine proper power steering fluid type; inspect fluid level and condition.	P-1
07.39	Flush, fill, and bleed power steering system.	P-2
07.40	Inspect for power steering fluid leakage; determine necessary action.	P-1
07.41	Remove, inspect, replace, and adjust power steering pump drive belt.	P-1
07.42	Remove and reinstall power steering pump.	P-2
07.43	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	P-2
07.44	Inspect and replace power steering hoses and fittings.	P-2
07.45	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	P-2
07.46	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	P-1
07.47	Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action.	P-3
07.48	Inspect electric power-assisted steering.	P-3
07.49	Identify hybrid vehicle power steering system electrical circuits and safety precautions.	P-2
07.50	Inspect tire condition; identify tire wear patterns; check of correct tire size and application (load and speed rating) and adjust air pressure; determine necessary action.	P-1
07.51	Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	P-2
07.52	Rotate tires according to manufacturer’s recommendations.	P-1
07.53	Measure wheel, tire, axle flange, and hub run out; determine necessary action.	P-2
07.54	Diagnose tire pull problems; determine necessary action.	P-2
07.55	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).	P-1
07.56	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	P-2
07.57	Reinstall wheel; torque lug nuts.	
07.58	Inspect tire and wheel assembly for air loss; perform necessary action.	P-1
07.59	Repair tire using internal patch.	P-1

CTE Standards and Benchmarks		Priority Number
07.60	Identify and test pressure monitor system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lambs.	P-2
07.61	Demonstrate knowledge of steps required to remove and replace sensor in a tire pressure monitoring system.	P-1
07.62	Service product specific suspension systems.	
07.63	Service product specific ride height control systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0419
Occupational Completion Point: F
Advanced Automotive Brake System Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Brake System Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study drum/disc brakes, hydraulics, power assist units, electronic brakes, traction control, stability control, and miscellaneous diagnostics, service, and repair.

Abbreviations:
BR = Brakes

For every task in Advanced Automotive Brake System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

BR Task List:	
	P-1 = 34
	P-2 = 12
	P-3 = 11
Total	**57**

CTE Standards and Benchmarks		**Priority Number**
08.0	Explain and apply proficiently the diagnosis, service and repair of drum/disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems--The student will be able to:	
08.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
08.02	Identify and interpret brake system concern; determine necessary action.	P-1
08.03	Describe procedures for performing a road test to check brake system operation; including an antilock brake system (ABS).	P-1
08.04	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
08.05	Install wheel and torque lug nuts.	P-1
08.06	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).	
08.07	Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).	P-1
08.08	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
08.09	Check master cylinder for internal/external leaks and proper operation; determine necessary action.	P-1
08.10	Remove, bench bleed, and reinstall master cylinder.	P-1
08.11	Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.	P-3
08.12	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; check for loose fittings and supports; determine necessary action.	P-1
08.13	Replace brake lines, hoses, fittings, and supports.	P-2
08.14	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	P-2
08.15	Select, handle, store, and fill brake fluids to proper level.	P-1
08.16	Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.	
08.17	Inspect, test, and/or replace components of brake warning light system.	P-3
08.18	Identify components of brake warning light system.	P-2
08.19	Bleed and/or flush brake system.	P-1
08.20	Test brake fluid for contamination.	P-1
08.21	Diagnose poor drum brake stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	P-1
08.22	Remove, clean, inspect, and measure brake drums; determine necessary action.	P-1
08.23	Refinish brake drum and measure final drum diameter; compare with specifications.	P-1
08.24	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	P-1
08.25	Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.	P-2
08.26	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments.	P-2
08.27	Install wheel, torque lug nuts, and make final checks and adjustments associated with drum brakes.	
08.28	Diagnose poor disk brake stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.	P-1
08.29	Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.	P-1
08.30	Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.	P-1
08.31	Remove, inspect, and replace pads and retaining hardware; determine necessary action.	P-1
08.32	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.	

CTE Standards and Benchmarks		Priority Number
08.33	Lubricate and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	P-1
08.34	Clean and inspect rotor; measure rotor thickness, thickness variation, and lateral run out; determine necessary action.	P-1
08.35	Remove and reinstall rotor.	P-1
08.36	Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.	P-1
08.37	Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.	P-1
08.38	Retract and re-adjust caliper piston on an integrated parking brake system.	P-3
08.39	Install wheel, torque lug nuts, and make final checks and adjustments associated with disc brakes.	
08.40	Check brake pad wear indicator; determine necessary action.	P-2
08.41	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations.	P-1
08.42	Check brake pedal travel with, and without engine running to verify proper power booster operation.	P-2
08.43	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.	P-1
08.44	Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action.	P-1
08.45	Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action.	P-3
08.46	Measure and adjust master cylinder pushrod length.	P-3
08.47	Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.	P-3
08.48	Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.	P-1
08.49	Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	P-2
08.50	Check parking brake operation and parking brake indicator light system; determine necessary action.	P-1
08.51	Check operation of brake stop light system.	P-1
08.52	Replace wheel bearing and race.	P-2
08.53	Inspect and replace wheel studs.	P-1
08.54	Remove and reinstall sealed wheel bearing assembly.	P-2
08.55	Identify and inspect electronic brake control system components; determine necessary action.	P-1
08.56	Identify traction control/vehicle stability control system components.	P-3
08.57	Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system ; determine necessary action.	P-2
08.58	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
08.59	Depressurize high-pressure components of the electronic brake control system.	P-3
08.60	Bleed the electronic brake control system hydraulic circuits.	P-1
08.61	Remove and install electronic brake control system electrical/electronic and hydraulic components.	
08.62	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).	P-3
08.63	Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).	P-3
08.64	Describe the operation of a regenerative braking system.	P-3
08.65	Service product specific anti-lock brake systems	
08.66	Service product specific traction control systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0319
Occupational Completion Point: G
Advanced Automotive Electrical/Electronic System Technician – 400 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Electrical/Electronic System Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems diagnostics, service, and repair.

Abbreviations:
EE = Electrical/Electronic Systems

For every task in Advanced Automotive Electrical/Electronic System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EE Task List:	
P-1 =	**36**
P-2 =	**14**
P-3 =	**8**
Total	**58**

CTE Standards and Benchmarks		**Priority Number**
09.0	Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems-- The student will be able to:	
09.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
09.02	Identify and interpret electrical/electronic system concern; determine necessary action.	
09.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
09.04	Locate and interpret vehicle and major component identification numbers.	
09.05	Diagnose and demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).	P-1
09.06	Use wiring diagrams during diagnosis (troubleshooting) of electrical/electronic circuit problems.	P-1
09.07	Demonstrate the proper use of a digital multimeter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.	P-1
09.08	Check operation of electrical circuits with a test light.	P-1

CTE Standards and Benchmarks		Priority Number
09.09	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.	P-2
09.10	Check operation of electrical circuits using fused jumper wires.	P-1
09.11	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.	P-1
09.12	Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.	P-1
09.13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1
09.14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.	P-1
09.15	Replace electrical connectors and terminal ends.	P-1
09.16	Repair wiring harness.	P-1
09.17	Perform solder repair of electrical wiring.	P-1
09.18	Repair CAN/BUS wiring harness.	P-1
09.19	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	
09.20	Perform battery state-of-charge test; determine necessary action.	P-1
09.21	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.	P-1
09.22	Maintain or restore electronic memory functions.	P-1
09.23	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.	P-1
09.24	Perform slow/fast battery charge according to manufacturer’s recommendations.	P-1
09.25	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.	P-1
09.26	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	P-3
09.27	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	P-1
09.28	Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3
09.29	Perform battery conductance test; determine necessary action.	
09.30	Perform starter current draw tests; determine necessary action.	P-1
09.31	Perform starter circuit voltage drop tests; determine necessary action.	P-1
09.32	Inspect and test starter relays and solenoids; determine necessary action.	P-2
09.33	Remove and install starter in a vehicle.	P-1

CTE Standards and Benchmarks		Priority Number
09.34	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2
09.35	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2
09.36	Perform charging system output test; determine necessary action.	P-1
09.37	Diagnose (troubleshoot) charging system for the cause of undercharge, no-charge, and overcharge conditions.	P-1
09.38	Inspect, adjust, or replace generator (alternator) drive belts, check pulleys, and tensioners for wear; check pulley and belt alignment.	P-1
09.39	Remove, inspect, and re-install generator (alternator).	P-1
09.40	Perform charging circuit voltage drop test; determine necessary action.	P-1
09.41	Diagnose (troubleshoot) the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	P-1
09.42	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving light); replace as needed.	P-1
09.43	Aim headlights.	P-2
09.44	Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.	
09.45	Identify system voltage and safety precautions associated with high intensity discharge headlights.	P-2
09.46	Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	P-2
09.47	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.	
09.48	Diagnose (troubleshoot) the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	P-2
09.49	Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action.	
09.50	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.	P-1
09.51	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	P-2
09.52	Diagnose (troubleshoot) windshield washer problems; perform necessary action.	P-2
09.53	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.	P-2
09.54	Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.	
09.55	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.	P-2
09.56	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action	P-3
09.57	Diagnose (troubleshoot) supplemental restraint system (SRS) concerns; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
09.58	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.	P-1
09.59	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.	P-3
09.60	Remove and reinstall door panel.	P-1
09.61	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.	P-3
09.62	Check for module communication (including CAN/BUS systems) using a scan tool.	P-2
09.63	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.	P-3
09.64	Describe the operation of keyless entry/remote-start systems.	P-3
09.65	Verify operation of instrument panel gauges and warning /indicator lights; reset maintenance indicator.	P-1
09.66	Verify windshield wiper and washer operation, replace wiper blades.	P-1
09.67	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.	P-3
09.68	Service and repair product specific electrical/electronic systems.	
09.69	Perform product specific diagnostic procedures.	

Florida Department of Education
Student Performance Standards

Course Number: AER0173
Occupational Completion Point: H
Advanced Automotive Heating and Air Conditioning Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Heating and Air Conditioning Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, recycling and handling, diagnostics, service, and repair.

Abbreviations:
HA = Heating and Air Conditioning

For every task in Advanced Automotive Heating and Air Conditioning Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

HA Task List:	
P-1	**17**
P-2	**17**
P-3	**4**
Total	**38**

CTE Standards and Benchmarks		Priority Number
10.0	Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling--The student will be able to:	
10.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
10.02	Identify and interpret heating and air conditioning problems; determine necessary action.	P-1
10.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
10.04	Locate and interpret vehicle and major component identification numbers.	
10.05	Performance test A/C system; identify problems.	P-1
10.06	Identify abnormal operating noises in the A/C system; determine necessary action.	P-2
10.07	Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.	P-1
10.08	Leak test A/C system; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
10.09	Inspect the condition of refrigerant oil removed from A/C system; determine necessary action.	P-2
10.10	Determine recommended oil and oil capacity for system application.	P-1
10.11	Using a scan tool, observe and record related HVAC data and trouble codes.	P-3
10.12	Diagnose A/C system conditions that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.	P-2
10.13	Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.	P-1
10.14	Inspect, test, service or replace A/C compressor clutch components and/or assembly; check compressor clutch air gap; adjust as needed.	P-2
10.15	Remove, inspect, and reinstall A/C compressor and mountings; determine recommended oil quantity.	P-2
10.16	Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.	P-2
10.17	Determine the need for an additional A/C system filter; perform necessary action.	P-3
10.18	Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action.	P-2
10.19	Inspect A/C condenser for airflow restrictions; perform necessary action.	P-1
10.20	Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine required oil quantity.	P-2
10.21	Remove, inspect, and install expansion valve or orifice (expansion) tube.	P-1
10.22	Inspect evaporator housing water drain; perform necessary action.	P-1
10.23	Determine procedure to remove and reinstall evaporator; determine required oil quantity.	P-2
10.24	Remove, inspect, and reinstall condenser; determine required oil quantity.	P-2
10.25	Diagnose temperature control problems in the heater/ventilation system; (determine PCM) to interpret system operation; determine necessary action.	P-2
10.26	Perform cooling system pressure tests; check coolant condition, inspect and test radiator, cap (pressure/vacuum), coolant recovery tank, and hoses; perform necessary action.	
10.27	Inspect engine cooling and heater system hoses; perform necessary action.	P-1
10.28	Determine procedure to remove, inspect, and reinstall heater core.	P-2
10.29	Inspect, test, and replace thermostat and gasket/seal.	
10.30	Determine coolant condition and coolant type for vehicle application; drain and recover coolant.	
10.31	Flush system; refill system with recommended coolant; bleed system.	
10.32	Inspect and test cooling fan, fan clutch, fan shroud, and air dams; perform necessary action.	
10.33	Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.	

CTE Standards and Benchmarks		Priority Number
10.34	Inspect and test heater control valve(s); perform necessary action.	P-2
10.35	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; perform necessary action.	P-1
10.36	Diagnose A/C compressor clutch control systems; determine necessary action.	P-2
10.37	Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action.	P-2
10.38	Inspect and test A/C-heater control panel assembly; determine necessary action.	P-3
10.39	Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action.	P-3
10.40	Inspect A/C-heater ducts, doors, hoses, cabin filters and outlets; perform necessary action.	P-1
10.41	Identify the source of A/C system odors.	P-2
10.42	Check operation of automatic or semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.	P-2
10.43	Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer’s standards.	P-1
10.44	Identify and recover A/C system refrigerant.	P-1
10.45	Recycle, label, and store refrigerant.	P-1
10.46	Evacuate and charge A/C system; add refrigerant oil as required.	P-1
10.47	Service product specific climate control systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0506
Occupational Completion Point: I
Advanced Automotive Engine Performance Technician – 400 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Engine Performance Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engines, ignition, fuel, air induction, exhaust, computer, engine and emission control systems diagnostics, service, and repair.

Abbreviations:
EP = Engine Performance

For every task in Advanced Automotive Engine Performance Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EP Task List:	
P-1	**21**
P-2	**17**
P-3	**9**
Total	**47**

CTE Standards and Benchmarks			Priority Number
11.0		Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer, engine and emission control systems --The student will be able to:	
	11.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
	11.02	Identify and interpret engine performance concern; determine necessary action.	P-1
	11.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
	11.04	Locate and interpret vehicle and major component identification numbers.	
	11.05	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	
	11.06	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	P-3
	11.07	Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action.	P-2
	11.08	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1
	11.09	Perform cylinder power balance test; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
11.10	Perform cylinder cranking and running compression tests; determine necessary action.	P-1
11.11	Perform cylinder leakage test; determine necessary action.	P-1
11.12	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-2
11.13	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.	
11.14	Verify engine operating temperature; determine necessary action.	P-1
11.15	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	
11.16	Verify correct camshaft timing.	P-1
11.17	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1
11.18	Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	P-1
11.19	Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action.	P-1
11.20	Check for module communication (including CAN/BUS systems) errors using a scan tool.	
11.21	Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.	P-2
11.22	Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1
11.23	Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.	P-3
11.24	Perform active tests of actuators using a scan tool; determine necessary action.	P-2
11.25	Describe the importance of running all OBDII monitors for repair verification.	P-1
11.26	Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	P-2
11.27	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	
11.28	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1
11.29	Remove and replace spark plugs; inspect secondary ignition components for wear and damage.	P-1
11.30	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3
11.31	Diagnose (troubleshoot) hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
11.32	Check fuel for contaminants; determine necessary action.	P-2
11.33	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	P-1
11.34	Replace fuel filters.	P-1
11.35	Inspect, service or replace air filters, filter housing and intake duct work.	P-1
11.36	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2
11.37	Inspect and test fuel injectors.	P-2
11.38	Verify idle control operation.	P-1
11.39	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action.	P-1
11.40	Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed.	P-1
11.41	Perform exhaust system back-pressure test; determine necessary action.	P-2
11.42	Check and refill diesel exhaust fluid (DEF).	P-3
11.43	Test the operation of turbocharger/supercharger systems; determine necessary action.	P-3
11.44	Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	P-3
11.45	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	P-2
11.46	Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	P-3
11.47	Diagnose emissions and driveability concerns caused by the secondary injection and catalytic converter systems; determine necessary action.	P-2
11.48	Inspect, test, service and replace components of the EGR system, including tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	P-2
11.49	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	P-2
11.50	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	
11.51	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	P-3
11.52	Inspect and test catalytic converter efficiency.	P-2
11.53	Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action.	P-2
11.54	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
11.55	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-3
11.56	Adjust valves on engines with mechanical or hydraulic lifters.	
11.57	Remove and replace timing belt; verify correct camshaft timing.	
11.58	Remove and replace thermostat and gasket/seal.	
11.59	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	
11.60	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	
11.61	Perform engine oil and filter change.	
11.62	Identify hybrid vehicle internal combustion engine service precautions.	
11.63	Demonstrate proficiency in use of computer-based information systems.	
11.64	Perform product specific OBD II drive cycle diagnostic tests.	
11.65	Service product specific ignition systems.	
11.66	Inspect and test distributor; service as needed.	
11.67	Perform exhaust system back-pressure test; determine needed action.	
11.68	Service product specific fuel injection systems.	

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 identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Medium and Heavy Duty Truck and Bus Technician**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	I470605
CIP Number	0647060501
Grade Level	30, 31
Standard Length	1800 hours
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists 49-9098 – Helpers—Installations, Maintenance, and Repair 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to maintaining and repairing diesel engines and electrical systems; reconditioning diesel fuel injection systems; overhauling diesel engines; and performing diesel engine preventive maintenance.

The course content should also include training in communication, leadership, human relations and employability skills; and safe efficient work practices.

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 nine occupational completion points.

The courses after the core (OCP-A) may be taken in any sequence. However, an individual must take the Diesel Engine Preventive Maintenance course (DIM0103). The Heavy Duty Truck and Bus Technician Program may be offered at both the secondary and postsecondary adult vocational (PSAV) levels.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	DIM0101	Diesel Engine Mechanic/Technician Helper	150 hours	49-9098
B	DIM0102	Diesel Electrical and Electronics Technician	300 hours	49-3031
C	DIM0103	Diesel Engine Preventative Maintenance Technician	150 hours	49-3031
D	DIM0104	Diesel Engine Technician	300 hours	49-3031
E	DIM0105	Diesel Brakes Technician	300 hours	49-3031
F	DIM0106	Diesel Heating and Air Conditioning Technician	150 hours	49-3031
G	DIM0107	Diesel Steering and Suspension Technician	150 hours	49-3031
H	DIM0108	Diesel Drivetrain Technician	150 hours	49-3031
I	DIM0109	Diesel Hydraulics Technician	150 hours	49-3031

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Medium and Heavy Duty Bus and Truck program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Proficiently explain and apply required shop and personal safety tasks.
02.0 Identify the basic diesel components and functions.
03.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment.
04.0 Identify principles, assemblies, and systems of engine operation.
05.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
06.0 Demonstrate workplace employability skills related to personal standards and work habits/ethics.
07.0 Diagnose and repair General electrical systems.
08.0 Diagnose and repair Battery systems.
09.0 Diagnose and repair Starting systems.
10.0 Diagnose and repair Charging systems.
11.0 Diagnose and repair Lighting systems.
12.0 Diagnose and repair Gauges and warning devices.
13.0 Diagnose and repair Related electrical systems.
14.0 Diagnose and repair Engine systems.
15.0 Diagnose and repair Fuel system
16.0 Diagnose and repair Air induction and exhaust system
17.0 Diagnose and repair Cooling system
18.0 Diagnose and repair Lubrication system
19.0 Diagnose and repair Instruments and controls
20.0 Diagnose and repair Safety equipment
21.0 Diagnose and repair Hardware
22.0 Diagnose and repair Heating, ventilation, and air conditioning (HVAC)
23.0 Diagnose and repair Battery and starting systems
24.0 Diagnose and repair Electrical/Electronic charging systems
25.0 Diagnose and repair Lighting systems.
26.0 Diagnose and repair Air brake systems.
27.0 Diagnose and repair Hydraulic brake systems.
28.0 Diagnose and repair Drive Train systems.
29.0 Diagnose and repair Suspension and steering systems.
30.0 Diagnose and repair Tires and wheels.
31.0 Diagnose and repair Frame and fifth wheel.
32.0 General engine diagnosis and repair.
33.0 Cylinder head and valve train diagnosis and repair.
34.0 Engine block diagnosis and repair.
35.0 Lubrication systems diagnosis and repair.
36.0 Cooling system diagnosis and repair.
37.0 Air induction and exhaust systems diagnosis and repair.
38.0 Fuel system diagnosis and repair.

38.01 Fuel supply system.
38.02 Electronic fuel management system.
39.0 Diagnose and repair engine brakes.
40.0 Diagnose and repair air supply and service systems.
41.0 Diagnose and repair mechanical/foundation air brake systems.
42.0 Diagnose and repair parking brakes.
43.0 Diagnose and repair hydraulic systems.
44.0 Diagnose and repair mechanical/foundation hydraulic brake systems.
45.0 Diagnose and repair power assist units.
46.0 Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC).
47.0 Diagnose and repair wheel bearings.
48.0 HVAC systems diagnosis, service, and repair.
49.0 A/C system and component diagnosis, service, and repair.
50.0 Diagnose and repair Compressor and clutch.
51.0 Diagnose and repair Evaporator, condenser, and related components.
52.0 Heating and engine cooling systems diagnosis, service, and repair.
53.0 Electrical system diagnosis, service, and repair.
54.0 Air/vacuum/mechanical diagnosis, service, and repair.
55.0 Refrigerant recovery, recycling, and handling.
56.0 Steering column diagnosis, service, and repair.
57.0 Steering units diagnosis, service, and repair.
58.0 Steering linkage diagnosis, service, and repair.
59.0 Suspension systems diagnosis and repair.
60.0 Wheel alignment diagnosis, adjustment, and repair.
61.0 Wheels and tires diagnosis, service, and repair.
62.0 Frame and coupling diagnosis, service, and repair.
63.0 Clutch diagnosis and repair.
64.0 Transmission diagnosis and repair.
65.0 Driveshaft and universal joint diagnosis and repair.
66.0 Drive axle diagnosis and repair.
67.0 General hydraulic system diagnosis and repair.
68.0 Diagnose and repair hydraulic pumps.
69.0 Diagnose and repair hydraulic filtration/reservoirs (tanks).
70.0 Diagnose and repair hydraulic hoses, fittings, and connections.
71.0 Diagnose and repair hydraulic control valves.
72.0 Diagnose and repair hydraulic actuators.

Florida Department of Education
Student Performance Standards

Program Title: **Medium and Heavy Duty Truck and Bus Technician**
PSAV Number: **I470605**

Course Number: DIM0101
Occupational Completion Point: A
Diesel Engine Mechanic/Technician Helper – 150 Hours – SOC Code 49-9098

Course Description:
The Diesel Engine Mechanic/Technician Helper course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop and personal safety skills, basic diesel components, tools and equipment, occupational safety, engine operation, and workplace employment skills.

ASE = Required Supplemental Tasks

CTE Standards and Benchmarks		Priority Number
01.0	Proficiently explain and apply required shop and personal safety tasks--The student will be able to:	
01.01	Identify basic shop organization and management regulations.	
01.02	Identify and apply general and required shop safety rules and procedures.	ASE
01.03	Utilize safe procedures for handling of tools and equipment.	ASE
01.04	Identify and use proper placement of floor jacks and jack stands.	ASE
01.05	Identify and use proper procedures for safe lift operation.	ASE
01.06	Utilize proper ventilation procedures for working within the lab/shop area.	ASE
01.07	Identify marked safety areas.	ASE
01.08	Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.	ASE
01.09	Identify the location and use of eye wash stations.	ASE
01.10	Identify the location of the posted evacuation routes.	ASE
01.11	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE
01.12	Identify and wear appropriate clothing for lab/shop activities.	ASE
01.13	Secure hair and jewelry for lab/shop activities.	ASE

CTE Standards and Benchmarks		Priority Number
01.14	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE
01.15	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HDD) lamps, ignition systems, injection systems, etc.).	ASE
01.16	Locate and demonstrate knowledge of Safety Data Sheets (SDS).	ASE
01.17	Assist in activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.	
01.18	Identify and comply with personal and environmental safety practices associated with the handling, storage, and disposal of chemicals and hazardous materials.	
02.0	Identify the basic diesel components and functions--The student will be able to:	
02.01	Identify types of bearings and their uses.	
02.02	Identify seals, gaskets, and fasteners.	
02.03	Identify drive power train components and functions.	
02.04	Identify threaded fasteners by size, type, thread series, thread classes, material hardness, and compatibility	
03.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment--The student will be able to:	
03.01	Identify tools and their usage in automotive applications.	ASE
03.02	Identify standard and metric designation.	ASE
03.03	Demonstrate safe handling and use of appropriate tools.	ASE
03.04	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE
03.05	Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper, etc.).	ASE
04.0	Identify principles, assemblies, and systems of engine operation--The student will be able to:	
04.01	Explain the basic principles in the operation of the four-stroke-cycle diesel engine	
04.02	Identify engine assemblies and systems.	
04.03	Explain the operating principles of two-and-four-stroke-cycle engines.	
04.04	Identify the equipment of two-and-four-stroke-cycle engines.	
04.05	Identify governor types and their operating principles.	
05.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services--The student will be able to:	
05.01	Identify information needed and the service requested on a repair order.	ASE
05.02	Identify purpose and demonstrate proper use of fender covers, mats.	ASE

CTE Standards and Benchmarks		Priority Number
05.03	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE
05.04	Review vehicle service history.	ASE
05.05	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE
05.06	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.)	ASE
06.0	Demonstrate workplace employability skills related to personal standards and work habits/ethics--The student will be able to:	
06.01	Reports to work daily on time; able to take directions and motivated to accomplish the task at hand.	ASE
06.02	Dresses appropriately and uses language and manners suitable for the workplace.	ASE
06.03	Maintains appropriate personal hygiene.	ASE
06.04	Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.	ASE
06.05	Demonstrates honesty, integrity and reliability.	ASE
06.06	Complies with workplace policies/laws	ASE
06.07	Contributes to the success of the team, assists others and requests help when needed.	ASE
06.08	Works well with all customers and coworkers.	ASE
06.09	Negotiates solutions to interpersonal and workplace conflicts.	ASE
06.10	Contributes ideas and initiative.	ASE
06.11	Follows directions.	ASE
06.12	Communicates (written and verbal) effectively with customers and coworkers.	ASE
06.13	Reads and interprets workplace documents; writes clearly and concisely.	ASE
06.14	Analyzes and resolves problems that arise in completing assigned tasks.	ASE
06.15	Organizes and implements a productive plan of work.	ASE
06.16	Uses scientific, technical, engineering and mathematics principles and reasoning to accomplish assigned tasks.	ASE
06.17	Identifies and address the needs of all customers, providing helpful, courteous and knowledgeable service and advice as needed.	ASE

Florida Department of Education
Student Performance Standards

Course Number: DIM0102
Occupational Completion Point: B
Diesel Electrical and Electronics Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Electrical and Electronics Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study general electrical systems, batteries, starting, charging, lighting, gauges, warning devices, and related electrical system diagnostics, service, and repair.

For every task in Diesel Electrical and Electronics Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Electrical and Electronics Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

EE Task List:	
P-1 =	**38**
P-2 =	**15**
P-3 =	**12**
Total	**65**

CTE Standards and Benchmarks		Priority Number
07.0	Diagnose and repair general electrical systems--The student will be able to:	
07.01	Read and interpret electrical/electronic circuits using wiring diagrams.	P-1
07.02	Check continuity in electrical/electronic circuits using appropriate test equipment.	P-1
07.03	Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using appropriate test equipment.	P-1
07.04	Check current flow in electrical/electronic circuits and components using appropriate test equipment.	P-1
07.05	Check resistance in electrical/electronic circuits and components using appropriate test equipment.	P-1
07.06	Locate shorts, grounds, and opens in electrical/electronic circuits.	P-1

CTE Standards and Benchmarks		Priority Number
07.07	Diagnose parasitic (key-off) battery drain problems; perform tests; determine needed action.	P-1
07.08	Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed.	P-1
07.09	Inspect and test spike suppression devices; replace as needed.	P-3
07.10	Check frequency and pulse width signal in electrical/electronic circuits using appropriate test equipment.	P-3
08.0	Diagnose and repair battery systems--The student will be able to:	
08.01	Identify battery type; perform appropriate battery load test; determine needed action.	P-1
08.02	Determine battery state of charge using an open circuit voltage test.	P-1
08.03	Inspect, clean, and service battery; replace as needed.	P-1
08.04	Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed.	P-1
08.05	Charge battery using appropriate method for battery type.	P-1
08.06	Inspect, test, and clean battery cables and connectors; repair or replace as needed.	P-1
08.07	Jump start a vehicle using jumper cables and a booster battery or auxiliary power supply using proper safety procedures.	P-1
08.08	Perform battery capacitance test; determine needed action.	P-2
08.09	Identify and test low voltage disconnect (LVD) systems; determine needed repair.	P-2
09.0	Diagnose and repair starting systems--The student will be able to:	
09.01	Perform starter circuit cranking voltage and voltage drop tests; determine needed action.	P-1
09.02	Inspect and test components (key switch, push button and/or magnetic switch) and wires and harnesses in the starter control circuit; replace as needed	P-2
09.03	Inspect and test starter relays and solenoids/switches; replace as needed.	P-1
09.04	Remove and replace starter; inspect flywheel ring gear or flex plate.	P-1
10.0	Diagnose and repair charging systems--The student will be able to:	
10.01	Test instrument panel mounted volt meters and/or indicator lamps; determine needed action.	P-1
10.02	Identify causes of a no charge, low charge, or overcharge problems; determine needed action.	P-1
10.03	Inspect and replace alternator drive belts, pulleys, fans, tensioners, and mounting brackets; adjust drive belts and check alignment.	P-1
10.04	Perform charging system voltage and amperage output tests; perform AC ripple test; determine needed action.	P-1
10.05	Perform charging circuit voltage drop tests; determine needed action.	P-1
10.06	Remove and replace alternator.	P-1

CTE Standards and Benchmarks		Priority Number
	10.07 Inspect, repair, or replace cables, wires, and connectors in the charging circuit.	P-1
11.0	Diagnose and repair lighting systems--The student will be able to:	
	11.01 Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
	11.02 Identify causes of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation.	P-1
	11.03 Test, aim, and replace headlights.	P-1
	11.04 Test headlight and dimmer circuit switches, relays, wires, terminals, connectors, sockets, and control components/modules; repair or replace as needed.	P-1
	11.05 Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, and control components/modules of parking, clearance, and taillight circuits; repair or replace as needed.	P-1
	11.06 Inspect and test instrument panel light circuit switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires, and printed circuits/control modules; repair or replace as needed.	P-2
	11.07 Inspect and test interior cab light circuit switches, bulbs/LEDs, sockets, low voltage disconnect (LVD), connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-2
	11.08 Inspect and test tractor-to-trailer multi-wire connector(s); repair or replace as needed.	P-1
	11.09 Inspect, test, and adjust stoplight circuit switches, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
	11.10 Inspect and test turn signal and hazard circuit flasher(s), switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
	11.11 Inspect and test reverse lights and warning device circuit switches, bulbs/LEDs, sockets, horns, buzzers, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
12.0	Diagnose and repair gauges and warning devices--The student will be able to:	
	12.01 Interface with vehicle's on-board computer; perform diagnostic procedure, verify instrument cluster operations using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
	12.02 Identify causes of intermittent, high, low, or no gauge readings; determine needed action.	P-2
	12.03 Identify causes of data bus-driven gauge malfunctions; determine needed action.	P-3
	12.04 Inspect and test gauge circuit sensor/sending units, gauges, connectors, terminals, and wires; repair or replace as needed.	P-2
	12.05 Inspect and test warning devices (lights and audible) circuit sensor/sending units, bulbs/LEDs, sockets, connectors, wires, and control components/modules; repair or replace as needed.	P-1
	12.06 Inspect, test, replace, and calibrate (if applicable) electronic speedometer, odometer, and tachometer systems.	P-2
13.0	Diagnose and repair related electrical systems--The student will be able to:	

CTE Standards and Benchmarks		Priority Number
13.01	Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
13.02	Identify causes of constant, intermittent, or no horn operation; determine needed action.	P-1
13.03	Inspect and test horn circuit relays, horns, switches, connectors, wires, clock springs, and control components/modules; repair or replace as needed.	P-2
13.04	Identify causes of constant, intermittent, or no wiper operation; diagnose the cause of wiper speed control and/or park problems; determine needed action.	P-2
13.05	Inspect and test wiper motor, resistors, park switch, relays, switches, connectors, wires and control components/modules; repair or replace as needed.	P-2
13.06	Inspect wiper motor transmission linkage, arms, and blades; adjust or replace as needed.	P-2
13.07	Inspect and test windshield washer motor or pump/relay assembly, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.08	Inspect and test side view mirror motors, heater circuit grids, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.09	Inspect and test heater and A/C electrical components including: A/C clutches, motors, resistors, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.10	Inspect and test auxiliary power outlet, integral fuse, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.11	Identify causes of slow, intermittent, or no power window operation; determine needed action.	P-3
13.12	Inspect and test motors, switches, relays, connectors, terminals, wires, and control components/modules of power window circuits; repair or replace as needed.	P-3
13.13	Inspect and test block heaters; determine needed repairs.	P-2
13.14	Inspect and test cruise control electrical components; repair or replace as needed.	P-3
13.15	Inspect and test switches, relays, controllers, actuator/solenoids, connectors, terminals, and wires of electric door lock circuits.	P-3
13.16	Check operation of keyless and remote lock/unlock devices; determine needed action.	P-3
13.17	Inspect and test engine cooling fan electrical control components/modules, wiring; repair or replace as needed.	P-2
13.18	Identify causes of data bus communication problems; determine needed action.	P-2

Florida Department of Education
Student Performance Standards

Course Number: DIM0103
Occupational Completion Point: C
Diesel Engine Preventative Maintenance Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Preventative Maintenance Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine system, cab and hood systems, electrical/electronic systems, frame and chassis systems diagnostics, service, and repair.

For every task in Diesel Engine Preventative Maintenance Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The tasks included in the Diesel Engine Preventative Maintenance Technician area are entry-level technician inspection tasks designed to introduce the student to correct procedures and practices of vehicle inspection in a teaching/learning environment. They are not intended to satisfy the Annual Federal Vehicle Inspection requirement as prescribed in the Federal Motor Carrier Safety Regulations, Part 396, Appendix G to Subchapter B, Minimum Periodic Inspection Standards.

The first task in Diesel Engine Preventative Maintenance Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

PM Task List:	
	P-1 = 132
	P-2 = 11
	P-3 = 0
Total	**143**

CTE Standards and Benchmarks		**Priority Number**
14.0	Diagnose and repair Engine systems--The student will be able to:	
14.01	Check engine starting/operation (including unusual noises, vibrations, exhaust smoke, etc.); record idle and governed rpm.	P-1
14.02	Inspect vibration damper.	P-1
14.03	Inspect belts, tensioners, and pulleys; check and adjust belt tension; check belt alignment.	P-1
14.04	Check engine oil level and condition; check dipstick seal.	P-1

CTE Standards and Benchmarks		Priority Number
14.05	Inspect engine mounts for looseness and deterioration.	P-1
14.06	Check engine for oil, coolant, air, fuel and exhaust leaks (Engine Off and Running).	P-1
14.07	Check engine compartment wiring harnesses, connectors, and seals for damage and proper routing.	P-1
14.08	Check electrical wiring, routing, and hold-down clamps, including Engine Control Module/Powertrain Control Module (ECM/PCM).	
15.0	Diagnose and repair Fuel system--The student will be able to:	
15.01	Check fuel tanks, mountings, lines, caps, and vents.	P-1
15.02	Drain water from fuel system.	P-1
15.03	Service water separator/fuel heater; replace fuel filter(s); prime and bleed fuel system.	P-1
15.04	Inspect throttle linkages and return springs.	
16.0	Diagnose and repair Air induction and exhaust system--The student will be able to:	
16.01	Check exhaust system mountings for looseness and damage.	P-1
16.02	Check engine exhaust system for leaks, proper routing, and damaged or missing components to include exhaust gas recirculation (EGR) system and after treatment devices, if equipped.	P-1
16.03	Check air induction system: piping, charge air cooler, hoses, clamps, and mountings; check for air restrictions and leaks.	P-1
16.04	Inspect turbocharger for leaks; check mountings and connections.	P-1
16.05	Check operation of engine compression/exhaust brake.	P-2
16.06	Service or replace air filter as needed; check and reset air filter restriction indicator.	P-1
16.07	Inspect and service crankcase ventilation system.	P-1
16.08	Inspect diesel exhaust fluid (DEF) system, to include tanks, lines, gauge pump, and filter.	P-1
16.09	Inspect selective catalyst reduction (SCR) system; including diesel exhaust fluid (DEF) for proper levels, leaks, mounting and connections.	P-2
17.0	Diagnose and repair Cooling system--The student will be able to:	
17.01	Check operation of fan clutch.	P-1
17.02	Inspect radiator (including air flow restriction, leaks, and damage) and mountings.	P-1
17.03	Inspect fan assembly and shroud.	P-1
17.04	Pressure test cooling system and radiator cap.	P-1
17.05	Inspect coolant hoses and clamps.	P-1
17.06	Inspect coolant recovery system.	P-1

CTE Standards and Benchmarks		Priority Number
17.07	Check coolant for contamination, additive package concentration, aeration, and protection level (freeze point).	P-1
17.08	Service coolant filter.	P-1
17.09	Inspect water pump.	P-1
18.0	Diagnose and repair Lubrication system--The student will be able to:	
18.01	Change engine oil and filters; visually check oil for coolant or fuel contamination; inspect and clean magnetic drain plugs.	P-1
18.02	Take an engine oil sample for analysis.	P-1
19.0	Diagnose and repair Instruments and control systems--The student will be able to:	
19.01	Inspect key condition and operation of ignition switch.	P-1
19.02	Check warning indicators.	P-1
19.03	Check instruments; record oil pressure and system voltage.	P-1
19.04	Check operation of electronic power take off (PTO) and engine idle speed controls (if applicable)	P-2
19.05	Check HVAC controls.	P-1
19.06	Check operation of all accessories.	P-1
19.07	Using electronic service tool(s) or on-board diagnostic system; retrieve engine monitoring information; check and record diagnostic codes and trip/operational data (including engine, transmission, ABS, and other systems).	P-1
19.08	Check mechanical, electronic, and emergency shutdown operation.	
19.09	Check mechanical and electronic engine speed controls.	
20.0	Diagnose and repair Safety equipment--The student will be able to:	
20.01	Check operation of electric/air horns and back-up warning devices.	P-1
20.02	Check condition of spare fuses, safety triangles, fire extinguisher, and all required decals.	P-1
20.03	Inspect seat belts and sleeper restraints.	P-1
20.04	Inspect wiper blades and arms.	P-1
21.0	Diagnose and repair Hardware--The student will be able to:	
21.01	Check operation of wiper and washer.	P-1
21.02	Inspect windshield glass for cracks or discoloration; check sun visor.	P-1
21.03	Check seat condition, operation, and mounting.	P-1
21.04	Check door glass and window operation.	P-1

CTE Standards and Benchmarks		Priority Number
21.05	Inspect steps and grab handles.	P-1
21.06	Inspect mirrors, mountings, brackets, and glass.	P-1
21.07	Record all observed physical damage.	P-2
21.08	Lubricate all cab and hood grease fittings.	P-2
21.09	Inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables.	P-1
21.10	Inspect cab mountings, hinges, latches, linkages and ride height; service as needed.	P-1
21.11	Inspect tilt cab hydraulic pump, lines, and cylinders for leakage; inspect safety devices; service as needed.	
22.0	Diagnose and repair Heating, ventilation, and air conditioning (HVAC)--The student will be able to:	
22.01	Inspect A/C condenser and lines for condition and visible leaks; check mountings.	P-2
22.02	Inspect A/C compressor and lines for condition and visible leaks; check mountings.	P-2
22.03	Check A/C system condition and operation; check A/C monitoring system, if applicable.	P-1
22.04	Check HVAC air inlet filters and ducts; service as needed.	P-1
23.0	Diagnose and repair Electrical/Electronic battery and starting systems--The student will be able to:	
23.01	Inspect battery box(es), cover(s), and mountings.	P-1
23.02	Inspect battery hold-downs, connections, cables, and cable routing; service as needed.	P-1
23.03	Check/record battery state-of-charge (open circuit voltage) and condition.	P-1
23.04	Perform battery test (load and/or capacitance).	P-1
23.05	Inspect starter, mounting, and connections.	P-1
23.06	Engage starter; check for unusual noises, starter drag, and starting difficulty.	P-1
24.0	Diagnose and repair Electrical/Electronic charging systems--The student will be able to:	
24.01	Inspect alternator, mountings, cable, wiring, and wiring routing; determine needed action.	P-1
24.02	Perform alternator output tests.	P-1
25.0	Diagnose and repair Electrical/Electronic lighting systems--The student will be able to:	
25.01	Check operation of interior lights; determine needed action.	P-1
25.02	Check all exterior lights, lenses, reflectors, and conspicuity tape; check headlight alignment; determine needed action.	P-1
25.03	Inspect and test tractor-to-trailer multi-wire connector(s), cable(s), and holder(s); determine needed action.	P-1
26.0	Diagnose and repair Air brake systems--The student will be able to:	

CTE Standards and Benchmarks		Priority Number
26.01	Check operation of parking brake.	P-1
26.02	Record air governor cut-in and cut-out setting (psi).	P-1
26.03	Check operation of air reservoir/tank drain valves.	P-1
26.04	Check air system for leaks (brakes released).	P-1
26.05	Check air system for leaks (brakes applied).	P-1
26.06	Test one-way and double-check valves.	P-1
26.07	Check low air pressure warning devices.	P-1
26.08	Check emergency (spring) brake control/modulator valve, if applicable.	P-1
26.09	Check tractor protection valve.	P-1
26.10	Test air pressure build-up time.	P-1
26.11	Inspect coupling air lines, holders, and gladhands.	P-1
26.12	Check brake chambers and air lines for secure mounting and damage.	P-1
26.13	Check operation of air drier.	P-1
26.14	Inspect and record brake shoe/pad condition, thickness, and contamination.	P-1
26.15	Inspect and record condition of brake drums/rotors.	P-1
26.16	Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing	P-1
26.17	Check operation and adjustment of brake automatic slack adjusters (ASA); check and record push rod stroke.	P-1
26.18	Lubricate all brake component grease fittings.	P-1
26.19	Check condition and operation of hand brake (trailer) control valve, if applicable.	P-2
26.20	Perform antilock brake system (ABS) operational system self-test.	P-1
26.21	Drain air tanks and check for contamination.	P-1
26.22	Check condition of pressure relief (safety) valves.	P-1
26.23	Check air governor cut-in pressure.	
26.24	Check operation of brake manual slack adjusters; adjust as needed.	
27.0	Diagnose and repair Hydraulic brake systems--The student will be able to:	
27.01	Check master cylinder fluid level and condition.	P-1
27.02	Inspect brake lines, fittings, flexible hoses, and valves for leaks and damage.	P-1

CTE Standards and Benchmarks		Priority Number
27.03	Check parking brake operation; inspect parking brake application and holding devices; adjust as needed.	P-1
27.04	Check operation of hydraulic system: pedal travel, pedal effort, pedal feel.	P-1
27.05	Inspect calipers for leakage, binding and damage.	P-1
27.06	Inspect brake assist system (booster), hoses and control valves; check reservoir fluid level and condition.	P-1
27.07	Inspect and record brake lining/pad condition, thickness, and contamination.	P-1
27.08	Inspect and record condition of brake rotors.	P-1
27.09	Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing.	P-1
27.10	Adjust drum brakes.	
28.0	Diagnose and repair Drive Train systems--The student will be able to:	
28.01	Check operation of clutch, clutch brake, and gearshift.	P-1
28.02	Check clutch linkage/cable for looseness or binding, if applicable.	P-1
28.03	Check hydraulic clutch slave and master cylinders, lines, fittings, and hoses, if applicable.	P-1
28.04	Check clutch adjustment; adjust as needed.	P-1
28.05	Check transmission case, seals, filter, hoses, lines and cooler for cracks and leaks.	P-1
28.06	Inspect transmission breather.	P-1
28.07	Inspect transmission mounts.	P-1
28.08	Check transmission oil level, type, and condition.	P-1
28.09	Inspect U-joints, yokes, driveshafts, boots/seals, center bearings, and mounting hardware for looseness, damage, and proper phasing.	P-1
28.10	Inspect axle housing(s) for cracks and leaks.	P-1
28.11	Inspect axle breather(s).	P-1
28.12	Lubricate all drivetrain grease fittings.	P-1
28.13	Check drive axle(s) oil level, type, and condition.	P-1
28.14	Change drive axle(s) oil and filter/screen, if applicable; check and clean magnetic plugs.	P-2
28.15	Check transmission wiring, connectors, seals, and harnesses for damage and proper routing.	P-1
28.16	Change transmission oil and filter, if applicable; check and clean magnetic plugs.	P-2
28.17	Check interaxle differential lock operation.	P-1
28.18	Check transmission range shift operation.	P-1

CTE Standards and Benchmarks		Priority Number
	28.19 Check two-speed axle unit operation and oil level.	
29.0	Diagnose and repair Suspension and steering systems--The student will be able to:	
	29.01 Check steering wheel operation for free play and binding.	P-1
	29.02 Check power steering pump, mounting, and hoses for leaks, condition, and routing; check fluid level.	P-1
	29.03 Change power steering fluid and filter.	P-1
	29.04 Inspect steering gear for leaks and secure mounting.	P-1
	29.05 Inspect steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, and linkages.	P-1
	29.06 Check kingpins for wear.	P-1
	29.07 Check wheel bearings for looseness and noise.	P-1
	29.08 Check oil level and condition in all non-drive hubs; check for leaks.	P-1
	29.09 Inspect springs, pins, hangers, shackles, spring U-bolts, and insulators.	P-1
	29.10 Inspect shock absorbers for leaks and secure mounting.	P-1
	29.11 Inspect air suspension springs, mounts, hoses, valves, linkage, and fittings for leaks and damage.	P-1
	29.12 Check and record suspension ride height.	P-1
	29.13 Lubricate all suspension and steering grease fittings.	P-1
	29.14 Check axle locating components (radius, torque, and/or track rods).	P-1
	29.15 Check tandem axle alignment and spacing.	
	29.16 Remove and inspect wheel bearings; reassemble and adjust.	
	29.17 Check toe adjustment.	
30.0	Diagnose and repair Tires and wheels--The student will be able to:	
	30.01 Inspect tires for wear patterns and proper mounting.	P-1
	30.02 Inspect tires for cuts, cracks, bulges, and sidewall damage.	P-1
	30.03 Inspect valve caps and stems; determine needed action.	P-1
	30.04 Measure and record tread depth; probe for imbedded debris.	P-1
	30.05 Check and record air pressure; adjust air pressure in accordance with manufacturers' specifications.	P-1
	30.06 Check wheel mounting hardware condition; determine needed action.	P-1
	30.07 Inspect wheels for cracks, damage and proper hand hold alignment.	P-1

CTE Standards and Benchmarks		Priority Number
	30.08 Check tire matching (diameter and tread) on single and dual tire applications.	P-1
	30.09 Retorque lugs in accordance with manufacturer's specifications.	
31.0	Diagnose and repair Frame and fifth wheel--The student will be able to:	
	31.01 Inspect fifth wheel mounting, bolts, air lines, and locks.	P-1
	31.02 Test operation of fifth wheel locking device; adjust if necessary.	P-1
	31.03 Check quarter fenders, mud flaps, and brackets.	P-1
	31.04 Check pintle hook assembly and mounting; if applicable.	P-2
	31.05 Lubricate all fifth wheel grease fittings and plate; if applicable	P-1
	31.06 Inspect frame and frame members for cracks and damage.	P-1

Florida Department of Education
Student Performance Standards

Course Number: DIM0104
Occupational Completion Point: D
Diesel Engine Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine, cylinder head, valve train, engine block, lubrication, cooling, air induction, exhaust, fuel, and engine brakes diagnostics, service, and repair.

For every task in Diesel Engine Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Engine Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

DE Task List:	
P-1	**35**
P-2	**32**
P-3	**21**
Total	**88**

CTE Standards and Benchmarks		Priority Number
32.0	General engine diagnosis and repair--The student will be able to:	
32.01	Inspect fuel, oil, Diesel Exhaust Fluid (DEF) and coolant levels, and condition; determine needed action.	P-1
32.02	Identify and diagnose the causes of engine fuel, oil, coolant, air, and other leaks; determine needed action.	P-1
32.03	Listen and interpret engine noises; determine needed action.	P-3
32.04	Observe engine exhaust smoke color and quantity; determine needed action.	P-2
32.05	Check and diagnose no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action.	P-1
32.06	Identify and diagnose causes of engine surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed action.	P-1
32.07	Identify and diagnose engine vibration problems; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
32.08	Check, record, and clear electronic diagnostic (fault) codes; monitor electronic data; determine needed action.	P-1
32.09	Perform air intake system restriction and leakage tests; determine needed action.	
32.10	Perform intake manifold pressure (boost) test; determine needed action.	
32.11	Perform exhaust back pressure test; determine needed action.	
32.12	Perform cylinder compression test; determine needed action.	
33.0	Cylinder head and valve train diagnosis and repair--The student will be able to:	
33.01	Inspect cylinder head for cracks/damage; check mating surfaces for warpage; check condition of passages; inspect core/expansion and gallery plugs; determine needed action.	P-2
33.02	Disassemble head and inspect valves, guides, seats, springs, retainers, rotators, locks, and seals; determine needed action.	P-3
33.03	Measure valve head height relative to deck, valve face-to-seat contact; determine needed action.	P-3
33.04	Inspect injector sleeves and seals; measure injector tip or nozzle protrusion; perform needed action.	P-3
33.05	Inspect valve train components; determine needed action.	P-1
33.06	Reassemble cylinder head.	P-3
33.07	Inspect, measure, and replace/reinstall overhead camshaft; measure/adjust end play and backlash.	P-3
33.08	Inspect electronic wiring harness and brackets for wear, bending, cracks, and looseness; determine needed action.	P-1
33.09	Inspect and adjust valve bridges (crossheads); adjust valve clearances and injector settings.	P-2
33.10	Remove, clean, inspect for visible damage, and replace cylinder head(s) assembly.	
33.11	Clean and inspect threaded holes, studs, and bolts for serviceability; determine needed action.	
33.12	Inspect pushrods, rocker arms, rocker arm shafts, and blocked oil passages; perform needed action.	
33.13	Inspect cam followers; perform needed action.	
34.0	Engine block diagnosis and repair--The student will be able to:	
34.01	Perform crankcase pressure test; determine needed action	P-1
34.02	Remove, inspect, service, and install pans, covers, gaskets, seals, wear rings, and crankcase ventilation components.	P-2
34.03	Disassemble, clean, and inspect engine block for cracks/damage; measure mating surfaces for warpage; check condition of passages, core/expansion and gallery plugs; inspect threaded holes, studs, dowel pins, and bolts for serviceability; determine needed action.	P-2
34.04	Inspect cylinder sleeve counter bore and lower bore; check bore distortion; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
34.05	Clean, inspect, and measure cylinder walls or liners for wear and damage; determine needed action.	P-2
34.06	Replace/reinstall cylinder liners and seals; check and adjust liner height (protrusion).	P-2
34.07	Inspect in-block camshaft bearings for wear and damage; determine needed action.	P-3
34.08	Inspect, measure, and replace/reinstall in-block camshaft; measure/adjust end play.	P-3
34.09	Clean and inspect crankshaft for surface cracks and journal damage; check condition of oil passages; check passage plugs; measure journal diameter; determine needed action.	P-2
34.10	Inspect main bearings for wear patterns and damage; replace as needed; check bearing clearances; check and correct crankshaft end play.	P-2
34.11	Inspect, install, and time gear train; measure gear backlash; determine needed action.	P-2
34.12	Inspect connecting rod and bearings for wear patterns; measure pistons, pins, retainers, and bushings; perform needed action.	P-3
34.13	Determine piston-to-cylinder wall clearance; check ring-to-groove fit and end gap; install rings on pistons.	P-3
34.14	Assemble pistons and connecting rods; install in block; install rod bearings and check clearances.	P-2
34.15	Check condition of piston cooling jets (nozzles); determine needed action.	P-2
34.16	Inspect and measure crankshaft vibration damper; determine needed action.	P-3
34.17	Install and align flywheel housing; inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.	P-3
34.18	Inspect flywheel/flexplate (including ring gear) and mounting surfaces for cracks and wear; measure runout; determine needed action.	P-2
35.0	Lubrication systems diagnosis and repair--The student will be able to:	
36.01	Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit, test engine oil temperature and check operation of temperature sensor; determine needed action.	P-1
36.02	Check engine oil level, condition, and consumption; determine needed action.	P-1
36.03	Inspect and measure oil pump, drives, inlet pipes, and pick-up screens; check drive gear clearances; determine needed action.	P-3
36.04	Inspect oil pressure regulator valve(s), by-pass and pressure relief valve(s), oil thermostat, and filters; determine needed action.	P-3
36.05	Inspect, clean, and test oil cooler and components; determine needed action.	P-3
36.06	Inspect turbocharger lubrication system; determine needed action.	P-2
36.07	Determine proper lubricant and perform oil and filter change.	P-1
36.0	Cooling system diagnosis and repair--The student will be able to:	
36.01	Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action.	P-1

CTE Standards and Benchmarks		Priority Number
	36.02 Test coolant temperature and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action.	P-1
	36.03 Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment.	P-1
	36.04 Inspect thermostat(s), by-passes, housing(s), and seals; replace as needed.	P-2
	36.05 Recover coolant, flush, and refill with recommended coolant/additive package; bleed cooling system.	P-1
	36.06 Inspect coolant conditioner/filter assembly for leaks; inspect valves, lines, and fittings; replace as needed.	P-1
	36.07 Inspect water pump and hoses; replace as needed.	P-1
	36.08 Inspect, clean, and pressure test radiator. Pressure test cap, tank(s), and recovery systems; determine needed action.	P-1
	36.09 Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.	P-1
	36.10 Inspect turbo charger cooling systems; determine needed action.	P-2
37.0	Air induction and exhaust systems diagnosis and repair--The student will be able to:	
	38.01 Perform air intake system restriction and leakage test; determine needed action.	P-1
	38.02 Perform intake manifold pressure (boost) test; determine needed action.	P-3
	38.03 Check exhaust back pressure; determine needed action.	P-3
	38.04 Inspect turbocharger(s), wastegate, and piping systems; determine needed action.	P-2
	38.05 Inspect turbocharger(s) (variable ratio/geometry VGT), pneumatic, hydraulic, electronic controls, and actuators.	P-2
	38.06 Check air induction system: piping, hoses, clamps, and mounting; service or replace air filter as needed.	P-1
	38.07 Remove and reinstall turbocharger/wastegate assembly.	P-3
	38.08 Inspect intake manifold, gaskets, and connections; replace as needed.	P-3
	38.09 Inspect, clean, and test charge air cooler assemblies; replace as needed.	P-2
	38.10 Inspect exhaust manifold, piping, mufflers, and mounting hardware; repair or replace as needed.	P-2
	38.11 Inspect exhaust after treatment devices; determine necessary action.	P-2
	38.12 Inspect and test preheater/inlet air heater, or glow plug system and controls; perform needed action.	P-2
	38.13 Inspect exhaust gas recirculation (EGR) system including EGR valve, cooler, piping, filter, electronic sensors, controls, and wiring; determine needed action.	P-2
38.0	Fuel system diagnosis and repair--The student will be able to:	
	38.01 Fuel supply system	

CTE Standards and Benchmarks			Priority Number
	38.01.1	Check fuel level, and condition; determine needed action.	P-1
	38.01.2	Perform fuel supply and return system tests; determine needed action.	P-1
	38.01.3	Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action.	P-1
	38.01.4	Inspect, clean, and test fuel transfer (lift) pump, pump drives, screens, fuel/water separators/indicators, filters, heaters, coolers, ECM cooling plates, and mounting hardware; determine needed action.	P-1
	38.01.5	Inspect and test pressure regulator systems (check valves, pressure regulator valves, and restrictive fittings); determine needed action.	P-1
	38.01.6	Check fuel system for air; determine needed action; prime and bleed fuel system; check primer pump.	P-1
	38.01.7	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time a distributor (rotary) type injection pump; determine needed action.	
	38.01.8	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time an in-line type injection pump; determine needed action.	
	38.01.9	Inspect and adjust throttle control linkage; determine needed action.	
	38.01.10	Inspect air/fuel ratio control systems; determine needed action.	
	38.01.11	Inspect, test, and adjust engine fuel shut-down devices and controls; determine needed action.	
38.02	Electronic fuel management system		
	38.02.1	Inspect and test power and ground circuits and connections; measure and interpret voltage, voltage drop, amperage, and resistance readings using a digital multimeter (DMM); determine needed action.	P-1
	38.02.2	Interface with vehicle's on-board computer; perform diagnostic procedures using electronic service tool(s) (to include PC based software and/or data scan tools); determine needed action.	P-1
	38.02.3	Check and record electronic diagnostic codes and trip/operational data; monitor electronic data; clear codes; determine further diagnosis.	P-1
	38.02.4	Locate and use relevant service information (to include diagnostic procedures, flow charts, and wiring diagrams).	P-1
	38.02.5	Inspect and replace electrical connector terminals, seals, and locks.	P-1
	38.02.6	Inspect and test switches, sensors, controls, actuator components, and circuits; adjust or replace as needed.	P-1
	38.02.7	Using electronic service tool(s) access and interpret customer programmable parameters.	P-1
	38.02.8	Perform on-engine inspections, test and adjustments on electronic unit injectors (EUI); determine needed action	P-2

CTE Standards and Benchmarks			Priority Number
	38.02.9	Remove and install electronic unit injectors (EUI) and related components; recalibrate ECM (if applicable).	P-2
	38.02.10	Perform cylinder contribution test utilizing electronic service tool(s).	P-1
	38.02.11	Perform on-engine inspections and tests on hydraulic electronic unit injectors (HEUI) and system electronic controls; determine needed action.	P-2
	38.02.12	Perform on-engine inspections and tests on hydraulic electronic unit injector (HEUI) high pressure oil supply and control systems; determine needed action.	P-2
	38.02.13	Perform on-engine inspections and tests on high pressure common rail (HPCR) type injection systems; determine needed action.	P-2
	38.02.14	Inspect high pressure injection lines, hold downs, fittings and seals; determine needed action.	P-2
	38.02.15	Perform engine timing sensor calibration (if applicable).	
	38.02.16	Perform on-engine inspections and tests on distributor-type injection pump electronic controls; determine needed action.	
	38.02.17	Perform on-engine inspections and tests on in-line type injection pump electronic controls; determine needed action.	
39.0	Diagnose and repair engine brakes--The student will be able to:		
	39.01	Inspect and adjust engine compression/exhaust brakes; determine needed action.	P-2
	39.02	Inspect, test, and adjust engine compression/exhaust brake control circuits, switches, and solenoids; determine needed action.	P-3
	39.03	Inspect engine compression/exhaust brake housing, valves, seals, lines, and fittings; repair or replace as needed.	P-3

Florida Department of Education
Student Performance Standards

Course Number: DIM0105
Occupational Completion Point: E
Diesel Brakes Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Brakes Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of air, and hydraulic brakes.

For every task in Diesel Brakes Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Brakes Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

BR Task List:	
P-1 =	**39**
P-2 =	**9**
P-3 =	**7**
Total	**55**

CTE Standards and Benchmarks		Priority Number
40.0	Diagnose and repair air supply and service systems--The student will be able to:	
40.01	Identify and diagnose poor stopping, air leaks, premature wear, pulling, grabbing, dragging, or balance problems caused by supply and service system malfunctions; determine needed action.	P-1
40.02	Check air system build-up time; determine needed action.	P-1
40.03	Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action.	P-1
40.04	Inspect air compressor drive gear, belts and coupling; adjust or replace as needed.	P-3
40.05	Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed.	P-1
40.06	Inspect and test air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings; replace as needed.	P-1
40.07	Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed.	P-1

CTE Standards and Benchmarks		Priority Number
40.08	Inspect and test air tank relief (safety) valves, one-way (single) check valves, two-way (double) check-valves, manual and automatic drain valves; replace as needed.	P-1
40.09	Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; repair or replace as needed.	P-1
40.10	Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation; replace as needed.	P-1
40.11	Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed.	P-1
40.12	Inspect and test hand brake (trailer) control valve, lines, fittings, and mountings; repair or replace as needed.	P-1
40.13	Inspect and test brake relay valve; replace as needed.	P-1
40.14	Inspect and test quick release valves; replace as needed.	P-1
40.15	Inspect and test tractor protection valve; replace as needed.	P-1
40.16	Inspect and test emergency (spring) brake control/modulator valve(s); replace as needed.	P-1
40.17	Inspect and test low pressure warning devices, wiring, and connectors; repair or replace as needed.	P-1
40.18	Inspect and test air pressure gauges, lines, and fittings; replace as needed.	P-2
40.19	Inspect and test front and rear axle limiting (proportioning) valves; replace as needed.	
41.0	Diagnose and repair mechanical/foundation air brake systems--The student will be able to:	
41.01	Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, or dragging problems caused by the foundation brake, slack adjuster, and brake chamber problems; determine needed action.	P-1
41.02	Inspect and test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets; repair or replace as needed.	P-1
41.03	Identify type, inspect and service slack adjusters; perform needed action.	P-1
41.04	Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; replace as needed.	P-1
41.05	Inspect, clean, and adjust air disc brake caliper assemblies; determine needed repairs.	P-2
41.06	Inspect and measure brake shoes or pads; perform needed action.	P-1
41.07	Inspect and measure brake drums or rotors; perform needed action.	P-1
42.0	Diagnose and repair parking brakes--The student will be able to**:**	
42.01	Inspect and test parking (spring) brake chamber diaphragm and seals; replace parking (spring) brake chamber; dispose of removed chambers in accordance with local regulations.	P-1
42.02	Inspect and test parking (spring) brake check valves, lines, hoses, and fittings; replace as needed.	P-1
42.03	Inspect and test parking (spring) brake application and release valve; replace as needed.	P-1

CTE Standards and Benchmarks		Priority Number
42.04	Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturers' recommendations.	P-1
42.05	Identify and test anti compounding brake function.	P-1
43.0	Diagnose and repair hydraulic systems--The student will be able to:	
43.01	Identify and diagnose poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system; determine needed action.	P-2
43.02	Inspect and test master cylinder for internal/external leaks and damage; replace as needed.	P-1
43.03	Inspect hydraulic system brake lines for leaks and damage, flexible hoses, and fittings for leaks and damage; replace as needed.	P-1
43.04	Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; replace as needed.	P-3
43.05	Inspect and test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors; repair or replace as needed.	P-2
43.06	Inspect disc brake caliper assemblies; replace as needed.	P-1
43.07	Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type.	P-1
43.08	Check and adjust brake pedal pushrod length.	
43.09	Inspect and clean wheel cylinders; replace as needed.	
43.10	Test and adjust brake stop light switch, bulbs, wiring, and connectors; repair or replace as needed.	
44.0	Diagnose and repair mechanical/foundation hydraulic brake systems--The student will be able to:	
44.01	Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components; determine needed action.	P-2
44.02	Inspect and measure rotors; perform needed action.	P-1
44.03	Inspect and measure disc brake pads; inspect mounting hardware; perform needed action.	P-1
44.04	Check parking brake operation; inspect parking brake application and holding devices; adjust and replace as needed.	P-2
44.05	Inspect and measure drum brake shoes and linings; inspect mounting hardware, adjuster mechanisms, and backing plates; perform needed action.	
45.0	Diagnose and repair power assist units--The student will be able to:	
45.01	Identify and diagnose stopping problems caused by the brake assist (booster) system; determine needed action.	P-3
45.02	Inspect, test, repair, or replace hydraulic brake assist (booster), hoses, and control valves; determine proper fluid type.	P-3
45.03	Check emergency (back-up, reserve) brake assist system.	P-3

CTE Standards and Benchmarks		Priority Number
46.0	Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC)--The student will be able to:	
46.01	Observe antilock brake system (ABS) warning light operation (includes trailer and dash mounted ABS warning light); determine needed action.	P-1
46.02	Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or electronic service tool(s); determine needed action.	P-1
46.03	Identify poor stopping and wheel lock-up caused by failure of the antilock brake system (ABS); determine needed action.	P-1
46.04	Test and check operation of antilock brake system (ABS) air, hydraulic, electrical, and mechanical components; perform needed action.	P-1
46.05	Test antilock brake system (ABS) wheel speed sensors and circuits; adjust or replace as needed.	P-1
46.06	Bleed the ABS hydraulic circuits according to manufacturers' procedures.	P-2
46.07	Observe automatic traction control (ATC) warning light operation; determine needed action.	P-3
46.08	Diagnose automatic traction control (ATC) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer); determine needed action.	P-3
46.09	Verify power line carrier (PLC) operations.	P-2
46.10	Diagnose, service, and adjust antilock brake system (ABS) wheel speed sensors and circuits following manufacturers' recommended procedures (including voltage output, resistance, shorts to voltage/ground, and frequency data).	
47.0	Diagnose and repair wheel bearings--The student will be able to:	
47.01	Clean, inspect, lubricate and replace wheel bearings and races/cups; replace seals and wear rings; inspect spindle/tube; inspect and replace retaining hardware; adjust wheel bearings. Verify end play with dial indicator method.	P-1
47.02	Identify, inspect or replace unitized/preset hub bearing assemblies.	P-2

Florida Department of Education
Student Performance Standards

Course Number: DIM0106
Occupational Completion Point: F
Diesel Heating and Air Conditioning Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Heating and Air Conditioning Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of HVAC, and A/C systems.

For every task in Diesel Heating and Air Conditioning Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Heating and Air Conditioning Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

HV Task List:	
P-1 =	**31**
P-2 =	**17**
P-3 =	**10**
Total	**58**

CTE Standards and Benchmarks		Priority Number
48.0	HVAC systems diagnosis, service, and repair--The student will be able to:	
48.01	Verify the need for service or repair of HVAC systems based on unusual operating noises; determine needed action.	P-1
48.02	Verify the need for service or repair of HVAC systems based on unusual visual, smell, and touch conditions; determine needed action.	P-1
48.03	Identify system type and components (cycling clutch orifice tube - CCOT, expansion valve) and conduct performance test(s) on HVAC systems; determine needed action.	P-1
48.04	Retrieve diagnostic codes; determine needed action.	P-3
49.0	A/C system and component diagnosis, service, and repair--The student will be able to:	
49.01	Identify causes of temperature control problems in the A/C system; determine needed action.	P-1
49.02	Identify refrigerant and lubricant types; check for contamination; determine needed action.	P-1

CTE Standards and Benchmarks		Priority Number
49.03	Identify A/C system problems indicated by pressure gauge and temperature readings; determine needed action.	P-1
49.04	Identify A/C system problems indicated by visual, audible, smell, and touch procedures; determine needed action.	P-1
49.05	Perform A/C system leak test; determine needed action.	P-1
49.06	Recover, evacuate, and recharge A/C system using appropriate equipment.	P-1
49.07	Identify contamination in the A/C system components; determine needed action.	P-3
49.08	Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-2
49.09	Charge A/C system with refrigerant.	
49.10	Identify lubricant type needed for system application.	
50.0	Diagnose and repair Compressor and clutch--The student will be able to:	
50.01	Identify and diagnose A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action.	P-1
50.02	Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices.	P-2
50.03	Inspect, and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension and check alignment.	P-1
50.04	Inspect, test, adjust, service, or replace A/C compressor clutch components or assembly.	P-2
50.05	Inspect and correct A/C compressor lubricant level (if applicable).	P-2
50.06	Inspect, test, or replace A/C compressor.	P-1
50.07	Inspect, repair, or replace A/C compressor mountings and hardware.	P-2
51.0	Diagnose and repair Evaporator, condenser, and related components--The student will be able to:	
51.01	Correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses.	P-1
51.02	Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action.	P-1
51.03	Inspect and test A/C system condenser. Check for proper airflow and mountings; determine needed action.	P-1
51.04	Inspect and replace receiver/drier or accumulator/drier.	P-1
51.05	Inspect and test cab/sleeper refrigerant solenoid, expansion valve(s); check placement of thermal bulb (capillary tube); determine needed action.	P-3
51.06	Remove and replace orifice tube.	P-1
51.07	Inspect and test cab/sleeper evaporator core; determine needed action.	P-3

CTE Standards and Benchmarks		Priority Number
51.08	Inspect, clean, and repair evaporator housing and water drain; inspect and service/replace evaporator air filter.	P-1
51.09	Identify and inspect A/C system service ports (gauge connections); determine needed action.	P-1
51.10	Identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device; determine needed action.	P-2
51.11	Inspect and test A/C system condenser and mountings; determine needed action.	
52.0	Heating and engine cooling systems diagnosis, service, and repair--The student will be able to:	
52.01	Identify causes of outlet air temperature control problems in the HVAC system; determine needed action.	P-1
52.02	Diagnose window fogging problems; determine needed action.	P-2
52.03	Perform engine cooling system tests for leaks, protection level, contamination, coolant level, coolant type, temperature, and conditioner concentration; determine needed action.	P-1
52.04	Inspect engine cooling and heating system hoses, lines, and clamps; determine needed action.	P-1
52.05	Inspect and test radiator, pressure cap, and coolant recovery system (surge tank); determine needed action.	P-1
52.06	Inspect water pump; determine needed action.	P-1
52.07	Inspect and test thermostats, by-passes, housings, and seals; determine needed repairs.	P-2
52.08	Recover, flush and refill with recommended coolant/additive package; bleed cooling system.	P-1
52.09	Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.	P-2
52.10	Inspect and test heating system coolant control valve(s) and manual shut-off valves; determine needed action.	P-2
52.11	Inspect and flush heater core; determine needed action.	P-3
53.0	Electrical system diagnosis, service, and repair--The student will be able to:	
53.01	Identify causes of HVAC electrical control system problems; determine needed action.	P-1
53.02	Inspect and test A/C heater blower motors, resistors, switches, relays, modules, wiring, and protection devices; determine needed action.	P-2
53.03	Inspect and test A/C compressor clutch relays, modules, wiring, sensors, switches, diodes, and protection devices; determine needed action.	P-2
53.04	Inspect and test A/C related electronic engine control systems; determine needed action.	P-2
53.05	Inspect and test engine cooling/condenser fan motors, relays, modules, switches, sensors, wiring, and protection devices; determine needed action.	P-2
53.06	Inspect and test electric actuator motors, relays/modules, switches, sensors, wiring, and protection devices; determine needed action.	P-2
53.07	Inspect and test HVAC system electrical/electronic control panel assemblies; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
53.08	Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-2
54.0	Air/vacuum/mechanical diagnostics, service, and repair--The student will be able to:	
54.01	Identify causes of HVAC air and mechanical control problems; determine needed action.	P-3
54.02	Inspect and test HVAC system air and mechanical control panel assemblies; determine needed action.	P-3
54.03	Inspect, test, and adjust HVAC system air and mechanical control cables and linkages; determine needed action.	P-3
54.04	Inspect and test HVAC system actuators and hoses; determine needed action.	P-3
54.05	Inspect, test, and adjust HVAC system ducts, doors, and outlets; determine needed action.	P-3
54.06	Inspect and test HVAC system vacuum reservoir(s), check valve(s), and restrictors; determine needed action.	
NOTE: Tasks 1 through 5 should be accomplished in accordance with appropriate EPA regulations and SAE "J" standards.		
55.0	Refrigerant recovery, recycling, and handling--The student will be able to:	
55.01	Maintain and verify correct operation of certified equipment.	P-1
55.02	Identify and recover A/C system refrigerant.	P-1
55.03	Recycle or properly dispose of refrigerant.	P-1
55.04	Handle, label, and store refrigerant.	P-1
55.05	Test recycled refrigerant for non-condensable gases.	P-1

Florida Department of Education
Student Performance Standards

Course Number: DIM0107
Occupational Completion Point: G
Diesel Steering and Suspension Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Steering and Suspension Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of steering, suspension, wheel alignment, wheels, tires, and frame systems.

For every task in Diesel Steering and Suspension Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Steering and Suspension Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

SS Task List:	
P-1 =	**23**
P-2 =	**14**
P-3 =	**8**
Total	**45**

CTE Standards and Benchmarks		Priority Number
56.0	Steering column diagnosis, service, and repair--The student will be able to:	
56.01	Identify and diagnose fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action.	P-1
56.02	Inspect and service steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft.	P-1
56.03	Check cab mounting and adjust ride height.	P-2
56.04	Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components); install and center the steering wheel. Inspect, test, replace and calibrate steering angle sensor.	P-1
56.05	Disable and enable supplemental restraint system (SRS) in accordance with manufacturers' procedures.	P-1
57.0	Steering units diagnosis, service, and repair--The student will be able to:	

CTE Standards and Benchmarks		Priority Number
57.01	Identify and diagnose power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action.	P-1
57.02	Determine recommended type of power steering fluid; check level and condition; determine needed action.	P-1
57.03	Flush and refill power steering system; purge air from system.	P-2
57.04	Perform power steering system pressure, temperature, and flow tests; determine needed action.	P-3
57.05	Inspect, service, or replace power steering reservoir including filter, seals, and gaskets.	P-2
57.06	Inspect power steering pump drive gear and coupling; replace as needed.	P-3
57.07	Inspect, adjust, or replace power steering pump, mountings, and brackets.	P-3
57.08	Inspect and replace power steering system cooler, lines, hoses, clamps/mountings, hose routings, and fittings.	P-2
57.09	Inspect, adjust, repair, or replace integral type power steering gear(s) (single and/or dual) and mountings.	P-2
57.10	Inspect, and reinstall/replace pulleys, tensioners, and drive belts; adjust drive belts and check alignment.	
57.11	Inspect, adjust, or replace linkage-assist type power steering cylinder or gear (dual system).	
57.12	Adjust manual and automatic steering gear poppet/relief valves.	
58.0	Steering linkage diagnosis, service, and repair--The student will be able to:	
58.01	Inspect and align pitman arm; replace as needed.	P-1
58.02	Check and adjust steering (wheel) stops; verify relief pressures.	P-1
58.03	Inspect and lubricate steering components.	P-1
58.04	Inspect drag link (relay rod) and tie rod ends; adjust or replace as needed.	
58.05	Inspect steering arm and levers, and linkage pivot joints; replace as needed.	
58.06	Inspect clamps and retainers on cross tube/relay rod/centerline/tie rod; position or replace as needed.	
59.0	Suspension systems diagnosis, service, and repair--The student will be able to:	
59.01	Inspect front axles and attaching hardware; determine needed action.	P-1
59.02	Inspect and service kingpins, steering knuckle bushings, locks, bearings, seals, and covers; determine needed action.	P-1
59.03	Inspect shock absorbers, bushings, brackets, and mounts; replace as needed.	P-1
59.04	Inspect leaf springs, center bolts, clips, pins and bushings, shackles, U-bolts, insulators, brackets, and mounts; determine needed action.	P-1
59.05	Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, torque arms, related bushings, mounts, shims, and cams; determine needed action.	P-1

CTE Standards and Benchmarks		Priority Number
59.06	Inspect tandem suspension equalizer components; determine needed action.	P-3
59.07	Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; adjust, repair or replace as needed.	P-1
59.08	Inspect air springs, mounting plates, springs, suspension arms, and bushings; replace as needed.	P-1
59.09	Measure and adjust vehicle ride height; determine needed action.	P-1
59.10	Identify rough ride problems; determine needed action.	P-3
59.11	Inspect walking beams, center (cross) tube, bushings, mounts, load pads, and saddles/caps; replace as needed.	
60.0	Wheel alignment diagnosis, adjustment, and repair--The student will be able to:	
60.01	Identify and diagnose vehicle wandering, pulling, shimmy, hard steering and off-center steering wheel problems; adjust or repair as needed.	P-1
60.02	Check camber; determine needed action.	P-2
60.03	Check caster; adjust as needed.	P-2
60.04	Check and adjust toe settings.	P-1
60.05	Check rear axle(s) alignment (thrust line/centerline) and tracking; adjust or repair as needed.	P-2
60.06	Diagnose turning/Ackerman angle (toe-out-on-turns) problems; determine needed action.	P-3
60.07	Check front axle alignment (centerline); adjust or repair as needed.	P-2
61.0	Wheels and tires diagnosis, service, and repair --The student will be able to:	
61.01	Identify and diagnose tire wear patterns; check tread depth and pressure; determine needed action.	P-1
61.02	Identify and diagnose wheel/tire vibration, shimmy, pounding, hop (tramp) problems; determine needed action.	P-2
61.03	Remove and install steering and drive axle wheel/tier assemblies; torque mounting hardware to specifications with a torque wrench.	P-1
61.04	Inspect tire for proper application, (size, load range, position, and tread design); determine needed action.	P-2
61.05	Inspect wheel/rims for proper application, hand hold alignment, load range, and design; determine needed action.	P-2
61.06	Check operation of tire pressure monitoring system (TPMS); determine needed action if applicable.	P-3
62.0	Frame and coupling diagnosis, service, and repair --The student will be able to:	
62.01	Inspect, service, and/or adjust fifth wheel, pivot pins, bushings, locking mechanisms, and mounting hardware.	P-1
62.02	Inspect and service sliding fifth wheel, tracks, stops, locking systems, air cylinders, springs, lines, hoses, and controls.	P-2

CTE Standards and Benchmarks		Priority Number
62.03	Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage; determine needed repairs.	P-1
62.04	Inspect, install, or repair frame hangers, brackets, and cross members in accordance with manufacturers' recommended procedures.	P-3
62.05	Inspect, repair or replace pintle hooks and draw bars, if applicable.	P-2

Florida Department of Education
Student Performance Standards

Course Number: DIM0108
Occupational Completion Point: H
Diesel Drivetrain Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Drivetrain Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of clutch, transmission, driveshaft, universal joint, and drive axle systems.

For every task in Diesel Drivetrain Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Drivetrain Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

DT Task List:	
P-1 =	**27**
P-2 =	**18**
P-3 =	**12**
Total	**57**

CTE Standards and Benchmarks			Priority Number
63.0	Clutch diagnosis and repair--The student will be able to:		
	63.01	Identify causes of clutch noise, binding, slippage, pulsation, vibration, grabbing, dragging, and chatter problems; determine needed action.	P-1
	63.02	Inspect and adjust clutch linkage, cables, levers, brackets, bushings, pivots, springs, and clutch safety switch (includes push and pull-type assemblies); check pedal height and travel; perform needed action.	P-1
	63.03	Inspect, adjust, repair, and replace hydraulic clutch slave and master cylinders, lines, and hoses; bleed system.	P-2
	63.04	Inspect, adjust, lubricate or replace release (throw-out) bearing, sleeve, bushings, springs, housing, levers, release fork, fork pads, rollers, shafts, and seals.	P-1
	63.05	Inspect, adjust, and replace single-disc clutch pressure plate and clutch disc.	P-1

CTE Standards and Benchmarks		Priority Number
63.06	Inspect, adjust, and replace two-plate clutch pressure plate, clutch discs, intermediate plate, and drive pins/lugs.	P-1
63.07	Inspect and/or replace clutch brake assembly; inspect input shaft and bearing retainer; perform needed action.	P-1
63.08	Inspect, adjust, and replace self-adjusting/continuous-adjusting clutch mechanisms.	P-1
63.09	Inspect and replace pilot bearing.	P-1
63.10	Remove and reinstall flywheel, inspect mounting area on crankshaft, rear main oil seal, and measure crankshaft end play; determine needed action.	P-1
63.11	Inspect flywheel, starter ring gear and measure flywheel face and pilot bore runout; determine needed action.	P-1
63.12	Inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.	P-2
64.0	Transmission diagnosis and repair--The student will be able to:	
64.01	Identify causes of transmission noise, shifting concerns, lockup, jumping-out-of-gear, overheating, and vibration problems; determine needed action.	P-1
64.02	Inspect, test, repair, or replace air shift controls, lines, hoses, valves, regulators, filters, and cylinder assemblies.	P-2
64.03	Inspect and replace transmission mounts, insulators, and mounting bolts.	P-1
64.04	Inspect for leakage and replace transmission cover plates, gaskets, seals, and cap bolts; inspect seal surfaces and vents; repair as needed.	P-1
64.05	Check transmission fluid level and condition; determine needed service; add proper type of lubricant.	P-1
64.06	Inspect, adjust, and replace transmission shift lever, cover, rails, forks, levers, bushings, sleeves, detents, interlocks, springs, and lock bolts/safety wires.	P-2
64.07	Remove and reinstall transmission.	P-1
64.08	Inspect input shaft, gear, spacers, bearings, retainers, and slingers; determine needed action.	P-3
64.09	Inspect transmission oil filters and coolers and related components; replace as needed.	P-2
64.10	Inspect speedometer components; determine needed action.	P-2
64.11	Inspect and adjust power take-off (P.T.O.) assemblies, controls, and shafts; determine needed action.	P-3
64.12	Inspect and test function of reverse light, neutral start, and warning device circuits; determine needed action.	P-1
64.13	Inspect and test transmission temperature gauge, wiring harnesses and sensor/sending unit; determine needed action.	P-2
64.14	Inspect and test operation of automated mechanical transmission and manual electronic shift controls, shift, range and splitter solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU) neutral/in gear and reverse switches, and wiring harnesses; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
64.15	Inspect and test operation of automated mechanical transmission electronic shift selectors, air and electrical switches, displays and indicators, wiring harnesses, and air lines; determine needed action.	P-2
64.16	Use appropriate electronic service tool(s) and procedures to diagnose automated mechanical transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed action.	P-1
64.17	Inspect and test operation of automatic transmission electronic shift controls, shift solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU), neutral/in gear and reverse switches, and wiring harnesses.	P-2
64.18	Inspect and test operation of automatic transmission electronic shift selectors, switches, displays and indicators, wiring harnesses.	P-2
64.19	Use appropriate electronic service tool(s) and procedures to diagnose automatic transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed repairs.	P-3
64.20	Diagnose transmission component failure cause, both before and during disassembly procedures; determine needed action.	
64.21	Inspect, adjust, service, repair, or replace transmission remote shift linkages, brackets, bushings, pivots, and levers.	
64.22	Inspect and adjust main shaft, gears, sliding clutches, washers, spacers, bushings, bearings, auxiliary drive assemblies, retainers, and keys; replace as needed.	
64.23	Inspect countershafts, gears, bearings, retainers, and keys; adjust bearing preload and time multiple countershaft gears; replace as needed.	
64.24	Inspect output shafts, gears, washers, spacers, bearings, retainers, and keys; replace as needed.	
64.25	Inspect and/or replace reverse idler shafts, gears, bushings, bearings, thrust washers, and retainers; check reverse idler gear end play (where applicable).	
64.26	Inspect synchronizer hub, sleeve, keys (inserts), springs, blocking rings, synchronizer plates, blocker pins, and sliding clutches; replace as needed.	
64.27	Inspect transmission cases including surfaces, bores, bushings, pins, studs, and magnets; replace as needed.	
64.28	Inspect transmission lubrication system pumps, troughs, collectors, and slingers; service or replace as needed.	
65.0	Driveshaft and universal joint diagnosis and repair--The student will be able to:	
65.01	Identify causes of driveshaft and universal joint noise and vibration problems; determine needed action.	P-1
65.02	Inspect, service, or replace driveshaft, slip joints, yokes, drive flanges, and universal joints; driveshaft boots and seals, and retaining hardware; check phasing of all shafts.	P-1
65.03	Inspect driveshaft center support bearings and mounts; determine needed action.	P-1
65.04	Measure drive line angles; determine needed action.	P-1
66.0	Drive axle diagnosis and repair--The student will be able to:	

CTE Standards and Benchmarks		Priority Number
66.01	Identify causes of drive axle(s) drive unit noise and overheating problems; determine needed action.	P-2
66.02	Check and repair fluid leaks; inspect and replace drive axle housing cover plates, gaskets, sealants, vents, magnetic plugs, and seals.	P-1
66.03	Check drive axle fluid level and condition; determine needed service; add proper type of lubricant.	P-1
66.04	Remove and replace differential carrier assembly.	P-2
66.05	Inspect and replace differential case assembly including spider gears, cross shaft, side gears, thrust washers, case halves, and bearings.	P-3
66.06	Inspect and replace components of locking differential case assembly.	P-3
66.07	Inspect differential carrier housing and caps, side bearing bores, and pilot (spigot, pocket) bearing bore; determine needed action.	P-3
66.08	Measure ring gear runout; determine needed action.	P-2
66.09	Inspect and replace ring and drive pinion gears, spacers, sleeves, bearing cages, and bearings.	P-3
66.10	Measure and adjust drive pinion bearing preload.	P-3
66.11	Measure and adjust drive pinion depth.	P-3
66.12	Measure and adjust side bearing preload and ring gear backlash.	P-2
66.13	Check and interpret ring gear and pinion tooth contact pattern; determine needed action.	P-2
66.14	Inspect, adjust, or replace ring gear thrust block/bolt.	P-3
66.15	Inspect power divider (inter-axle differential) assembly; determine needed action.	P-3
66.16	Inspect, adjust, repair, or replace air operated power divider (inter-axle differential) lockout assembly including diaphragms, seals, springs, yokes, pins, lines, hoses, fittings, and controls.	P-2
66.17	Inspect, repair, or replace drive axle lubrication system: pump, troughs, collectors, slingers, tubes, and filters.	P-3
66.18	Inspect and replace drive axle shafts.	P-1
66.19	Remove and replace wheel assembly; check rear wheel seal and axle flange gasket for leaks; perform needed action.	P-1
66.20	Identify causes of drive axle wheel bearing noise and check for damage; perform needed action.	P-1
66.21	Inspect and test drive axle temperature gauge, wiring harnesses, and sending unit/sensor; determine needed action.	P-2
66.22	Clean, inspect, lubricate and replace wheel bearings; replace seals and wear rings; inspect and replace retaining hardware; adjust drive axle wheel bearings. Verify end play with dial indicator method	P-1
66.23	Inspect, adjust, repair, or replace planetary gear-type 2-speed axle assembly including: case, idler pinion, pins, thrust washers, sliding clutch gear, shift fork, pivot, seals, cover, and springs.	
66.24	Inspect, repair, or replace 2-speed axle shift control system, speedometer adapters, motors, axle shift units, wires, air lines, and connectors.	

Florida Department of Education
Student Performance Standards

Course Number: DIM0109
Occupational Completion Point: I
Diesel Hydraulics Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Hydraulics Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of hydraulic, pumps, filtration/reservoir, hoses, fittings, connectors, control valves, and actuator systems.

For every task in Diesel Hydraulics Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Hydraulics Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

HY Task List:	
P-1 =	**27**
P-2 =	**5**
P-3 =	**0**
Total	**32**

CTE Standards and Benchmarks		Priority Number
67.0	General hydraulic system diagnosis and repair--The student will be able to:	
67.01	Identify system type (closed and open) and verify proper operation.	P-1
67.02	Read and interpret system diagrams and schematics.	P-1
67.03	Perform system temperature, pressure, flow, and cycle time tests; determine needed action.	P-1
67.04	Verify placement of equipment /component safety labels and placards; determine needed action.	P-1
68.0	Diagnose and repair hydraulic pumps--The student will be able to:	
68.01	Identify system fluid type.	P-1
68.02	Identify causes of pump failure, unusual pump noises, temperature flow, and leakage problems; determine needed action.	P-1

CTE Standards and Benchmarks		Priority Number
	68.03 Determine pump type, rotation, and drive system.	P-1
	68.04 Remove and install pump; prime and/or bleed system.	P-2
	68.05 Inspect pump inlet for restrictions and leaks; determine needed action.	P-2
	68.06 Inspect pump outlet for restrictions and leaks; determine needed action.	P-2
69.0	Diagnose and repair hydraulic filtration/reservoirs (tanks)--The student will be able to:	
	69.01 Identify type of filtration system; verify filter application and flow direction.	P-1
	69.02 Service filters and breathers.	P-1
	69.03 Identify causes of system contamination; determine needed action.	P-2
	69.04 Take a hydraulic oil sample for analysis.	P-1
	69.05 Check reservoir fluid level and condition; determine needed action.	P-1
	69.06 Inspect and repair or replace reservoir, sight glass, vents, caps, mounts, valves, screens, supply and return lines.	P-1
70.0	Diagnose and repair hydraulic hoses, fittings, and connections--The student will be able to:	
	70.01 Diagnose causes of component leakage, damage, and restriction; determine needed action.	P-2
	70.02 Inspect hoses and connections (length, size, routing, bend radii, and protection); repair or replace as needed.	P-1
	70.03 Assemble hoses, tubes, connectors, and fittings in accordance with manufacturers' specifications; use proper procedures to avoid contamination.	P-1
	70.04 Inspect and replace fitting seals and sealants.	P-1
71.0	Diagnose and repair hydraulic control valves--The student will be able to:	
	71.01 Pressure test system safety relief valve; determine needed action.	P-1
	71.02 Perform control valve operating pressure and flow tests; determine needed action.	P-1
	71.03 Inspect, test, and adjust valve controls (electrical/electronic, mechanical, and pneumatic).	P-1
	71.04 Identify causes of control valve leakage problems (internal/external); determine needed action.	P-1
	71.05 Inspect pilot control valve linkages, cables, and PTO controls; adjust, repair, or replace as needed.	P-1
72.0	Diagnose and repair hydraulic actuators--The student will be able to:	
	Comply with manufacturers' and industry accepted safety practices associated with equipment lock out/tag out; pressure line release; implement/support (blocked or resting on ground); and articulated cylinder devices/machinery safety locks.	
	72.01 Identify actuator type (single/double acting, multi-stage/telescopic, and motors).	P-1

CTE Standards and Benchmarks		Priority Number
72.02	Identify the cause of seal failure; determine needed repairs.	P-1
72.03	Identify the cause of incorrect actuator movement and leakage (internal and external); determine needed repairs.	P-1
72.04	Inspect actuator mounting, frame components, and hardware for looseness, cracks, and damage; determine needed action.	P-1
72.05	Remove, repair, and/or replace actuators in accordance with manufacturers' recommended procedures.	P-1
72.06	Inspect actuators for dents, cracks, damage, and leakage; determine needed action.	P-1
72.07	Purge and/or bleed system in accordance with manufacturers' recommended procedures.	P-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.

Special Notes

The purpose of this program is to prepare students for employment as bus, truck and diesel engine mechanics, diesel mechanics helpers, mobile heavy equipment mechanics, construction equipment mechanics, industrial truck mechanics.

The safety guidelines in the student performance standards have been recommended in the ASE Program Certification Standards for Medium/Heavy Truck Technician Training Program administered by National Automotive Technicians Education Foundation (NATEF).

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Automotive Service Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	I470608
CIP Number	0647060405
Grade Level	30, 31
Standard Length	1800 hours
Teacher Certification	AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 nine occupational completion points.

NOTE: It is recommended that students complete **OCP-A (Automobile Services Assistor)** and/or demonstrate mastery of the outcomes in **OCP-A (Automobile Services Assistor)** prior to enrolling in additional Automotive Service Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automobile Services Assistor), is at the discretion of the instructor.**

For institutions using this framework, the National Automotive Technicians Education Foundation (NATEF) highly recommends the Master Automotive Service Technology (MAST) program Certification/Accreditation. Florida Statute (F.S.) 1004.925 – Automotive service technology education programs; certification. – requires all automotive service technology education programs shall be industry certified in accordance with rules adopted by the State Board of Education.

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0014	Automobile Services Assistor	300 hours	49-3023
B	AER0110	Engine Repair Technician	150 hours	49-3023
C	AER0257	Automatic Transmission and Transaxle Technician	150 hours	49-3023
D	AER0274	Manual Drivetrain and Axle Technician	150 hours	49-3023
E	AER0453	Automobile Suspension and Steering Technician	150 hours	49-3023
F	AER0418	Automotive Brake System Technician	150 hours	49-3023
G	AER0360	Automotive Electrical/Electronic System Technician	300 hours	49-3023
H	AER0172	Automotive Heating and Air Conditioning Technician	150 hours	49-3023
I	AER0503	Automotive Engine Performance Technician	300 hours	49-3023

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Automotive Service Technology program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry.
02.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry.
03.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
04.0 Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems.
05.0 Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles.
06.0 Explain and apply proficiently the diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive.
07.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires.
08.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems.
09.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.
10.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling.
11.0 Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Service Technology**
PSAV Number: **I470608**

Course Number: AER0014
Occupational Completion Point: A
Automotive Services Assistor – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Service Assistor course prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study equipment skills, safety regulations, routine maintenance, and customer service.

Abbreviations:
ASE = Required Supplemental Tasks

For every task in Automotive Services Assistor course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks		Priority Number
01.0	Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry--The student will be able to:	
01.01	Identify and apply general shop safety rules and procedures, EPA and OSHA standards.	ASE
01.02	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.	
01.03	Research, identify, and interpret the Federal 'Workers Right To Know Law'.	
01.04	Identify and use appropriate emergency first aid procedures.	
01.05	Utilize and demonstrate safe procedures for handling of tools and equipment.	ASE
01.06	Identify and use proper placement of floor jacks and jack stands.	ASE
01.07	Identify and use proper procedures for safe lift operation.	ASE
01.08	Utilize proper ventilation procedures for working within the lab/shop area.	ASE
01.09	Identify and use proper procedures for safe pit usage.	

CTE Standards and Benchmarks		Priority Number
01.10	Identify marked safety areas.	ASE
01.11	Identify the location and the types of fire extinguishers and other fire safety equipment.	ASE
01.12	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.	ASE
01.13	Identify the location and use of eye wash stations.	ASE
01.14	Identify the location of the posted evacuation routes.	ASE
01.15	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE
01.16	Identify and wear appropriate clothing for lab/shop activities.	ASE
01.17	Secure hair and jewelry for lab/shop activities.	ASE
01.18	Use proper handling procedures for automotive fluids.	
01.19	Identify and describe typical automotive lubricants and lubricant properties.	
01.20	Identify and describe the proper procedure to apply and remove automotive fasteners, including thread inserts.	
01.21	Identify and describe typical automotive seals and gaskets.	
01.22	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE
01.23	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.	
01.24	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)	ASE
01.25	Locate and demonstrate knowledge of Safety Data Sheets (SDS).	ASE
02.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry--The student will be able to:	
02.01	Identify tools and equipment and their appropriate usage in automotive applications.	ASE
02.02	Identify and use standard and metric measurement skills and designation.	ASE
02.03	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE
02.04	Demonstrate proper use of precision-measuring tools (i.e. micrometer, digital/dial-indicator, digital/dial-caliper) and torque methods.	ASE
03.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services --The student will be able to:	
03.01	Identify information needed and the service requested on a repair order.	ASE
03.02	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.	
03.03	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.	ASE

CTE Standards and Benchmarks		Priority Number
03.04	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE
03.05	Review vehicle service history.	ASE
03.06	Use computer and operate keyboard.	
03.07	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE
03.08	Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.	
03.09	Determine the presence of a Tire Pressure Monitoring System (TPMS).	
03.10	Determine the presence of wheel locks.	
03.11	Determine the presence of an air suspension system.	
03.12	Check operation and status of instrument panel warning lights and gauges.	
03.13	Locate and use the Vehicle Identification Number (VIN).	
03.14	Locate and use vehicle information placards, decals, tags, as required.	
03.15	Locate and use paper and electronic manuals.	
03.16	Locate and use technical service bulletins (TSBs).	
03.17	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.	
03.18	Use proper chemicals for cleaning and lubrication.	
03.19	Reset maintenance indicators.	
03.20	Verify status of instrument panel warning lights and gauges.	
03.21	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).	ASE
03.22	Inspect underhood area for leaks, damage, and unusual conditions.	
03.23	Determine fluid type requirements and identify fluid.	
03.24	Check engine oil level and condition; service as required.	
03.25	Check engine coolant level and condition; service as required.	
03.26	Check power steering fluid level and condition; service as required.	
03.27	Check brake fluid level and condition; service as required.	
03.28	Check hydraulic clutch fluid and condition; service as required.	
03.29	Check windshield washer fluid level and condition; service as required.	

CTE Standards and Benchmarks	Priority Number
03.30 Check automatic transmission fluid level and condition; service as required.	
03.31 Inspect undercar area for leaks, damage, and unusual conditions.	
03.32 Check differential/transfer case fluid level; note unusual conditions; service as required.	
03.33 Check manual transmission fluid level; note unusual conditions; service as required.	
03.34 Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear.	
03.35 Lubricate driveline, suspension and steering systems.	
03.36 Inspect cooling system pipes and hoses for wear, damage, and proper routing.	
03.37 Change engine oil and filter.	
03.38 Replace inline fuel filters as applicable.	
03.39 Inspect and replace air filter.	
03.40 Inspect and replace cabin air filter.	
03.41 Inspect, replace and adjust drive belts; inspect tensioners and pulleys.	
03.42 Document observed damage, unusual conditions, and concerns.	
03.43 Visually inspect struts, springs, and related components.	
03.44 Visually inspect stabilizer bar, bushings, brackets, and links.	
03.45 Visually inspect springs, torsion bars, and related components.	
03.46 Visually inspect shock absorbers and related components.	
03.47 Visually inspect constant velocity (CV) axle shaft boots.	
03.48 Identify service considerations when equipped with a Tire Pressure Monitoring System (TPMS).	
03.49 Identify nitrogen-filled tires.	
03.50 Inspect tires; inspect spare and mounting system; check and adjust tire pressure.	
03.51 Rotate tires according to recommendations.	
03.52 Balance wheel and tire assembly.	
03.53 Dismount, inspect, and remount tire on wheel.	
03.54 Repair tire according to industry standards.	
03.55 Reinstall wheel; torque wheel fasteners to specification.	
03.56 Check wheel bearings for play and other signs of wear.	

CTE Standards and Benchmarks	Priority Number
03.57 Perform a visual inspection of a brake drum system.	
03.58 Perform a visual inspection of a disc brake system.	
03.59 Check parking brake operation; check parking brake components for unusual conditions.	
03.60 Document damage, unusual conditions and concerns.	
03.61 Check wiper blades, inserts, and arms; replace wiper blades or inserts.	
03.62 Lubricate door latches and hinges.	
03.63 Inspect fuel cap and seal.	
03.64 Charge battery as needed.	
03.65 Inspect and clean battery hold-downs; repair or replace as needed.	
03.66 Inspect and clean battery and battery cable clamp connections.	
03.67 Perform battery, starting, and charging system tests using appropriate tester.	
03.68 Start vehicle using an auxiliary power supply.	
03.69 Maintain or restore electronic memory functions if required.	
03.70 Test and replace fuses; confirm proper circuit operation.	
03.71 Inspect and replace exterior and courtesy lamps.	
03.72 Document damage, unusual conditions, and concerns.	

Florida Department of Education
Student Performance Standards

Course Number: AER0110
Occupational Completion Point: B
Engine Repair Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Engine Repair Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of general engine, cylinder heads, valve trains, engine block, lubrication, and cooling systems.

Abbreviations:
ER = Engine Repair

For every task in Engine Repair Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

ER Task List:	
	P-1 = 23
	P-2 = 17
	P-3 = 11
Total	**51**

CTE Standards and Benchmarks		**Priority Number**
04.0	Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems--The student will be able to:	
04.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1
04.02	Identify and interpret engine concern; determine necessary action.	
04.03	Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.	P-1
04.04	Verify operation of the instrument panel engine warning indicator.	P-1
04.05	Locate and interpret vehicle and major component identification numbers.	
04.06	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	P-1
04.07	Diagnose engine noises and vibrations; determine necessary action.	
04.08	Diagnose the cause of excessive oil consumption, coolant consumption, unusual engine exhaust color and odor; determine necessary action.	
04.09	Perform engine vacuum tests; determine necessary action.	

CTE Standards and Benchmarks		Priority Number
04.10	Perform cylinder power balance tests; determine necessary action.	
04.11	Remove and replace timing belt; verify correct camshaft timing.	P-1
04.12	Perform cylinder cranking and running compression tests; determine necessary action.	
04.13	Perform cylinder leakage tests; determine necessary action.	
04.14	Remove and reinstall engine in an OBDII or newer vehicle; reconnect all attaching components and restore the vehicle to running condition.	P-3
04.15	Install engine covers using gaskets, seals and sealers as required.	P-1
04.16	Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.	P-1
04.17	Inspect, remove and replace engine mounts.	P-2
04.18	Identify hybrid vehicle internal combustion engine service precautions.	P-3
04.19	Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.	P-1
04.20	Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.	P-1
04.21	Inspect valve springs for squareness and free height comparison; determine necessary action.	P-3
04.22	Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action.	P-3
04.23	Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action.	P-3
04.24	Inspect valves and valve seats; determine necessary action.	P-3
04.25	Check valve spring assembled height and valve stem height; determine necessary action.	P-3
04.26	Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action.	P-2
04.27	Inspect valve lifters; determine necessary action.	P-2
04.28	Adjust valves (mechanical or hydraulic lifters).	P-1
04.29	Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing.	P-1
04.30	Inspect and/or measure camshaft for run out, journal wear and lobe wear.	P-2
04.31	Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
04.32	Establish camshaft position sensor indexing.	P-1
04.33	Remove, inspect, or replace crankshaft vibration damper (harmonic balancer).	P-2

CTE Standards and Benchmarks		Priority Number
04.34	Disassemble engine block; clean and prepare components for inspection and reassembly.	P-1
04.35	Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action.	P-2
04.36	Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action.	P-2
04.37	Deglaze and clean cylinder walls.	P-2
04.38	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
04.39	Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action.	P-1
04.40	Inspect main and connecting rod bearings for damage and wear; determine necessary action.	P-2
04.41	Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action.	P-3
04.42	Inspect and measure piston skirts and ring lands; determine necessary action.	P-2
04.43	Remove and replace piston pin.	
04.44	Determine piston-to-bore clearance.	P-2
04.45	Inspect, measure, and install piston rings.	P-2
04.46	Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.	P-2
04.47	Assemble engine block.	P-1
04.48	Perform oil pressure tests; determine necessary action.	P-1
04.49	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.	P-2
04.50	Perform cooling system pressure and dye test to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and gallery plugs; determine necessary action.	P-1
04.51	Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1
04.52	Inspect and replace engine cooling and heater system hoses.	
04.53	Remove, inspect, and replace thermostat and gasket/seal.	P-1
04.54	Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	P-1
04.55	Inspect, remove and replace water pump.	P-2
04.56	Remove and replace radiator.	P-2

CTE Standards and Benchmarks	Priority Number
04.57 Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.	P-1
04.58 Inspect auxiliary coolers; determine necessary action.	P-3
04.59 Inspect, test, and replace oil temperature and pressure switches and sensors.	P-2
04.60 Perform engine oil and filter change.	P-1
04.61 Identify causes of engine overheating.	P-1

Florida Department of Education
Student Performance Standards

Course Number: AER0257
Occupational Completion Point: C
Automatic Transmission and Transaxle Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automatic Transmission and Transaxle Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics, repair, service, and operation of automatic transmission/transaxles.

Abbreviations:
AT = Automatic Transmission/Transaxle

For every task in Automatic Transmission and Transaxle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

AT Task List:	
P-1 =	**15**
P-2 =	**20**
P-3 =	**4**
Total	**39**

CTE Standards and Benchmarks		**Priority Number**
05.0	Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles -- The student will be able to:	
05.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
05.02	Identify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action.	P-1
05.03	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.	P-1
05.04	Locate and interpret vehicle and major component identification numbers.	
05.05	Diagnose fluid loss and condition concerns; determine necessary action.	P-1
05.06	Check fluid level in a transmission or a transaxle equipped with a dipstick.	P-1
05.07	Check fluid level in a transmission or a transaxle not equipped with a dipstick.	P-1
05.08	Perform pressure tests (including transmissions/transaxles equipped with electronic pressure control); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
05.09	Perform stall test; determine necessary action.	P-3
05.10	Perform lock-up converter system tests; determine necessary action.	P-3
05.11	Diagnose noise and vibration concerns; determine necessary action.	P-2
05.12	Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.	P-1
05.13	Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law).	P-2
05.14	Diagnose electronic transmission/transaxle control systems using appropriate test equipment and service information.	P-1
05.15	Inspect, adjust, and replace manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.	P-2
05.16	Inspect for leakage; replace external seals, gaskets, and bushings.	P-2
05.17	Inspect, test, adjust, repair, or replace electrical/electronic components and circuits, including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses.	P-1
05.18	Diagnose electronic transmission control systems using a scan tool; determine necessary action.	
05.19	Inspect, replace, and align powertrain mounts.	P-2
05.20	Drain and replace fluids and filter(s).	P-1
05.21	Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces.	P-1
05.22	Disassemble, clean, and inspect transmission/transaxle.	P-2
05.23	Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, sleeves, retainers, brackets, check valves/balls, screens, spacers, and gaskets).	P-2
05.24	Inspect servo and accumulator bores, pistons, seals, pins, springs, and retainers; determine necessary action.	P-2
05.25	Assemble transmission/transaxle.	P-2
05.26	Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings.	P-1
05.27	Inspect converter flex (drive) plate, converter attaching bolts, converter pilot, converter pump drive surfaces, converter end play, and crankshaft pilot bore.	P-2
05.28	Install and seat torque converter to engage drive/splines.	
05.29	Inspect, measure, and reseal oil pump assembly and components.	P-2
05.30	Measure transmission/transaxle end play or preload; determine necessary action.	P-1
05.31	Inspect, measure, and replace thrust washers and bearings.	P-2
05.32	Inspect oil delivery circuits, including seal rings, ring grooves, and sealing surface areas, feed pipes, orifices, and check valves/balls.	P-2

CTE Standards and Benchmarks		Priority Number
05.33	Inspect bushings; determine necessary action.	P-2
05.34	Inspect and measure planetary gear assembly components; determine necessary action.	P-2
05.35	Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action.	P-2
05.36	Diagnose and inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action.	P-2
05.37	Inspect, measure, repair, adjust or replace transaxle final drive components.	P-2
05.38	Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; determine necessary action.	P-2
05.39	Measure clutch pack clearance; determine necessary action.	P-1
05.40	Air test operation of clutch and servo assemblies.	P-1
05.41	Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; determine necessary action.	P-2
05.42	Inspect bands and drums; determine necessary action.	
05.43	Describe the operational characteristics of a continuously variable transmission (CVT).	P-3
05.44	Describe the operational characteristics of a hybrid vehicle drive train.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0274
Occupational Completion Point: D
Manual Drivetrain and Axle Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Manual Drivetrain and Axle Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of drive train, clutch, transmission, transaxle, half shaft universal, constant-velocity joint, rear axle, ring and pinion gears, differential case assemble, limited slip differential, drive shaft, and four wheel drive/all-wheel drive.

Abbreviations:
MD = Manual Drivetrain and Axles

For every task in Manual Drivetrain and Axle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

MD Task List:	
	P-1 = 17
	P-2 = 12
	P-3 = 20
Total	**49**

CTE Standards and Benchmarks		**Priority Number**
06.0	Explain and apply proficiently the diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive- -The student will be able to:	
06.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
06.02	Identify and interpret drive train concern; determine necessary action.	P-1
06.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
06.04	Check fluid condition; check for leaks; determine necessary action.	P-1
06.05	Locate and interpret vehicle and major component identification numbers.	
06.06	Diagnose fluid loss, level, and condition concerns; determine necessary action.	
06.07	Drain and refill manual transmission/transaxle and final drive unit.	P-1
06.08	Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
06.09	Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action.	P-1
06.10	Inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action.	
06.11	Check and adjust clutch master cylinder fluid level; check for leaks.	P-1
06.12	Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable).	P-1
06.13	Bleed clutch hydraulic system.	P-1
06.14	Inspect flywheel and ring gear for wear and cracks; determine necessary action.	P-1
06.15	Inspect engine block, core plugs, rear main engine oil seal, clutch (bell) housing, transmission/transaxle case mating surfaces, and alignment dowels; determine necessary action.	
06.16	Measure flywheel run out and crankshaft end play; determine necessary action.	P-2
06.17	Remove and reinstall transmission/transaxle.	
06.18	Disassemble, inspect, clean, and reassemble internal transmission/transaxle components.	P-3
06.19	Inspect transmission/transaxle case, extension housing, case mating surfaces, bores, bushings, and vents; perform necessary action.	
06.20	Diagnose noise concerns through the application of transmission/transaxle powerflow principles.	P-2
06.21	Diagnose hard shifting and jumping out of gear concerns; determine necessary action.	P-2
06.22	Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers.	P-2
06.23	Inspect, replace, and align powertrain mounts.	
06.24	Inspect and replace gaskets, seals, and sealants; inspect sealing surfaces.	
06.25	Remove and replace transaxle final drive.	
06.26	Inspect, adjust, and reinstall shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.	
06.27	Measure end play or preload (shim or spacer selection procedure) on transmission/transaxle shafts; perform necessary action.	
06.28	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.	
06.29	Diagnose transaxle final drive assembly noise and vibration concerns; determine necessary action.	P-3
06.30	Remove, inspect, measure, adjust, and reinstall transaxle final drive pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.	P-3
06.31	Inspect lubrication devices (oil pump or slingers); perform necessary action.	
06.32	Inspect, test, and replace transmission/transaxle sensors and switches.	
06.33	Describe the operational characteristics of an electronically controlled manual transmission/transaxle.	P-3

CTE Standards and Benchmarks		Priority Number
06.34	Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action.	P-1
06.35	Diagnose universal joint noise and vibration concerns; perform necessary action.	P-2
06.36	Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.	P-1
06.37	Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.	P-1
06.38	Inspect, service, and replace shaft center support bearings.	
06.39	Check shaft balance and phasing; measure shaft run out; measure and adjust driveline angles.	P-2
06.40	Diagnose noise and vibration concerns; determine necessary action.	
06.41	Inspect and replace companion flange and pinion seal; measure companion flange run out.	P-2
06.42	Inspect ring gear and measure run out; determine necessary action.	P-3
06.43	Remove, inspect, and reinstall drive pinion and ring gear, spacers, sleeves, and bearings.	P-3
06.44	Measure and adjust drive pinion depth.	P-3
06.45	Measure and adjust drive pinion bearing preload.	P-3
06.46	Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup or shim types).	P-3
06.47	Check ring and pinion tooth contact patterns; perform necessary action.	P-3
06.48	Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.	P-3
06.49	Reassemble and reinstall differential case assembly; measure run out; determine necessary action.	P-3
06.50	Diagnose noise, slippage, and chatter concerns; determine necessary action.	P-3
06.51	Clean and inspect differential housing; check for leaks; inspect housing vent.	P-2
06.52	Check and adjust differential housing fluid level.	P-1
06.53	Drain and refill differential housing.	P-1
06.54	Inspect and reinstall limited slip differential components.	
06.55	Measure rotating torque; determine necessary action.	P-3
06.56	Diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leakage concerns; determine necessary action.	P-2
06.57	Inspect and replace drive axle wheel studs.	P-1
06.58	Remove and replace drive axle shafts.	P-1
06.59	Inspect and replace drive axle shaft seals, bearings, and retainers.	P-2

CTE Standards and Benchmarks		Priority Number
06.60	Measure drive axle flange run out and shaft end play; determine necessary action.	P-2
06.61	Diagnose noise and vibration concerns; determine necessary action.	P-2
06.62	Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.	P-3
06.63	Remove and reinstall transfer case.	
06.64	Disassemble, service, and reassemble transfer case and components.	P-3
06.65	Inspect front-wheel bearings and locking hubs; perform necessary action(s).	P-3
06.66	Check for leaks at drive assembly seals; check vents; check lube level.	P-3
06.67	Diagnose, test, adjust, and replace electrical/electronic components of four-wheel drive systems.	P-3
06.68	Diagnose noise, vibration, and unusual steering concerns; determine necessary action.	P-3
06.69	Identify concerns related to variations in tire circumference and/or final drive ratios.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0453
Occupational Completion Point: E
Automotive Suspension and Steering Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Suspension and Steering Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of general suspension, steering systems, front suspensions, rear suspensions, wheel alignment, and tires.

Abbreviations:
SS = Suspension and Steering

For every task in Automotive Suspension and Steering Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

SS Task List:	
P-1 =	**23**
P-2 =	**22**
P-3 =	**12**
Total	**57**

CTE Standards and Benchmarks		**Priority Number**
07.0	Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires –The student will be able to:	
07.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
07.02	Identify and interpret suspension and steering system concerns; determine necessary action.	P-1
07.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
07.04	Locate and interpret vehicle and major component identification numbers.	
07.05	Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
07.06	Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
07.07	Inspect, remove, and install upper and lower control arms, bushings, shafts, and rebound and jounce bumpers.	P-3
07.08	Inspect, remove and install strut rods and bushings.	P-3

CTE Standards and Benchmarks		Priority Number
07.09	Inspect, remove and install upper and/or lower ball joints (with or without wear indicators).	P-2
07.10	Inspect, remove and install steering knuckle assemblies.	P-3
07.11	Inspect, remove and install short and long arm suspension system coil springs and spring insulators.	P-3
07.12	Inspect, remove and install torsion bars and mounts.	P-3
07.13	Inspect, remove and install front stabilizer bar (sway bar) bushings, brackets, and links.	P-3
07.14	Inspect, remove and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	P-3
07.15	Inspect, remove and install track bar, strut rods/radius arms and related mounts and bushings.	P-3
07.16	Inspect rear suspension system leaf spring(s), bushings, center pins/bolts and mounts.	P-1
07.17	Inspect, remove, and replace shock absorbers; inspect mounts and bushings.	P-1
07.18	Remove, inspect, and service or replace front and rear wheel bearings.	P-1
07.19	Describe the function of the power steering pressure switch.	P-3
07.20	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concern; determine necessary action.	P-1
07.21	Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	P-1
07.22	Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber and toe as required; center steering wheel.	P-1
07.23	Check toe-out-on-turns (turning radius); determine necessary action.	P-2
07.24	Check SAI (steering axis inclination) and included angle; determine necessary action.	P-2
07.25	Check rear wheel thrust angle; determine necessary action.	P-1
07.26	Check for front wheel setback; determine necessary action.	P-2
07.27	Check front and/or rear cradle (sub-frame) alignment; determine necessary action.	P-3
07.28	Reset steering angle sensor.	P-2
07.29	Disable and enable supplemental restraint system (SRS).	P-1
07.30	Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).	P-1
07.31	Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.	P-2
07.32	Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action.	P-2
07.33	Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; perform necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
07.34	Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.	P-2
07.35	Adjust non-rack and pinion worm bearing preload and sector lash.	
07.36	Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.	P-2
07.37	Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed.	P-2
07.38	Determine proper power steering fluid type; inspect fluid level and condition.	P-1
07.39	Flush, fill, and bleed power steering system.	P-2
07.40	Inspect for power steering fluid leakage; determine necessary action.	P-1
07.41	Remove, inspect, replace, and adjust power steering pump drive belt.	P-1
07.42	Remove and reinstall power steering pump.	P-2
07.43	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	P-2
07.44	Inspect and replace power steering hoses and fittings.	P-2
07.45	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	P-2
07.46	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	P-1
07.47	Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action.	P-3
07.48	Inspect electric power-assisted steering.	P-3
07.49	Identify hybrid vehicle power steering system electrical circuits and safety precautions.	P-2
07.50	Inspect tire condition; identify tire wear patterns; check of correct tire size and application (load and speed rating) and adjust air pressure; determine necessary action.	P-1
07.51	Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	P-2
07.52	Rotate tires according to manufacturer’s recommendations.	P-1
07.53	Measure wheel, tire, axle flange, and hub run out; determine necessary action.	P-2
07.54	Diagnose tire pull problems; determine necessary action.	P-2
07.55	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).	P-1
07.56	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	P-2
07.57	Reinstall wheel; torque lug nuts.	
07.58	Inspect tire and wheel assembly for air loss; perform necessary action.	P-1
07.59	Repair tire using internal patch.	P-1
07.60	Identify and test pressure monitor system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lambs.	P-2

CTE Standards and Benchmarks		Priority Number
07.61	Demonstrate knowledge of steps required to remove and replace sensor in a tire pressure monitoring system.	P-1

Florida Department of Education
Student Performance Standards

Course Number: AER0418
Occupational Completion Point: F
Automotive Brake System Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Brake System Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of brake systems, drum brakes, disc brakes, power assist units, electronic brakes, traction, and stability control.

Abbreviations:
BR = Brakes

For every task in Automotive Brake System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

BR Task List:	
	P-1 = 34
	P-2 = 12
	P-3 = 11
Total	**57**

CTE Standards and Benchmarks		**Priority Number**
08.0	Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems--The student will be able to:	
08.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
08.02	Identify and interpret brake system concern; determine necessary action.	P-1
08.03	Describe procedures for performing a road test to check brake system operation; including an antilock brake system (ABS).	P-1
08.04	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
08.05	Install wheel and torque lug nuts.	P-1
08.06	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).	
08.07	Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).	P-1
08.08	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
08.09	Check master cylinder for internal/external leaks and proper operation; determine necessary action.	P-1
08.10	Remove, bench bleed, and reinstall master cylinder.	P-1
08.11	Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.	P-3
08.12	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; check for loose fittings and supports; determine necessary action.	P-1
08.13	Replace brake lines, hoses, fittings, and supports.	P-2
08.14	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	P-2
08.15	Select, handle, store, and fill brake fluids to proper level.	P-1
08.16	Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.	
08.17	Inspect, test, and/or replace components of brake warning light system.	P-3
08.18	Identify components of brake warning light system.	P-2
08.19	Bleed and/or flush brake system.	P-1
08.20	Test brake fluid for contamination.	P-1
08.21	Diagnose poor drum brake stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	P-1
08.22	Remove, clean, inspect, and measure brake drums; determine necessary action.	P-1
08.23	Refinish brake drum and measure final drum diameter; compare with specifications.	P-1
08.24	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	P-1
08.25	Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.	P-2
08.26	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments.	P-2
08.27	Install wheel, torque lug nuts, and make final checks and adjustments associated with drum brakes.	
08.28	Diagnose poor disk brake stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.	P-1
08.29	Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.	P-1
08.30	Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.	P-1
08.31	Remove, inspect, and replace pads and retaining hardware; determine necessary action.	P-1
08.32	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.	
08.33	Lubricate and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	P-1

CTE Standards and Benchmarks		Priority Number
08.34	Clean and inspect rotor; measure rotor thickness, thickness variation, and lateral run out; determine necessary action.	P-1
08.35	Remove and reinstall rotor.	P-1
08.36	Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.	P-1
08.37	Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.	P-1
08.38	Retract and re-adjust caliper piston on an integrated parking brake system.	P-3
08.39	Install wheel, torque lug nuts, and make final checks and adjustments associated with disc brakes.	
08.40	Check brake pad wear indicator; determine necessary action.	P-2
08.41	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations.	P-1
08.42	Check brake pedal travel with, and without engine running to verify proper power booster operation.	P-2
08.43	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.	P-1
08.44	Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action.	P-1
08.45	Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action.	P-3
08.46	Measure and adjust master cylinder pushrod length.	P-3
08.47	Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.	P-3
08.48	Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.	P-1
08.49	Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	P-2
08.50	Check parking brake operation and parking brake indicator light system; determine necessary action.	P-1
08.51	Check operation of brake stop light system.	P-1
08.52	Replace wheel bearing and race.	P-2
08.53	Inspect and replace wheel studs.	P-1
08.54	Remove and reinstall sealed wheel bearing assembly.	P-2
08.55	Identify and inspect electronic brake control system components; determine necessary action.	P-1
08.56	Identify traction control/vehicle stability control system components.	P-3
08.57	Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system ; determine necessary action.	P-2
08.58	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
08.59	Depressurize high-pressure components of the electronic brake control system.	P-3
08.60	Bleed the electronic brake control system hydraulic circuits.	P-1
08.61	Remove and install electronic brake control system electrical/electronic and hydraulic components.	
08.62	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).	P-3
08.63	Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).	P-3
08.64	Describe the operation of a regenerative braking system.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0360
Occupational Completion Point: G
Automotive Electrical/Electronic System Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Electrical/Electronic System Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of electrical/electronics, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.

Abbreviations:
EE = Electrical/Electronic Systems

For every task in Automotive Electrical/Electronic System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EE Task List:	
P-1 =	**36**
P-2 =	**14**
P-3 =	**8**
Total	**58**

CTE Standards and Benchmarks			**Priority Number**
09.0		Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems--The student will be able to:	
	09.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
	09.02	Identify and interpret electrical/electronic system concern; determine necessary action.	
	09.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
	09.04	Locate and interpret vehicle and major component identification numbers.	
	09.05	Diagnose and demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).	P-1
	09.06	Use wiring diagrams during diagnosis (troubleshooting) of electrical/electronic circuit problems.	P-1
	09.07	Demonstrate the proper use of a digital multimeter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.	P-1
	09.08	Check operation of electrical circuits with a test light.	P-1

CTE Standards and Benchmarks		Priority Number
09.09	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.	P-2
09.10	Check operation of electrical circuits using fused jumper wires.	P-1
09.11	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.	P-1
09.12	Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.	P-1
09.13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1
09.14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.	P-1
09.15	Replace electrical connectors and terminal ends.	P-1
09.16	Repair wiring harness.	P-1
09.17	Perform solder repair of electrical wiring.	P-1
09.18	Repair CAN/BUS wiring harness.	P-1
09.19	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	
09.20	Perform battery state-of-charge test; determine necessary action.	P-1
09.21	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.	P-1
09.22	Maintain or restore electronic memory functions.	P-1
09.23	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.	P-1
09.24	Perform slow/fast battery charge according to manufacturer's recommendations.	P-1
09.25	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.	P-1
09.26	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	P-3
09.27	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	P-1
09.28	Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3
09.29	Perform battery conductance test; determine necessary action.	
09.30	Perform starter current draw tests; determine necessary action.	P-1
09.31	Perform starter circuit voltage drop tests; determine necessary action.	P-1
09.32	Inspect and test starter relays and solenoids; determine necessary action.	P-2
09.33	Remove and install starter in a vehicle.	P-1

CTE Standards and Benchmarks		Priority Number
09.34	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2
09.35	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2
09.36	Perform charging system output test; determine necessary action.	P-1
09.37	Diagnose (troubleshoot) charging system for the cause of undercharge, no-charge, and overcharge conditions.	P-1
09.38	Inspect, adjust, or replace generator (alternator) drive belts, check pulleys, and tensioners for wear; check pulley and belt alignment.	P-1
09.39	Remove, inspect, and re-install generator (alternator).	P-1
09.40	Perform charging circuit voltage drop test; determine necessary action.	P-1
09.41	Diagnose (troubleshoot) the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	P-1
09.42	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving light); replace as needed.	P-1
09.43	Aim headlights.	P-2
09.44	Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.	
09.45	Identify system voltage and safety precautions associated with high intensity discharge headlights.	P-2
09.46	Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	P-2
09.47	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.	
09.48	Diagnose (troubleshoot) the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	P-2
09.49	Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action.	
09.50	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.	P-1
09.51	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	P-2
09.52	Diagnose (troubleshoot) windshield washer problems; perform necessary action.	P-2
09.53	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.	P-2
09.54	Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.	
09.55	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.	P-2
09.56	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action	P-3
09.57	Diagnose (troubleshoot) supplemental restraint system (SRS) concerns; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
09.58	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.	P-1
09.59	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.	P-3
09.60	Remove and reinstall door panel.	P-1
09.61	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.	P-3
09.62	Check for module communication (including CAN/BUS systems) using a scan tool.	P-2
09.63	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.	P-3
09.64	Describe the operation of keyless entry/remote-start systems.	P-3
09.65	Verify operation of instrument panel gauges and warning /indicator lights; reset maintenance indicator.	P-1
09.66	Verify windshield wiper and washer operation, replace wiper blades.	P-1
09.67	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0172
Occupational Completion Point: H
Automotive Heating and Air Conditioning Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Heating and Air Conditioning Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling.

Abbreviations:
HA = Heating and Air Conditioning

For every task in Automotive Heating and Air Conditioning Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

HA Task List:	
P-1 =	**17**
P-2 =	**17**
P-3 =	**4**
Total	**38**

CTE Standards and Benchmarks		Priority Number
10.0	Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling--The student will be able to:	
10.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
10.02	Identify and interpret heating and air conditioning problems; determine necessary action.	P-1
10.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
10.04	Locate and interpret vehicle and major component identification numbers.	
10.05	Performance test A/C system; identify problems.	P-1
10.06	Identify abnormal operating noises in the A/C system; determine necessary action.	P-2
10.07	Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.	P-1
10.08	Leak test A/C system; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
10.09	Inspect the condition of refrigerant oil removed from A/C system; determine necessary action.	P-2
10.10	Determine recommended oil and oil capacity for system application.	P-1
10.11	Using a scan tool, observe and record related HVAC data and trouble codes.	P-3
10.12	Diagnose A/C system conditions that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.	P-2
10.13	Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.	P-1
10.14	Inspect, test, service or replace A/C compressor clutch components and/or assembly; check compressor clutch air gap; adjust as needed.	P-2
10.15	Remove, inspect, and reinstall A/C compressor and mountings; determine recommended oil quantity.	P-2
10.16	Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.	P-2
10.17	Determine the need for an additional A/C system filter; perform necessary action.	P-3
10.18	Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action.	P-2
10.19	Inspect A/C condenser for airflow restrictions; perform necessary action.	P-1
10.20	Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine required oil quantity.	P-2
10.21	Remove, inspect, and install expansion valve or orifice (expansion) tube.	P-1
10.22	Inspect evaporator housing water drain; perform necessary action.	P-1
10.23	Determine procedure to remove and reinstall evaporator; determine required oil quantity.	P-2
10.24	Remove, inspect, and reinstall condenser; determine required oil quantity.	P-2
10.25	Diagnose temperature control problems in the heater/ventilation system; (determine PCM) to interpret system operation; determine necessary action.	P-2
10.26	Perform cooling system pressure tests; check coolant condition, inspect and test radiator, cap (pressure/vacuum), coolant recovery tank, and hoses; perform necessary action.	
10.27	Inspect engine cooling and heater system hoses; perform necessary action.	P-1
10.28	Determine procedure to remove, inspect, and reinstall heater core.	P-2
10.29	Inspect, test, and replace thermostat and gasket/seal.	
10.30	Determine coolant condition and coolant type for vehicle application; drain and recover coolant.	
10.31	Flush system; refill system with recommended coolant; bleed system.	
10.32	Inspect and test cooling fan, fan clutch, fan shroud, and air dams; perform necessary action.	
10.33	Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.	

CTE Standards and Benchmarks		Priority Number
10.34	Inspect and test heater control valve(s); perform necessary action.	P-2
10.35	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; perform necessary action.	P-1
10.36	Diagnose A/C compressor clutch control systems; determine necessary action.	P-2
10.37	Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action.	P-2
10.38	Inspect and test A/C-heater control panel assembly; determine necessary action.	P-3
10.39	Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action.	P-3
10.40	Inspect A/C-heater ducts, doors, hoses, cabin filters and outlets; perform necessary action.	P-1
10.41	Identify the source of A/C system odors.	P-2
10.42	Check operation of automatic or semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.	P-2
10.43	Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards.	P-1
10.44	Identify and recover A/C system refrigerant.	P-1
10.45	Recycle, label, and store refrigerant.	P-1
10.46	Evacuate and charge A/C system; add refrigerant oil as required.	P-1

Florida Department of Education
Student Performance Standards

Course Number: AER0503
Occupational Completion Point: I
Automotive Engine Performance Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Engine Performance Technician course prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems.

Abbreviations:
EP = Engine Performance

For every task in Automotive Engine Performance Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EP Task List:
P-1 = 21
P-2 = 17
P-3 = 9
Total 47

CTE Standards and Benchmarks		Priority Number
11.0	Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems --The student will be able to:	
11.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
11.02	Identify and interpret engine performance concern; determine necessary action.	P-1
11.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
11.04	Locate and interpret vehicle and major component identification numbers.	
11.05	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	
11.06	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	P-3
11.07	Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action.	P-2
11.08	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1
11.09	Perform cylinder power balance test; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
11.10	Perform cylinder cranking and running compression tests; determine necessary action.	P-1
11.11	Perform cylinder leakage test; determine necessary action.	P-1
11.12	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-2
11.13	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.	
11.14	Verify engine operating temperature; determine necessary action.	P-1
11.15	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	
11.16	Verify correct camshaft timing.	P-1
11.17	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1
11.18	Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	P-1
11.19	Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action.	P-1
11.20	Check for module communication (including CAN/BUS systems) errors using a scan tool.	
11.21	Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.	P-2
11.22	Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1
11.23	Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.	P-3
11.24	Perform active tests of actuators using a scan tool; determine necessary action.	P-2
11.25	Describe the importance of running all OBDII monitors for repair verification.	P-1
11.26	Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	P-2
11.27	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	
11.28	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1
11.29	Remove and replace spark plugs; inspect secondary ignition components for wear and damage.	P-1
11.30	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3
11.31	Diagnose (troubleshoot) hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
11.32	Check fuel for contaminants; determine necessary action.	P-2
11.33	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	P-1
11.34	Replace fuel filters.	P-1
11.35	Inspect, service or replace air filters, filter housing and intake duct work.	P-1
11.36	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2
11.37	Inspect and test fuel injectors.	P-2
11.38	Verify idle control operation.	P-1
11.39	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action.	P-1
11.40	Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed.	P-1
11.41	Perform exhaust system back-pressure test; determine necessary action.	P-2
11.42	Check and refill diesel exhaust fluid (DEF).	P-3
11.43	Test the operation of turbocharger/supercharger systems; determine necessary action.	P-3
11.44	Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	P-3
11.45	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	P-2
11.46	Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	P-3
11.47	Diagnose emissions and driveability concerns caused by the secondary injection and catalytic converter systems; determine necessary action.	P-2
11.48	Inspect, test, service and replace components of the EGR system, including tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	P-2
11.49	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	P-2
11.50	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	
11.51	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	P-3
11.52	Inspect and test catalytic converter efficiency.	P-2
11.53	Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action.	P-2
11.54	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
11.55	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-3
11.56	Adjust valves on engines with mechanical or hydraulic lifters.	
11.57	Remove and replace timing belt; verify correct camshaft timing.	
11.58	Remove and replace thermostat and gasket/seal.	
11.59	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	
11.60	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	
11.61	Perform engine oil and filter change.	
11.62	Identify hybrid vehicle internal combustion engine service precautions.	

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 identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 9.0. 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: **Aircraft Airframe Mechanics**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Aviation Airframe Mechanics (T640300)

PSAV – Career Preparatory	
Program Number	I470612
CIP Number	0647060700
Grade Level	30, 31
Standard Length	1,440 hours
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 9 Reading: 10

Purpose

The purpose of this program is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. This program prepares students for employment as an Aviation General Maintenance Technician Helper, and an Aviation Maintenance Technician with FAA Airframe Rating.

This program focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

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. The Aviation General Maintenance Technical Helper (AMT0700) course is the core course.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3) (b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AMT0700	Aviation General Maintenance Technician Helper	480 hours	49-3011
 B	AMT0710 AMT0711	Aviation Maintenance Technician with FAA Airframe Rating 1 Aviation Maintenance Technician with FAA Airframe Rating 2	480 hours 480 hours	49-3011 49-3011

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Aircraft Airframe Mechanics program can be found using the following link:

http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part147-appC.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 Perform basic electricity skills.
02.0 Perform basic aircraft drawing skills.
03.0 Demonstrate aircraft weight and balance skills.
04.0 Maintain aircraft fluid lines and fittings.
05.0 Perform aircraft materials and processes skills.
06.0 Perform ground operations and servicing duties.
07.0 Perform cleaning and corrosion-control operations.
08.0 Demonstrate mathematical skills.
09.0 Maintain forms and records.
10.0 Apply principles of basic physics.
11.0 Demonstrate the use of maintenance publications.
12.0 Interpret mechanic privileges and limitations.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate employability skills as an Aviation General Maintenance Technician Helper.
15.0 Maintain wood structures.
16.0 Perform aircraft covering.
17.0 Apply aircraft finishes.
18.0 Repair sheet-metal and non-metallic structures.
19.0 Perform and identify proper welding.
20.0 Perform assembly and rigging.
21.0 Perform airframe inspection.
22.0 Maintain aircraft landing-gear systems.
23.0 Maintain hydraulic and pneumatic power systems.
24.0 Maintain cabin atmosphere control systems.
25.0 Maintain aircraft instrument systems.
26.0 Maintain communication and navigation systems.
27.0 Inspect and repair aircraft fuel systems.
28.0 Inspect and repair aircraft electrical systems.
29.0 Inspect and repair position and warning systems.
30.0 Maintain ice and rain control systems.
31.0 Inspect and repair aircraft fire-protection systems.
32.0 Demonstrate knowledge of Federal Aviation Administration Airframe licensing requirements.
33.0 Demonstrate employability skills as an Aviation Maintenance Technician with a FAA airframe rating.
34.0 Demonstrate an understanding of entrepreneurship related to opportunities in Aviation Airframe Maintenance occupations.

Florida Department of Education
Student Performance Standards

Program Title: **Aircraft Airframe Mechanic**
PSAV Number: **I470612**

Course Number: AMT0700
Occupational Completion Point: A
Aviation General Maintenance Technician Helper – 480 Hours – SOC Code 49-3011

Course Description:
The Aviation General Maintenance Technician Helper course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study basic electricity, aircraft drawing, weight, balance, fluid lines, fittings, materials, processes, operations, services, cleaning, corrosion-control, math, forms, records, basic physics, maintenance publications, communication, and employability skills.

CTE Standards and Benchmarks		FAA FAR Part 147
01.0	Perform basic electricity skills--The student will be able to:	
01.01	Calculate and measure capacitance and inductance.	App. B, A, 1. Level 2
01.02	Calculate and measure electrical power.	App. B, A, 2. Level 2
01.03	Measure voltage, current, resistance, and continuity.	App. B, A, 3. Level 3
01.04	Determine the relationship of voltage, current, and resistance in electrical circuits.	App. B, A, 4. Level 3
01.05	Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.	App. B, A, 5. Level 3
01.06	Inspect and service batteries.	App. B, A, 6. Level 3
01.07	Utilize proper electrical safety procedures.	
02.0	Perform basic aircraft drawing skills--The student will be able to:	
02.01	Use aircraft drawings, symbols, and system schematics.	App. B, B, 7. Level 2
02.02	Draw sketches of repairs and alterations.	App. B, B, 8. Level 3
02.03	Use blueprint information.	App. B, B, 9. Level 3
02.04	Use graphs and charts.	App. B, B, 10. Level 3
03.0	Demonstrate aircraft weight and balance skills--The student will be able to:	
03.01	Weigh aircraft.	App. B, C, 11. Level 2

CTE Standards and Benchmarks		FAA FAR Part 147
	03.02 Perform complete weight-and-balance check and record data.	App. B, C, 12. Level 3
	03.03 Properly configure aircraft for weighing and capable of setting up and using weighing equipment.	
04.0	Maintain aircraft fluid lines and fittings--The student will be able to:	
	04.01 Fabricate and install rigid and flexible fluid lines and fittings.	App. B, D, 13. Level 3
	04.02 Utilize proper personal safety procedures for fluid lines and fittings.	
05.0	Perform aircraft materials and processes skills--The student will be able to:	
	05.01 Identify and select appropriate nondestructive testing methods.	App. B, E, 14. Level 1
	05.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.	App. B, E, 15. Level 2
	05.03 Perform basic heat-testing processes.	App. B, E, 16. Level 1
	05.04 Identify and select aircraft hardware and materials.	App. B, E, 17. Level 3
	05.05 Inspect and check welds.	App. B, E, 18. Level 3
	05.06 Perform precision measurements.	App. B, E, 19. Level 3
	05.07 Perform safety-wiring techniques.	
06.0	Perform ground operations and servicing duties--The student will be able to:	
	06.01 Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards.	App. B, G, 20. Level 2
	06.02 Identify and select fuels.	App. B, G, 21. Level 2
	06.03 Comply with prescribed shop and personal safety procedures.	
07.0	Perform cleaning and corrosion-control operations--The student will be able to:	
	07.01 Identify and select cleaning materials.	App. B, G, 22. Level 3
	07.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. Understand metal strength limitations when removing corrosion.	App. B, G, 23. Level 3
08.0	Demonstrate mathematical skills--The student will be able to:	
	08.01 Extract roots and raise numbers to a given power.	App. B, H, 24. Level 3
	08.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.	App. B, H, 25. Level 3
	08.03 Solve ratio, proportion, and percentage problems.	App. B, H, 26. Level 3
	08.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	App. B, H, 27. Level 3
09.0	Maintain forms and records--The student will be able to:	

CTE Standards and Benchmarks		FAA FAR Part 147
	09.01 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.	App. B, I, 28. Level 3
	09.02 Complete required maintenance forms, records, and inspection reports.	App. B, I, 29. Level 3
10.0	Apply principles of basic physics--The student will be able to:	
	10.01 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.	App. B, J, 30. Level 2
	10.02 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.	
	10.03 Draw conclusions or make inferences from data.	
	10.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.	
	10.05 Understand pressure measurement in terms of PSI, inches of mercury, and KPA.	
11.0	Demonstrate the use of maintenance publications--The student will be able to:	
	11.01 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.	App. B, K, 31. Level 3
	11.02 Read technical data.	App. B, K, 32. Level 3
12.0	Interpret mechanic privileges and limitations--The student will be able to:	
	12.01 Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.	App. B, L, 33. Level 3
	12.02 Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.	
	12.03 Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.	
13.0	Demonstrate appropriate communication skills--The student will be able to:	
	13.01 Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.	
	13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.	
	13.03 Read and follow written and oral instructions.	
	13.04 Answer and ask questions coherently and concisely.	
	13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.	
	13.06 Demonstrate appropriate telephone/communication skills.	
14.0	Demonstrate employability skills as an Aviation General Maintenance Technician Helper--The student will be able to:	

CTE Standards and Benchmarks	FAA FAR Part 147
14.01 Conduct a job search.	
14.02 Secure information about a job.	
14.03 Identify documents that may be required when applying for a job position.	
14.04 Complete a job-application form correctly.	
14.05 Demonstrate job-interview skills.	
14.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.	
14.07 Identify work habits for getting and keeping a job.	
14.08 Explain how to make job changes.	
14.09 Explain the purpose of the Right-to-Know" law.	

Florida Department of Education
Student Performance Standards

Course Number: AMT0710
Occupational Completion Point: B (1 of 2)
Aviation Maintenance Technician with FAA Airframe Rating 1 – 480 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Technician with FAA Airframe Rating (1) course is designed to build on the skills and knowledge students learned in the Aviation General Maintenance Technician Helper course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study wood structures, aircraft covering, finishes, metallic and non-metallic surfaces, basic welding, assembly, rigging, airframe inspection, landing gear, hydraulic and pneumatic systems, atmosphere control, aircraft instruments, communication, and navigation systems.

CTE Standards and Benchmarks		FAA FAR Part 147
15.0	Maintain wood structures--The student will be able to:	
15.01	Service and repair wood structures.	App. C, I, A, 1. Level 1
15.02	Identify wood defects.	App. C, I, A, 2. Level 1
15.03	Inspect wood structures.	App. C, I, A, 3. Level 1
16.0	Perform aircraft covering--The student will be able to:	
16.01	Select and apply fabric and fiberglass covering materials.	App. C, I, B, 4. Level 1
16.02	Inspect, test, and repair fabric and fiberglass.	App. C, I, B, 5. Level 1
17.0	Apply aircraft finishes--The student will be able to:	
17.01	Apply trim, letters, and touch-up paint.	App. C, I, C, 6. Level 1
17.02	Identify and select aircraft finishing materials.	App. C, I, C, 7. Level 2
17.03	Apply finishing materials.	App. C, I, C, 8. Level 2
17.04	Inspect finishes and identify defects.	App. C, I, C, 9. Level 2
17.05	Demonstrate an understanding of common safety practices dealing with paints and solvents.	
18.0	Repair sheet-metal and non-metallic structures--The student will be able to:	
18.01	Select, install, and remove special fasteners for metallic, bonded, and composite structures.	App. C, I, D, 10. Level 2
18.02	Inspect bonded structures.	App. C, I, D, 11. Level 2
18.03	Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.	App. C, I, D, 12. Level 2

CTE Standards and Benchmarks		FAA FAR Part 147
	18.04 Inspect, check, service, and repair windows, doors, and interior furnishings.	App. C, I, D, 13. Level 2
	18.05 Inspect and repair sheet-metal structures.	App. C, I, D, 14. Level 3
	18.06 Install conventional rivets.	App. C, I, D, 15. Level 3
	18.07 Form, lay out, and bend sheet metal.	App. C, I, D, 16. Level 3
19.0	Perform and identify proper welding--The student will be able to:	
	19.01 Weld magnesium and titanium.	App. C, I, E, 17. Level 1
	19.02 Solder stainless steel.	App. C, I, E, 18. Level 1
	19.03 Fabricate tubular structures.	App. C, I, E, 19. Level 1
	19.04 Solder, braze, gas-weld, and arc-weld steel.	App. C, I, E, 20. Level 2
	19.05 Weld aluminum and stainless steel.	App. C, I, E, 21. Level 1
20.0	Perform assembly and rigging--The student will be able to:	
	20.01 Rig rotary-wing aircraft.	App. C, I, F, 22. Level 1
	20.02 Rig fixed-wing aircraft.	App. C, I, F, 23. Level 2
	20.03 Check alignment of structures.	App. C, I, F, 24. Level 2
	20.04 Assemble aircraft components, including flight control surfaces.	App. C, I, F, 25. Level 3
	20.05 Balance, rig, and inspect movable primary and secondary flight control structures.	App. C, I, F, 26. Level 3
	20.06 Jack aircraft.	App. C, I, F, 27. Level 3
21.0	Perform airframe inspection--The student will be able to:	
	21.01 Perform aircraft conformity and airworthiness inspections.	App. C, I, G, 28. Level 3
22.0	Maintain aircraft landing gear systems--The student will be able to:	
	22.01 Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.	App. C, II, A, 29. Level 3
	22.02 Utilize proper safety procedures and equipment when working on aircraft with electrical or hydraulic power on.	
	22.03 Utilize proper safety procedures when working on landing gear struts or wheel and tire assemblies.	
23.0	Maintain hydraulic and pneumatic power systems--The student will be able to:	
	23.01 Repair hydraulic and pneumatic power system components.	App. C, II, B, 30. Level 2
	23.02 Identify and select hydraulic fluids.	App. C, II, B, 31. Level 3
	23.03 Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.	App. C, II, B, 32. Level 3

CTE Standards and Benchmarks		FAA FAR Part 147
24.0	Maintain cabin atmosphere control systems--The student will be able to:	
24.01	Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, pressurization systems, and air-cycle machines.	App. C, II, C, 33. Level 1
24.02	Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, and pressurization systems.	App. C, II, C, 34. Level 1
24.03	Inspect, check, troubleshoot, service and repair oxygen systems.	App. C, II, C, 35. Level 2
25.0	Maintain aircraft instrument systems--The student will be able to:	
25.01	Inspect, check, service, troubleshoot, and repair electronic flight-instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position-indicating systems to include the use of built-in test equipment.	App. C, II, D, 36. Level 1
25.02	Install instruments and perform a static pressure-system leak test.	App. C, II, D, 37. Level 2
26.0	Maintain communication and navigation systems--The student will be able to:	
26.01	Inspect, check, and troubleshoot autopilot, servos, and approach coupling systems.	App. C, II, E, 38. Level 1
26.02	Inspect, check, and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static-discharge devices, aircraft VOR, ILS, LORAN, radar beacon transponders, flight-management computers, and GPWS.	App. C, II, E, 39. Level 1
26.03	Inspect and repair antenna and electronic equipment installations.	App. C, II, E, 40. Level 2

Course Number: AMT0711
Occupational Completion Point: B (2 of 2)
Aviation Maintenance Technician with FAA Airframe Rating 2 – 480 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Technician with FAA Airframe Rating (2) course is designed to build on the skills and knowledge students learned in the Aviation Maintenance Technician with FAA Airframe Rating (1) course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study aircraft fuel, electrical, position, warning, ice and rain control, fire-protection, FAA Airframe licensing requirements, employability skills, and entrepreneurship.

CTE Standards and Benchmarks		FAA FAR Part 147
27.0	Inspect and repair aircraft fuel systems--The student will be able to:	
27.01	Check and service fuel-dump systems	App. C, II, F, 41. Level 1
27.02	Perform fuel-management transfer, re-fueling, and de-fueling	App. C, II, F, 42. Level 1
27.03	Inspect, check, and repair pressure fuel systems	App. C, II, F, 43. Level 1

CTE Standards and Benchmarks		FAA FAR Part 147
	27.04 Repair aircraft fuel-system components.	App. C, II, F, 44. Level 2
	27.05 Inspect and repair fluid quantity-indicating systems.	App. C, II, F, 45. Level 2
	27.06 Troubleshoot, service, and repair fluid pressure and temperature warning systems.	App. C, II, F, 46. Level 2
	27.07 Inspect, check, service, troubleshoot, and repair aircraft fuel systems.	App. C, II, F, 47. Level 3
28.0	Inspect and repair aircraft electrical systems--The student will be able to:	
	28.01 Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors.	App. C, II, G, 48. Level 2
	28.02 Install, check, and service airframe electric wiring, controls, switches, indicators, and protective devices.	App. C, II, G, 49. Level 3
	28.03 Inspect, check, troubleshoot, service, and repair alternating and direct current electrical systems.	App. C, II, G, 50a. Level 3
	28.04 Inspect, check, and troubleshoot constant and integrated speed- drive generators.	App. C, II, G, 50b. Level 1
29.0	Inspect and repair position and warning systems--The student will be able to:	
	29.01 Inspect, check, and service speed and configuration warning systems, electrical brake controls, and antiskid systems.	App. C, II, H, 51. Level 2
	29.02 Inspect, check, troubleshoot, and service landing gear position- indicating and warning systems.	App. C, II, H, 52. Level 3
30.0	Maintain ice and rain control systems--The student will be able to:	
	30.01 Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.	App. C, II, I, 53. Level 2
31.0	Inspect and repair aircraft fire-protection systems--The student will be able to:	
	31.01 Inspect, check, and service smoke and carbon monoxide detection systems.	App. C, II, J, 54. Level 1
	31.02 Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.	App. C, II, J, 55. Level 3
32.0	Demonstrate knowledge of Federal Aviation Administration Airframe licensing requirements--The student will be able to:	
	32.01 Explain the requirements for obtaining FAA authorization to take the FAA Airframe examinations.	
33.0	Demonstrate employability skills as an Aviation Maintenance Technician (AMT) with an FAA Airframe rating--The student will be able to:	
	33.01 Conduct a job search for an AMT with FAA Airframe rating position.	
	33.02 Secure information about the requirements for an AMT with FAA Airframe rating in a particular firm.	
	33.03 Identify documents that may be required when applying for an AMT with FAA Airframe rating position.	
	33.04 Complete a job-application form correctly.	
	33.05 Demonstrate competency in job-interview techniques.	

CTE Standards and Benchmarks		FAA FAR Part 147
	33.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.	
	33.07 Identify or adopt acceptable work habits.	
	33.08 Demonstrate knowledge of how to make job changes appropriately.	
	33.09 Demonstrate acceptable employee health habits.	
	33.10 Demonstrate knowledge of the **"**Right-to-Know" law.	
34.0	Demonstrate an understanding of entrepreneurship related opportunities in Aviation Airframe Maintenance occupations--The student will be able to:	
	34.01 Define entrepreneurship.	
	34.02 Describe the importance of entrepreneurship to Aviation Airframe Maintenance occupations.	
	34.03 List the advantages and disadvantages of Aviation Airframe Maintenance business ownership.	
	34.04 Identify the risks involved in ownership of an Aviation Airframe Maintenance business.	
	34.05 Identify the necessary personal characteristics of a successful Aviation Airframe Maintenance business owner.	
	34.06 Identify the business skills needed to operate an Aviation Airframe Maintenance business efficiently and effectively.	

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.

Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

Special Notes

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral, and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

Common hand tools, portable tools, precision tools, machine tools, torqueing tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician school shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 10.0. 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: **Motorcycle Service Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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 – Career Preparatory	
Program Number	I470616
CIP Number	0647060601
Grade Level	30, 31
Standard Length	1500 hours
Teacher Certification	MOTORCYCLE @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3052 – Motorcycle Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 9 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the motorcycle services technology industry, and demonstrates such elements of the industry as 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 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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	MOM0001	Assembler (Setup)	150 hours	49-3052
B	MOM0002	Parts Clerk	200 hours	49-3052
C	MOM0100	Helper, Mechanic	400 hours	49-3052
D	MOM0400	Motorcycle Mechanic	750 hours	49-3052

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 Recognize personal and industry safety requirements.
02.0 Verify the proper use and care of basic shop tools and equipment.
03.0 Outline the appropriate set-up procedures.
04.0 Show proficiency in performing routine preventative maintenance services.
05.0 Compare and contrast the differences in the measurement systems, fasteners and thread repair.
06.0 Illustrate industry-related math skills.
07.0 Show proficiency in parts inventory identification and repair order processing.
08.0 Perform basic services and minor repairs.
09.0 Perform basic frame and suspension service.
10.0 Perform basic electrical system service.
11.0 Diagnose, service and repair cooling systems.
12.0 Diagnose, repair and recondition basic engine components.
13.0 Apply industry-related science to motorcycle service.
14.0 Diagnose, service and repair frames and suspension components.
15.0 Diagnose, service and repair wheels, tires, and brakes.
16.0 Diagnose, service and repair drive trains.
17.0 Diagnose, service and repair fuel and exhaust systems.
18.0 Troubleshoot and repair electrical-system components.
19.0 Tune up motorcycles.
20.0 Diagnose, repair, and recondition engines.
21.0 Demonstrate the proper use of industry tools and equipment.

Florida Department of Education
Student Performance Standards

Program Title: **Motorcycle Service Technology**
PSAV Number: **I470616**

Course Number: MOM0001
Occupational Completion Point: A
Assembler (Setup) – 150 Hours – SOC Code 49-3052

Course Description:
The Assembler (Setup) course prepares students for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study safety requirements, tools and equipment, set-up procedures, and routine preventative maintenance.

CTE Standards and Benchmarks	
01.0	Recognize personal and industry safety requirements--The student will be able to:
01.01	List the federal and state standards for health and safety, including OSHA and the "Right-to-Know" law.
01.02	Outline the safety requirements for shop organization and management.
01.03	Recognize the safety requirements for the use of industry tools and equipment.
01.04	List the fire-safety precautions.
01.05	Recognize electrical-safety precautions.
02.0	Verify the proper use and care of basic shop tools and equipment--The student will be able to:
02.01	Categorize general and specialized hand tools.
02.02	Examine and use power tools.
02.03	Classify and use fasteners.
02.04	Document proper use of air tools.
02.05	Utilize oxy-acetylene welding outfit for heating, welding, brazing and cutting.
02.06	Use heating devices to perform service procedures.
03.0	Outline the appropriate set-up procedures--The student will be able to:
03.01	Inspect and interpret vehicle identification number information.
03.02	Inspect tires; check and adjust air pressure.
03.03	Check for proper fluid levels.

CTE Standards and Benchmarks	
03.04	Utilize electrical test equipment to isolate defective components and check lamp circuits.
03.05	Inspect and fill battery.
03.06	Clean engine.
03.07	Install cables, hoses and electrical assemblies.
03.08	Inspect cables, connectors, clamps and hold-downs; adjust as necessary.
03.09	Read and interpret a wiring diagram.
03.10	Troubleshoot and repair wiring harnesses.
04.0	Show proficiency in performing routine preventative maintenance services--The student will be able to:
04.01	Compare and contrast typical motorcycle lubricants and lubricant properties.
04.02	Inspect and test head and tail lamp circuits; aim headlights and replace bulbs.
04.03	Inspect battery terminals and the state-of-charge test; perform slow/fast battery charge.
04.04	Inspect and clean battery cables, connectors, clamps and hold-downs; repair or replace as needed.
04.05	Inspect and test fusible links, circuit breakers and fuses; replace as needed.
04.06	Check radiator coolant level (if applicable), test and add coolant.
04.07	Check fluid levels and change fluids and the tightness of the oil filters.

Florida Department of Education
Student Performance Standards

Course Number: MOM0002
Occupational Completion Point: B
Parts Clerk – 200 Hours – SOC Code 49-3052

Course Description:
The Parts Clerk course is designed to build on the skills and knowledge students learned in Assembler (Setup) course for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study measurement systems, fasteners, thread repair, math, parts inventory, and repair ordering.

CTE Standards and Benchmarks	
05.0	Compare and contrast the differences in the measurement systems, fasteners and thread repair--The student will be able to:
05.01	Describe and distinguish the different types of measurement systems.
05.02	Compare and contrast the different types of fasteners.
05.03	Explain the steps of inspecting, cleaning and replacement of broken fasteners.
05.04	Describe the sequence of tightening and torqueing fasteners to specs.
05.05	Compare and contrast the different stress fractures of fasteners
06.0	Illustrate industry-related math skills--The student will be able to:
06.01	Measure tolerance(s) using millimeters and inches.
06.02	Perform metric to SAE and SAE to metric conversions.
06.03	Perform correct measurements using different precise metering tools. T handle measuring tool.
06.04	Perform correct measures using Vernier Calipers.
06.05	Perform correct measures using Micrometers.
07.0	Show proficiency in parts inventory identification and repair order processing--The student will be able to:
07.01	Read and interpret information in parts and service manuals and other technical media.
07.02	Read and understand graphs, charts, diagrams and tables commonly used in the industry.
07.03	Write and process work orders.
07.04	Prepare cost estimates for jobs using service and flat-rate standards.
07.05	Perform basic parts inventory tracking with the latest computer updates.

CTE Standards and Benchmarks
07.06 Interpret and verify complaint; determine needed repairs. If find more than first estimated ask customer if ok to do repairs.

Florida Department of Education
Student Performance Standards

Course Number: MOM0100
Occupational Completion Point: C
Helper, Mechanic – 400 Hours – SOC Code 49-3052

Course Description:
The Helper, Mechanic course is designed to build on the skills and knowledge students learned in Parts Clerk course for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study basic services and minor repairs, basic frame, suspension, electrical, cooling, and engine components.

CTE Standards and Benchmarks	
08.0	Perform basic services and minor repairs--The student will be able to:
08.01	Identify, select and use appropriate replacement parts.
08.02	Clean or replace after inspection of air filtration.
08.03	Service and check batteries, if not charging then replace.
08.04	Service lubrication systems.
08.05	Name the components of air and liquid cooling systems by name and function.
08.06	Remove, remount and balance tires.
08.07	Diagnose, service and repair chain and belt final drive components.
09.0	Perform basic frame and suspension service--The student will be able to:
09.01	Categorize the different front- and rear-suspension systems and explain their operation.
09.02	Compare the parts and functions of different frames and suspension systems.
09.03	Explain how wheels, tires and suspension affect chassis performance and driveability.
09.04	Replace and true a wheel assembly.
09.05	Diagnose and service wheel bearings and seals.
10.0	Perform basic electrical system service--The student will be able to:
10.01	Assess and use basic electrical system test equipment.
10.02	Use basic DC electrical theory to select appropriate test procedures.
10.03	Inspect and test fusible links, circuit breakers and fuses; replace as needed.

CTE Standards and Benchmarks	
	10.04 Check electrical circuits with a test light; determine needed repairs.
	10.05 Troubleshoot and repair battery-operated electronic ignition systems.
	10.06 Troubleshoot and repair magneto-ignition systems.
	10.07 Troubleshoot and repair capacitive-discharge-ignition (CDI) systems.
	10.08 Troubleshoot and repair half-wave and full-wave charging systems.
	10.09 Troubleshoot and repair three-phase charging systems.
	10.10 Troubleshoot and repair electrical starter systems.
	10.11 Troubleshoot and repair Direct-Current (DC) Generators.
	10.12 Troubleshoot and repair Warning systems.
11.0	Diagnose, service, and repair cooling systems--The student will be able to:
	11.01 Categorize the components of air and liquid cooling systems by name and function.
	11.02 Diagnose service and repair air-cooling systems.
	11.03 Diagnose service and repair liquid cooling systems.
12.0	Diagnose, repair and recondition basic engine components--The student will be able to:
	12.01 Explain the engine operating theory.
	12.02 Recondition a two-stroke engine top-end.
	12.03 Recondition a single-cylinder four-stroke engine top-end.
	12.04 Recondition a multi-cylinder four-stroke engine top-end.
	12.05 Rebuild a four-stroke head.
	12.06 Recondition a single-cylinder four-stroke engine bottom-end.
	12.07 Recondition a multi-cylinder four-stroke engine bottom-end.
	12.08 Recondition a two-stroke engine bottom-end.
	12.09 Service a plain-bearing crankshaft.
	12.10 Diagnose and repair oil-delivery systems.

Florida Department of Education
Student Performance Standards

Course Number: MOM0400
Occupational Completion Point: D
Motorcycle Mechanic – 750 Hours – SOC Code 49-3052

Course Description:
The Motorcycle Mechanic course is designed to build on the skills and knowledge students learned in Helper, Mechanic course for entry into the motorcycle service industry. Students explore career opportunities and requirements of a professional motorcycle mechanic. Students study science of motorcycles, frames, suspension systems, wheels, tires, brakes, drive trains, fuel, exhaust systems, troubleshooting and repair of electrical system components, study tune-up, engine reconditioning, and proper use of industry tools/equipment.

CTE Standards and Benchmarks	
13.0	Apply industry-related science to motorcycle service--The student will be able to:
13.01	Explain how temperature extremes, chemical reactions and moisture content affect motorcycle systems.
13.02	Draw conclusions or make inferences from data.
14.0	Diagnose, service, and repair frames and suspension components--The student will be able to:
14.01	Service and repair front suspension.
14.02	Service and repair rear suspension.
14.03	Inspect, remove, and replace frames.
15.0	Diagnose, service, and repair wheels, tires and brakes--The student will be able to:
15.01	Diagnose and repair mechanical disc and drum brake systems and components.
15.02	Diagnose and repair hydraulic disc and drum brake systems and components.
15.03	Diagnose and repair ABS braking systems and other advanced stopping systems.
16.0	Diagnose, service, and repair drive trains--The student will be able to:
16.01	Diagnose, service, and repair primary-drive systems.
16.02	Diagnose, service, and repair clutch assemblies.
16.03	Diagnose, service, and repair transmissions.
16.04	Diagnose, service, and repair shaft drives.
16.05	Diagnose and repair kickstart systems.

CTE Standards and Benchmarks	
17.0	Diagnose, service, and repair fuel and exhaust systems--The student will be able to:
17.01	Identify components and operation of carburetion and fuel-injection systems.
17.02	Diagnose, service, and repair slide-type carburetors.
17.03	Diagnose, service, and repair constant-velocity-type (CV-type) carburetors.
17.04	Diagnose, service, and repair fixed-venturi carburetors.
17.05	Diagnose, service, and repair fuel-injection systems.
17.06	Diagnose service and repair exhaust systems replace necessary components as needed.
17.07	Diagnose, service, and repair other fuel-delivery-system components.
18.0	Troubleshoot and repair electrical-system components--The student will be able to:
18.01	Utilize electrical test equipment to isolate defective components.
18.02	Read and interpret a wiring diagram.
18.03	Troubleshoot and repair wiring harnesses.
18.04	Troubleshoot and repair battery/points ignition systems.
18.05	Troubleshoot and repair battery-operated electronic ignition systems.
18.06	Troubleshoot and repair magneto-ignition systems.
18.07	Troubleshoot and repair capacitive-discharge-ignition (CDI) systems.
18.08	Troubleshoot and repair half-wave and full-wave charging systems.
18.09	Troubleshoot and repair three-phase charging systems.
18.10	Troubleshoot and repair electrical starter systems.
18.11	Troubleshoot and repair direct current (DC) generators.
18.12	Troubleshoot and repair warning systems.
19.0	Tune up motorcycles--The student will be able to:
19.01	Diagnose driveability problems.
19.02	Adjust the cam chain tension.
19.03	Adjust the valve clearances.
19.04	Replace the ignition points, condenser, and spark plugs.
19.05	Check and set the ignition timing.

CTE Standards and Benchmarks	
	19.06 Adjust the carburetor and service the fuel-delivery systems.
	19.07 Service the air-filtration systems.
	19.08 Service and diagnose batteries.
	19.09 Service the lubrication systems.
20.0	Diagnose, repair, and recondition engines--The student will be able to:
	20.01 Explain the engine operating theory.
	20.02 Recondition a single-cylinder four-stroke engine top-end.
	20.03 Recondition a multi-cylinder four-stroke engine top-end.
	20.04 Recondition a two-stroke engine top-end.
	20.05 Rebuild a four-stroke head.
	20.06 Recondition a single-cylinder four-stroke engine bottom-end.
	20.07 Recondition a multi-cylinder four-stroke engine bottom-end.
	20.08 Recondition a two-stroke engine bottom-end.
	20.09 Rebuild a built-up crankshaft.
	20.10 Service a plain-bearing crankshaft.
	20.11 Diagnose and repair electric-starter drive systems.
	20.12 Diagnose and repair oil-delivery systems.
21.0	Demonstrate the proper use of industry tools and equipment--The student will be able to:
	21.01 Utilize oxyacetylene welding outfit for heating, welding, brazing and cutting.
	21.02 Use heating devices to perform service procedures.
	21.03 Recondition cylinders.

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)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 10.0. 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: **Aircraft Powerplant Mechanics**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Aviation Powerplant Mechanics (T640400)

PSAV – Career Preparatory	
Program Number	I470622
CIP Number	0647060800
Grade Level	30, 31
Standard Length	1,440 hours
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 9 Reading: 10

Purpose

The purpose of this program is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. This program prepares students for employment as an Aviation General Maintenance Technician Helper, and an Aviation Maintenance Technician with FAA Powerplant Rating.

This program focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

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. The Aviation General Maintenance Technical Helper (AMT0700) course is the core course.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3) (b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AMT0700	Aviation General Maintenance Technician Helper	480 hours	49-3011
B	AMT0720 AMT0721	Aviation Maintenance Technician with FAA Powerplant Rating 1 Aviation Maintenance Technician with FAA Powerplant Rating 2	480 hours 480 hours	49-3011 49-3011

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Aircraft Powerplant Mechanics program can be found using the following link:

http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part147-appC.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 Perform basic electricity skills.
02.0 Perform basic aircraft drawing skills.
03.0 Demonstrate aircraft weight and balance skills.
04.0 Maintain aircraft fluid lines and fittings.
05.0 Perform aircraft materials and processes skills.
06.0 Perform ground operations and servicing duties.
07.0 Perform cleaning and corrosion control operations.
08.0 Demonstrate mathematical skills.
09.0 Maintain forms and records.
10.0 Apply principles of basic physics and aerodynamics.
11.0 Demonstrate the use of maintenance publications.
12.0 Interpret mechanic privileges and limitations.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate employability skills as an Aviation General Maintenance Technician Helper.
15.0 Perform basic reciprocating engine skills.
16.0 Perform basic turbine engine skills.
17.0 Perform engine inspection.
18.0 Maintain engine instrument systems.
19.0 Maintain engine fire-protection systems.
20.0 Maintain engine electrical systems.
21.0 Maintain lubrication systems.
22.0 Maintain ignition and starting systems.
23.0 Maintain fuel-metering systems.
24.0 Maintain engine fuel systems.
25.0 Maintain induction and engine airflow systems.
26.0 Maintain engine cooling systems.
27.0 Maintain engine exhaust and reverser systems.
28.0 Maintain aircraft propellers.
29.0 Maintain unducted fans.
30.0 Maintain auxiliary power units
31.0 Demonstrate knowledge of FAA Powerplant licensing requirements.
32.0 Demonstrate employability skills for an Aviation Maintenance Technician with a FAA Powerplant rating.
33.0 Demonstrate an understanding of entrepreneurship opportunities in Aviation Powerplant Maintenance occupations.

Florida Department of Education
Student Performance Standards

Program Title: **Aviation Powerplant Mechanic**
PSAV Number: **I470622**

Course Number: AMT0700
Occupational Completion Point: A
Aviation General Maintenance Technician Helper – 480 Hours – SOC Code 49-3011

Course Description:
The Aviation General Maintenance Technician Helper course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study basic electricity, aircraft drawing, weight, balance, fluid lines, fittings, materials, processes, operations, services, cleaning, corrosion-control, math, forms, records, basic physics, maintenance publications, communication, and employability skills.

CTE Standards and Benchmarks		FAA FAR Part 147
01.0	Perform basic electricity skills--The student will be able to:	
01.01	Calculate and measure capacitance and inductance.	App. B, A, 1. Level 2
01.02	Calculate and measure electrical power.	App. B, A, 2. Level 2
01.03	Measure voltage, current, resistance, and continuity.	App. B, A, 3. Level 3
01.04	Determine the relationship of voltage, current, and resistance in electrical circuits.	App. B, A, 4. Level 3
01.05	Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.	App. B, A, 5. Level 3
01.06	Inspect and service batteries.	App. B, A, 6. Level 3
01.07	Utilize proper electrical safety procedures.	
02.0	Perform basic aircraft drawing skills--The student will be able to:	
02.01	Use aircraft drawings, symbols, and system schematics.	App. B, B, 7. Level 2
02.02	Draw sketches of repairs and alterations.	App. B, B, 8. Level 3
02.03	Use blueprint information.	App. B, B, 9. Level 3
02.04	Use graphs and charts.	App. B, B, 10. Level 3
03.0	Demonstrate aircraft weight and balance skills--The student will be able to:	
03.01	Weigh aircraft.	App. B, C, 11. Level 2

CTE Standards and Benchmarks		FAA FAR Part 147
	03.02 Perform complete weight-and-balance check and record data.	App. B, C, 12. Level 3
	03.03 Properly configure aircraft for weighing and capable of setting up and using weighing equipment.	
04.0	Maintain aircraft fluid lines and fittings--The student will be able to:	
	04.01 Fabricate and install rigid and flexible fluid lines and fittings.	App. B, D, 13. Level 3
	04.02 Utilize proper personal safety procedures for fluid lines and fittings.	
05.0	Perform aircraft materials and processes skills--The student will be able to:	
	05.01 Identify and select appropriate nondestructive testing methods.	App. B, E, 14. Level 1
	05.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.	App. B, E, 15. Level 2
	05.03 Perform basic heat-testing processes.	App. B, E, 16. Level 1
	05.04 Identify and select aircraft hardware and materials.	App. B, E, 17. Level 3
	05.05 Inspect and check welds.	App. B, E, 18. Level 3
	05.06 Perform precision measurements.	App. B, E, 19. Level 3
	05.07 Perform safety-wiring techniques.	
06.0	Perform ground operations and servicing duties--The student will be able to:	
	06.01 Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards.	App. B, G, 20. Level 2
	06.02 Identify and select fuels.	App. B, G, 21. Level 2
	06.03 Comply with prescribed shop and personal safety procedures.	
07.0	Perform cleaning and corrosion-control operations--The student will be able to:	
	07.01 Identify and select cleaning materials.	App. B, G, 22. Level 3
	07.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. Understand metal strength limitations when removing corrosion.	App. B, G, 23. Level 3
08.0	Demonstrate mathematical skills--The student will be able to:	
	08.01 Extract roots and raise numbers to a given power.	App. B, H, 24. Level 3
	08.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.	App. B, H, 25. Level 3
	08.03 Solve ratio, proportion, and percentage problems.	App. B, H, 26. Level 3
	08.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	App. B, H, 27. Level 3
09.0	Maintain forms and records--The student will be able to:	

CTE Standards and Benchmarks		FAA FAR Part 147
	09.01 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.	App. B, I, 28. Level 3
	09.02 Complete required maintenance forms, records, and inspection reports.	App. B, I, 29. Level 3
10.0	Apply principles of basic physics--The student will be able to:	
	10.01 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.	App. B, J, 30. Level 2
	10.02 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.	
	10.03 Draw conclusions or make inferences from data.	
	10.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.	
	10.05 Understand pressure measurement in terms of PSI, inches of mercury, and KPA.	
11.0	Demonstrate the use of maintenance publications--The student will be able to:	
	11.01 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.	App. B, K, 31. Level 3
	11.02 Read technical data.	App. B, K, 32. Level 3
12.0	Interpret mechanic privileges and limitations--The student will be able to:	
	12.01 Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.	App. B, L, 33. Level 3
	12.02 Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.	
	12.03 Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.	
13.0	Demonstrate appropriate communication skills--The student will be able to:	
	13.01 Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.	
	13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.	
	13.03 Read and follow written and oral instructions.	
	13.04 Answer and ask questions coherently and concisely.	
	13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.	
	13.06 Demonstrate appropriate telephone/communication skills.	
14.0	Demonstrate employability skills as an Aviation General Maintenance Technician Helper--The student will be able to:	

CTE Standards and Benchmarks	FAA FAR Part 147
14.01 Conduct a job search.	
14.02 Secure information about a job.	
14.03 Identify documents that may be required when applying for a job position.	
14.04 Complete a job-application form correctly.	
14.05 Demonstrate job-interview skills.	
14.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.	
14.07 Identify work habits for getting and keeping a job.	
14.08 Explain how to make job changes.	
14.09 Explain the purpose of the Right-to-Know" law.	

Florida Department of Education
Student Performance Standards

Course Number: AMT0720
Occupational Completion Point: B (1 of 2)
Aviation Maintenance Technician with FAA Powerplant Rating 1 – 480 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Technician with FAA Powerplant Rating (1) course is designed to build on the skills and knowledge students learned in the Aviation General Maintenance Technician Helper course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study reciprocating engines, turbine engines, inspection, instruments, fire-protection, electrical, lubrication, ignition, and starting systems.

CTE Standards and Benchmarks		FAA FAR Part 147
15.0	Perform basic reciprocating engine skills--The student will be able to:	
15.01	Inspect and repair a radial engine.	App. D, I, A, 1. Level 1
15.02	Overhaul a reciprocating engine.	App. D, I, A, 2. Level 2
15.03	Inspect, check, service, and repair reciprocating engines and engine installations.	App. D, I, A, 3. Level 3
15.04	Install, troubleshoot, and remove reciprocating engines.	App. D, I, A, 4. Level 3
16.0	Perform basic turbine engine skills--The student will be able to:	
16.01	Overhaul a turbine engine.	App. D, I, B, 5. Level 2
16.02	Inspect, check, service, and repair turbine engines and turbine engine installations.	App. D, I, B, 6. Level 3
16.03	Install, troubleshoot, and remove turbine engines.	App. D, I, B, 7. Level 3
17.0	Perform engine inspection--The student will be able to:	
17.01	Perform Powerplant conformity and airworthiness inspections.	App. D, I, C, 8. Level 3
18.0	Maintain engine instrument systems--The student will be able to:	
18.01	Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.	App. D, II, A, 9. Level 2
18.02	Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and r.p.m. indicating systems.	App. D, II, A, 10. Level 2
19.0	Maintain engine fire-protection systems--The student will be able to:	
19.01	Inspect, check, service, troubleshoot, and repair engine fire-detection and extinguishing systems.	App. D, II, B, 11. Level 3
20.0	Maintain engine electrical systems--The student will be able to:	

CTE Standards and Benchmarks		FAA FAR Part 147
	20.01 Repair engine electrical system components.	App. D, II, C, 12. Level 2
	20.02 Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.	App. D, II, C, 13. Level 3
21.0	Maintain lubrication systems--The student will be able to:	
	21.01 Identify and select lubricants.	App. D, II, D, 14. Level 2
	21.02 Repair engine lubrication system components.	App. D, II, D, 15. Level 2
	21.03 Inspect, check, service, troubleshoot, and repair engine lubrication systems.	App. D, II, D, 16. Level 3
22.0	Maintain ignition and starting systems--The student will be able to:	
	22.01 Overhaul magneto and ignition harness.	App. D, II, E, 17. Level 2
	22.02 Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.	App. D, II, E, 18. Level 2
	22.03 Inspect, service, troubleshoot, and repair turbine engine electrical starting systems.	App. D, II, E, 19a. Level 3
	22.04 Inspect, service, and troubleshoot turbine engine pneumatic starting systems.	App. D, II, E, 19b. Level 1

Course Number: AMT0721
Occupational Completion Point: B (2 of 2)
Aviation Maintenance Technician with FAA Powerplant Rating 2 – 480 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Technician with FAA Powerplant Rating (2) course is designed to build on the skills and knowledge students learned in the Aviation Maintenance Technician with FAA Powerplant Rating (1) course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study fuel, metering, induction, airflow, cooling, exhaust, reverser, propellers, inductors, auxiliary power units, FAA Powerplant Rating licensing, employability skills, and entrepreneurship.

CTE Standards and Benchmarks		FAA FAR Part 147
23.0	Maintain fuel metering systems--The student will be able to:	
	23.01 Troubleshoot and adjust turbine engine fuel-metering systems and electronic-engine fuel controls.	App. D, II, F, 20. Level 1
	23.02 Overhaul carburetor.	App. D, II, F, 21. Level 1
	23.03 Repair engine fuel metering system components.	App. D, II, F, 22. Level 2
	23.04 Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel-metering systems.	App. D, II, F, 23. Level 3
24.0	Maintain engine fuel systems--The student will be able to:	

CTE Standards and Benchmarks		FAA FAR Part 147
	24.01 Repair engine fuel system components.	App. D, II, G, 24. Level 2
	24.02 Inspect, check, service, troubleshoot, and repair engine fuel systems.	App. D, II, G, 25. Level 3
25.0	Maintain induction and engine airflow systems --The student will be able to:	
	25.01 Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.	App. D, II, H, 26. Level 2
	25.02 Inspect, check, service, troubleshoot, and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.	App. D, II, H, 27. Level 1
	25.03 Inspect, check, service, and repair carburetor air intake and induction manifolds.	App. D, II, H, 28. Level 3
26.0	Maintain engine cooling systems--The student will be able to:	
	26.01 Repair engine cooling system components.	App. D, II, I, 29. Level 2
	26.02 Inspect, check, troubleshoot, service, and repair engine cooling systems.	App. D, II, I, 30. Level 3
27.0	Maintain engine exhaust and reverser systems--The student will be able to:	
	27.01 Repair engine exhaust system components.	App. D, II, J, 31. Level 2
	27.02 Inspect, check, troubleshoot, service, and repair engine exhaust systems.	App. D, II, J, 32a. Level 3
	27.03 Troubleshoot and repair engine thrust reverser systems and related components.	App. D, II, J, 32b. Level 1
28.0	Maintain aircraft propellers--The student will be able to:	
	28.01 Inspect, check, service, and repair propeller synchronizing and ice control systems.	App. D, II, K, 33. Level 1
	28.02 Identify and select propeller lubricants.	App. D, II, K, 34. Level 2
	28.03 Balance propellers.	App. D, II, K, 35. Level 1
	28.04 Repair propeller control system components.	App. D, II, K, 36. Level 2
	28.05 Inspect, check, service, and repair fixed-pitch, constant-speed, feathering propellers, and propeller-governing systems.	App. D, II, K, 37. Level 3
	28.06 Install, troubleshoot, and remove propellers.	App. D, II, K, 38. Level 3
	28.07 Repair aluminum alloy propeller blades.	App. D, II, K, 39. Level 3
29.0	Maintain unducted fans-The student will be able to:	
	29.01 Inspect and troubleshoot unducted fan systems and components.	App. D, II, L, 40. Level 1
30.0	Maintain auxiliary power units-The student will be able to:	
	30.01 Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.	
31.0	Demonstrate knowledge of Federal Aviation Administration Powerplant licensing requirements--The student will be able to:	
	31.01 Explain the requirements for obtaining FAA authorization to take the FAA Powerplant examinations.	
32.0	Demonstrate employability skills for an Aviation Maintenance Technician (AMT) with an FAA Powerplant rating--The student will be able to:	

CTE Standards and Benchmarks		FAA FAR Part 147
	32.01 Conduct a job search for an AMT position.	
	32.02 Secure information about the requirements for an AMT in a particular firm.	
	32.03 Identify documents that may be required when applying for an AMT position.	
	32.04 Complete a job-application form correctly.	
	32.05 Demonstrate competency in job-interview techniques.	
	32.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.	
	32.07 Identify or adopt acceptable AMT work habits.	
	32.08 Demonstrate knowledge of how to make job changes appropriately.	
	32.09 Demonstrate acceptable employee health habits.	
	32.10 Demonstrate knowledge of the "Right-to-Know" law.	
33.0	Demonstrate an understanding of entrepreneurship related to opportunities in Aviation Powerplant Maintenance occupations--The student will be able to:	
	33.01 Define entrepreneurship.	
	33.02 Describe the importance of entrepreneurship to the Aviation Maintenance industry.	
	33.03 List the advantages and disadvantages of Aviation Maintenance business ownership.	
	33.04 Identify the risks involved in ownership of an Aviation Maintenance business.	
	33.05 Identify the necessary personal characteristics of a successful Aviation Maintenance business owner.	
	33.06 Identify the business skills needed to operate an Aviation Maintenance business efficiently and effectively.	

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.

Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

Special Notes

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral, and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

Common hand tools, portable tools, precision tools, machine tools, torqueing tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician school shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 10.0. 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: **Automotive Detailing and Reconditioning**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Automotive Collision Repair and Refinishing (8709000).

PSAV – Career Preparatory	
Program Number	I470623
CIP Number	0647060302
Grade Level	30, 31
Standard Length	450 hours
Teacher Certification	AUTO BODY @7 7G AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	53-7061 – Cleaners of Vehicles and Equipment
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to communication skills, leadership skills, human relations and employability skills, safe and efficient work practices.

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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	ARR0610	Basic Prep, Automotive	150 hours	53-7061
B	ARR0611	Reconditioning Detailer	150 hours	53-7061
C	ARR0612	Automobile Detailer	150 hours	53-7061

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate shop and occupational safety skills.
02.0 Demonstrate proficiency in washing a vehicle.
03.0 Perform vehicle interior cleaning.
04.0 Demonstrate proficiency in reconditioning vehicle paint surfaces.
05.0 Demonstrate proficiency in caring for vinyl tops.
06.0 Degrease and clean engine compartment.
07.0 Perform minor upholstery and vinyl repairs.
08.0 Demonstrate proficiency in applying vinyl pinstripes.
09.0 Demonstrate proficiency in applying window tint.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Detailing and Reconditioning**
PSAV Number: **I470623**

Course Number: ARR0610
Occupational Completion Point: A
Basic Prep, Automotive – 150 Hours – SOC Code 53-7061

Course Description:
The Basic Prep, Automotive course prepares students for entry into the automotive detailing and reconditioning industry. Students explore career opportunities and requirements of a professional auto detailer. Students study occupational safety, washing, and interior cleaning.

CTE Standards and Benchmarks	
01.0	Demonstrate shop and occupational safety skills--The student will be able to:
01.01	Apply shop safety rules and procedures.
01.02	Comply with safety rules regarding chemicals.
01.03	Comply with shop safety rules regarding hand tools and power equipment.
01.04	Apply fire safety rules and procedures.
01.05	Comply with EPA standards regarding use of and disposal of chemicals.
02.0	Demonstrate proficiency in washing a vehicle--The student will be able to:
02.01	Identify the proper supplies needed to wash a vehicle.
02.02	Identify the correct sequence of washing a vehicle.
02.03	Dry the vehicle.
02.04	Inspect the finished vehicle.
03.0	Perform vehicle interior cleaning--The student will be able to:
03.01	Identify the proper supplies and chemicals needed to clean and protect a vehicle interior.
03.02	Vacuum a vehicle interior.
03.03	Shampoo and/or clean vehicle upholstery.
03.04	Apply fabric guard chemicals.
03.05	Apply vinyl dressing and preservative chemicals.

Florida Department of Education
Student Performance Standards

Course Number: ARR0611
Occupational Completion Point: B
Reconditioning Detailer – 150 Hours – SOC Code 53-7061

Course Description:
The Reconditioning Detailer course is designed to build on the skills and knowledge students learned in Basic Prep, Automotive course for entry into the automotive detailing and reconditioning industry. Students explore career opportunities and requirements of a professional auto detailer. Students study vehicle paint surfaces, vinyl tops, engine compartments, and upholstery and vinyl repairs.

CTE Standards and Benchmarks	
04.0	Demonstrate proficiency in reconditioning vehicle paint surfaces--The student will be able to:
04.01	Identify the proper supplies and chemicals needed to recondition vehicle paint surfaces.
04.02	Operate a power buffer.
04.03	Apply rubbing/buffing compound.
04.04	Remove heavy paint oxidation.
04.05	Apply polishing compounds.
04.06	Apply waxes, sealants, and polymers.
04.07	Apply touch-up paint.
04.08	Contamination Removal/Claying
05.0	Demonstrate proficiency in caring for vinyl tops--The student will be able to:
05.01	Identify the proper supplies and chemicals needed to care for vehicle vinyl tops.
05.02	Apply vinyl top cleaners.
05.03	Apply vinyl top dressings.
06.0	Degrease and clean vehicle engine compartment--The student will be able to:
06.01	Identify the proper supplies and chemicals needed to clean and recondition vehicle engine compartment.
06.02	Operate a high-pressure washer.
06.03	Degrease engine and engine compartment.
06.04	Select and apply correct color engine paint.

CTE Standards and Benchmarks	
	06.05 Apply clear engine paint.
	06.06 Inspect belts and hoses.
07.0	Perform minor upholstery and vinyl repairs--The student will be able to:
	07.01 Identify the supplies necessary to perform minor upholstery repair.
	07.02 Repair fabric upholstery.
	07.03 Repair vinyl seat upholstery.
	07.04 Repair vinyl dashboards.

Florida Department of Education
Student Performance Standards

Course Number: ARR0612
Occupational Completion Point: C
Automobile Detailer – 150 Hours – SOC Code 53-7061

Course Description:
The Automobile Detailer course is designed to build on the skills and knowledge students learned in Reconditioning Detailer course for entry into the automotive detailing and reconditioning industry. Students explore career opportunities and requirements of a professional auto detailer. Students study applying vinyl pinstripes, and window tints.

CTE Standards and Benchmarks	
08.0	Demonstrate proficiency in applying vinyl pinstripes--The student will be able to:
08.01	Identify the supplies and materials necessary to pinstripe a vehicle.
08.02	Sketch a vehicle pinstripe layout.
08.03	Apply pinstripes to a vehicle.
08.04	Sketch a multi-color graphic design using vinyl material.
09.0	Demonstrate proficiency in applying window tint--The student will be able to:
09.01	Identify the supplies and materials necessary to apply window tint to a vehicle.
09.02	Comply with local and state regulations regarding application of window tint on motor vehicles.
09.03	Apply window tint on flat glass surfaces.
09.04	Apply window tint to curved glass surfaces.

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)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Heavy Equipment Operation**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	I490202
CIP Number	0649020200
Grade Level	30, 31
Standard Length	1200 hours
Teacher Certification	OPER ENGR @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	47-2073 – Operating Engineers and Other Construction Equipment Operators 53-7021 – Crane and Tower Operators
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 8 Language: 8 Reading: 8

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and skills to operate and maintain a variety of heavy equipment such as crawler tractors, motor graders, scrapers and shovels or cranes. Students training on one machine must complete all related program content.

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 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	TRA0070	Heavy Equipment Maintenance Technician	150 hours	47-2073
B	TRA0086	Tractor Operator	150 hours	47-2073
C	TRA0087 TRA0088	Off-road Equipment Operator 1 Off-road Equipment Operator 2	300 hours 300 hours	47-2073
D	TRA0049	Crane Operator	300 hours	53-7021

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate understanding of procedures.
02.0 Demonstrate understanding of operation and maintenance of mechanical systems and engines.
03.0 Operate pneumatic and crawler -type tractor with attachments.
04.0 Operate a back hoe.
05.0 Operate a motor grader.
06.0 Utilize utility construction equipment as applicable.
07.0 Operate a crane.

Florida Department of Education
Student Performance Standards

Program Title: **Heavy Equipment Operation**
PSAV Number: **I490202**

Course Number: TRA0070
Occupational Completion Point: A
Heavy Equipment Maintenance Technician – 150 Hours – SOC Code 47-2073

Course Description:
The Heavy Equipment Maintenance Technician course prepares students for entry into the Heavy Equipment Operations industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop safety, mechanical systems, and engines.

CTE Standards and Benchmarks	
01.0	Demonstrate understanding of procedures--The student will be able to:
01.01	Apply safety practices during operation of heavy equipment.
01.02	Discuss function of each piece of heavy equipment as appropriate.
01.03	Turn and back-up equipment safely.
01.04	Operate equipment on roadway safely.
02.0	Demonstrate understanding of operation and maintenance of mechanical systems and engines--The student will be able to:
02.01	Perform preventive maintenance on equipment including greasing, changing oil, and replacing filters.
02.02	Perform additional maintenance based on specific equipment needs.
02.03	Safety check equipment prior to operation.

Florida Department of Education
Student Performance Standards

Course Number: TRA0086
Occupational Completion Point: B
Tractor Operator – 150 Hours – SOC Code 47-2073

Course Description:
The Tractor Operator course is designed to build on the skills and knowledge students learned in the Heavy Equipment Maintenance Technician course for entry into the Heavy Equipment Operations industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study pneumatic and crawler-type tractor operations.

CTE Standards and Benchmarks	
03.0	Operate pneumatic and crawler-type tractor with attachments--The student will be able to:
03.01	Move, level, and spread top soil.
03.02	Remove stumps.
03.03	Pile debris for burning.
03.04	Remove and replace dozer blade.
03.05	Remove and replace bucket.
03.06	Attach cutting teeth as needed.
03.07	Safely load dump trucks.

Florida Department of Education
Student Performance Standards

Course Number: TRA0087
Occupational Completion Point: C (1 of 2)
Off-road Equipment Operator 1 – 300 Hours – SOC Code 47-2073

Course Description:
The Off-road Equipment Operator 1 course is designed to build on the skills and knowledge students learned in the Tractor Operator course for entry into the Heavy Equipment Operations industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study back hoe, and motor grader operations.

CTE Standards and Benchmarks	
04.0	Operate back hoe--The student will be able to:
04.01	Dig pit to specified grade.
04.02	Observe for cables, pipes, and underground utilities.
04.03	Dig ditches for drainage and pipes.
04.04	Install bucket teeth to back hoe
05.0	Operate a motor grader--The student will be able to:
05.01	Grade to specific levels.
05.02	Apply use of grading stakes when operating motor grade.
05.03	Build a road-bed.
05.04	Perform blue-top grade (finish).
05.05	Change blade and scarifier teeth on motor grader.

Course Number: TRA0088
Occupational Completion Point: C (2 of 2)
Off-road Equipment Operator 2 – 300 Hours – SOC Code 47-2073

Course Description:
The Off-road Equipment Operator 2 course is designed to build on the skills and knowledge students learned in the Off-road Equipment Operator 1 course for entry into the Heavy Equipment Operations industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study utility construction equipment operation.

CTE Standards and Benchmarks	
06.0	Utilize utility construction equipment as applicable--The student will be able to:
06.01	Operate scraper.
06.02	Operate trencher.
06.03	Operate tar kettle.
06.04	Operate rollers.
06.05	Operate concrete mixer.

Florida Department of Education
Student Performance Standards

Course Number: TRA0049
Occupational Completion Point: D
Crane Operator – 300 Hours – SOC Code 53-7021

Course Description:
The Crane Operator course is designed to build on the skills and knowledge students learned in the Off-road Equipment Operator 1 & 2 courses for entry into the Heavy Equipment Operations industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study crane or alternative equipment operation.

CTE Standards and Benchmarks	
07.0	Operate crane or alternative equipment(operating engineer)--The student will be able to:
07.01	Apply safety procedures.
07.02	Review “Construction Industry Manufactures Association” safety manuals.
07.03	Operate crane with drag bucket, clamshell, and hook. (Optional)
07.04	Load dump truck with crane. (Optional)
07.05	Operate alternative equipment

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

The purpose of this program is to prepare students for initial employment with occupational titles as operating engineers (SOC 47-2073). **Schools may elect to train on heavy equipment unique to their Local employment area in OCP C and D as an instructional option.**

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Heavy Equipment industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Many areas of the state do not have the need to train crane operators. To assist business and industry and provide solutions for students needing training on alternative pieces of equipment; requiring the same number of hours (300), alternative equipment to meet the requirements of Occupational Completion Point D may be used.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 8.0, Language 8.0, and Reading 8.0. 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: **Commercial Vehicle Driving**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	I490205
CIP Number	0649020500
Grade Level	30, 31
Standard Length	320 hours
Teacher Certification	COMM DRIV @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	53-3032 – Heavy and Tractor-Trailer Truck Drivers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: Loading and unloading cargo; reporting delays or accidents on the road; verifying load against shipping papers; and keeping records. The course content should also include instruction in human relations, leadership, communication, and employability skills, and safe, efficient work practices.

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.

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	TRA0080	Tractor Trailer Truck Driver	320 hours	53-3032

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 vehicle safety and accident prevention procedures.
02.0 Comply with vehicle operating regulations.
03.0 Demonstrate proper cargo handling and documentation procedures.
04.0 Demonstrate pre-trip preparation procedures.
05.0 Demonstrate vehicle inspection procedures.
06.0 Perform vehicle maintenance and servicing procedures.
07.0 Demonstrate basic vehicle control procedures.
08.0 Demonstrate backing, coupling and uncoupling skills.
09.0 Demonstrate basic vehicle maneuvers.
10.0 Demonstrate road driving skills.
11.0 Describe hazardous driving skills.
12.0 Demonstrate mathematics knowledge and skills.
13.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas.
14.0 Explain the importance of employability and entrepreneurship skills.
15.0 Obtain a Florida Commercial Vehicle Driver's License by passing written and performance tests.

Florida Department of Education
Student Performance Standards

Program Title: **Commercial Vehicle Driving**
PSAV Number: **I490205**

Course Number: TRA0080
Occupational Completion Point: A
Tractor Trailer Truck Driver – 320 Hours – SOC Code 53-3032

Course Description:
The Tractor Trailer Truck Driver course prepares students for entry into the trucking and logistics industry. Students explore career opportunities and requirements of a professional tractor trailer driver. Students study vehicle safety, accident prevention, operating regulations, cargo handling, documentation procedures, pre-trip preparation, vehicle inspection, maintenance, service, control procedures, backing, coupling, uncoupling, maneuvering, road and hazardous driving skills, math, communication, employability, entrepreneurship, and licensing requirements.

CTE Standards and Benchmarks	
01.0	Describe vehicle safety and accident prevention procedures--The student will be able to:
01.01	Understand, identify and explain the use of vehicle safety equipment.
01.02	Explain the use of fire extinguishers and firefighting procedures..
01.03	Utilize seat belts and personal protection gear appropriate to type of operation.
01.04	Demonstrate safe lifting procedures through use of hands-on labs or through viewing safety video.
01.05	Describe personal safety equipment and procedures.
01.06	Describe actions applicable for vehicle accidents.
01.07	Complete reports in a classroom activity (company, state, federal).
01.08	Identify all information needed for accident reports to the State, the employer and the insurance company.
01.09	Complete an accident report.
01.10	Describe procedures for protecting the scene of an accident.
01.11	Identify types of hazardous cargoes.
01.12	Describe personal liability requirements.
01.13	Identify hazardous road conditions that are a potential threat to the safety of the tractor-trailer driver.
01.14	Describe activities and characteristics of other road users that make them potentially dangerous.
01.15	Describe the potential consequences of excessive speed.

	01.16	Describe the potential consequences of use of drugs or alcohol.
02.0	Understand and comply with vehicle operating regulations--The student will be able to:	
	02.01	Understand and comply with Hours of Service regulations.
	02.02	Maintain a complete, neat and accurate driver's duty status log including discussion of electronic logs.
	02.03	Keep accurate records required by hours of service regulations.
	02.04	Perform mathematical calculations necessary to recap and apply totals to the hours of service regulations.
	02.05	Determine driving hours remaining on a particular day or tour of duty.
	02.06	Understand and comply with applicable United States Department of Transportation regulations.
	02.07	Understand and comply with Florida Department of Transportation regulations.
	02.08	Understand and comply with state and local traffic laws including restrictions on vehicle size and weight.
	02.09	Identify permit requirements.
	02.10	Fully understand and comply with Federal Motor Carrier Safety Administration rules and regulations - Compliance, Safety, and Accountability (CSA) particularly the role of drivers and motor carriers.
03.0	Demonstrate proper cargo handling and documentation procedures--The student will be able to:	
	03.01	Load and unload cargo safely and efficiently.
	03.02	Obtain gross weight and axle weight.
	03.03	Describe cargo load to meet legal weight and safety requirements.
	03.04	Secure cargo using blocking, bracing, packing, rope, cable, chains and strapping.
	03.05	Describe the placement of placards when carrying hazardous materials.
	03.06	Describe procedure for use of common cargo handling equipment, including pallets, jacks, dollies, hand trucks, nets, slings, poles and other equipment.
	03.07	Identify categories of hazardous materials and the need for specialized training to handle hazardous materials.
	03.08	Identify hazardous materials documentation requirements.
	03.09	Verify nature, amount and condition of cargo on both pickup and delivery.
	03.10	Verify information on bill of lading and properly record and report discrepancies and damage to the cargo.
	03.11	Obtain appropriate signatures on delivery receipts and other required forms.
	03.12	Prepare a manifest.
	03.13	Describe the handling of C.O.D. shipments.
	03.14	Verify door seal number against shipping document.
	03.15	Comply with port of entry or exit and other inspection station procedures.

04.0	Demonstrate pre-trip preparation procedures--The student will be able to:
04.01	Check and secure tractor-trailer or vehicle permit.
04.02	Check accident report packets for proper contents.
04.03	Plan a route from one point to another that is optimal in terms of travel time, fuel costs, potential hazards and federal, state and local travel restrictions. Describe the use of manual and contemporary GPS navigation systems.
04.04	Arrange to secure permits required by the nature of the vehicle, its cargo and route to be traveled.
04.05	Arrange a secure place for vehicle on layovers, especially when transporting hazardous materials.
04.06	Demonstrate map-reading skills.
04.07	Estimate travel time and plan rest stops and layovers.
04.08	Estimate fuel consumption and plan fuel stops.
04.09	Estimate expense money and obtain funds and/or credit cards.
05.0	Demonstrate vehicle inspection procedures--The student will be able to:
05.01	Check general appearance and condition of vehicle.
05.02	Check fuel, oil, water levels and automatic transmission fluid level.
05.03	Check signal lights, stop lights and running lights.
05.04	Check tires, rims and suspension.
05.05	Check horn, windshield wipers, mirrors and reflectors.
05.06	Check fifth wheel, trailer hook-up and brake lines.
05.07	Check emergency bi-directional reflective triangles and fire extinguishers.
05.08	Check instruments for normal readings.
05.09	Check steering system, brake action and tractor protection valve.
05.10	Check cargo-blocking, bracing and tie down.
05.11	Perform enroute inspections of mirrors, instrument panel, engine and power train, suspension system and brakes.
05.12	Perform post-trip inspection of vehicle and all systems.
06.0	Perform vehicle maintenance and servicing procedures--The student will be able to:
06.01	Describe function and operation of principle vehicle systems including, engine, engine auxiliary brake, drive train, coupling, suspension and electrical system.
06.02	Check engine fuel, oil, coolant, battery and filters.
06.03	Check tire air pressure.
06.04	Check for proper tire and wheel mounting.

06.05	Drain moisture from air brake supply reservoirs.
06.06	Check brakes.
06.07	Clean and repair lights.
06.08	Change fuses and reset circuit breakers.
06.09	Clean interior and exterior of vehicle.
06.10	Check and replace mud/rain flaps.
06.11	Check and adjust tandem and fifth-wheel slides, if so equipped.
07.0	Demonstrate basic vehicle control procedures--The student will:
07.01	Place transmission in neutral before starting engine.
07.02	Start, warm up and shut down the engine, according to the manufacturer's specifications.
07.03	Build full pressure (90-120 PSI) in air tanks before starting.
07.04	Test parking brake and service brake before starting.
07.05	Coordinate use of accelerator and clutch to achieve proper gear shifts, smooth acceleration and avoid clutch abuse.
07.06	Maintain proper engine RPM while driving.
07.07	Properly modulate air brakes to bring vehicle to a smooth stop.
07.08	Shift up and down through all gears of all major types of conventional transmissions.
07.09	Double clutch and time shift for smooth acceleration and fuel-efficient performance.
07.10	Select proper gear for speed and highway conditions.
07.11	Operate manual, automatic and semiautomatic transmissions as available training equipment allows.
07.12	Coordinate steering, braking and acceleration to take the vehicle through a desired path forward and backward in a straight line.
07.13	Adequately judge the path trailer will take (off tracking) as vehicle negotiates left or right curves and turns.
07.14	Use clutch and gears to maintain proper operating range/power/RPM of the motor while slowing the vehicle.
07.15	Park the vehicle, set brakes and shut off the engine.
07.16	Properly chock/block wheels where and when required.
08.0	Demonstrate backing, coupling and uncoupling skills--The student will:
08.01	Check area before backing.
08.02	Properly utilize guides and mirrors.
08.03	Properly back in straight line and curved paths.
08.04	Properly back into an alley dock.

08.05	Properly Parallel Park.
08.06	Judge side, rear and overhead clearances and path of the trailer.
08.07	Reverse-steer and articulate a vehicle.
08.08	Align the tractor properly to connect with trailer.
08.09	Back and secure the tractor properly into the trailer kingpin without damage.
08.10	Perform tug test against the locking mechanisms and visual checks to make sure coupling is secure.
08.11	Connect electrical and air lines properly.
08.12	Set in-cab air brake controls properly.
08.13	Retract and secure landing gear after coupling is secure.
08.14	Properly uncouple and secure the trailer.
09.0	Demonstrate basic vehicle maneuvers--The student will be able to:
09.01	Make a straight-in approach to an alley.
09.02	Drive forward through an alley for 100 feet.
09.03	Back 100 feet through an alley.
09.04	Make proper straight in approach to multiple curves (serpentine).
09.05	Drive forward through curves (serpentine) while keeping tires inside of line.
09.06	Properly position unit for backing into a loading dock.
09.07	Properly back to a dock – actual or simulated.
09.08	Properly stop unit within three feet (36") from the end of the alley dock.
09.09	Properly enter a weighing platform.
10.0	Demonstrate road driving skills--The student will be able to:
10.01	Carefully enter traffic from parked position.
10.02	Use clutch and gears properly.
10.03	Proceed from a stopped position without rolling backward.
10.04	Use mirrors properly.
10.05	Signal intention to turn well in advance.
10.06	Get into proper lane well in advance of turn.
10.07	Check traffic conditions and turn only when intersection is clear.
10.08	Restrict traffic from passing on right when preparing to complete a right hand turn. Maintain 3 feet or less on right side of vehicle.

10.09	Complete a turn promptly and safely and not impede other traffic.
10.10	Select and shift to proper gear prior to beginning any turn.
10.11	Obey all traffic signals.
10.12	Plan stop in advance and adjust speed correctly.
10.13	Use brakes properly on grades.
10.14	Plan stops far enough in advance to avoid hard braking.
10.15	Stop clear of crosswalks.
10.16	Come to a complete stop at all stop signs.
10.17	Yield right of way at intersections having yield signs.
10.18	Check for cross traffic regardless of traffic signals.
10.19	Enter all intersections prepared to stop if necessary.
10.20	Stop a minimum of 15 feet but not more than 50 feet before railroad grade crossing if stop is necessary.
10.21	Select proper gear to avoid shifting gears on railroad grade crossing.
10.22	Determine sufficient space required for passing.
10.23	Pass only in safe locations.
10.24	Pass on two-lane highway.
10.25	Pass on four or more lane highway.
10.26	Signal lane changes before and after passing.
10.27	Warn driver ahead of intention to pass.
10.28	Pass only when appropriate to avoid impeding other traffic.
10.29	Return to right lane promptly, but only when safe to do so.
10.30	Observe speed limits.
10.31	Adjust speed properly to road, weather and traffic conditions.
10.32	Slow down in advance of curves, danger zones and intersections.
10.33	Maintain consistent speed where possible.
10.34	Yield right of way.
10.35	Allow faster traffic to pass.
10.36	Use horn only when necessary.
10.37	Park only in legally permissible parking areas.

	10.38	Check instruments at regular intervals.
	10.39	Maintain proper engine RPM while driving.
	10.40	Determine minimum front-to-rear distances when following other vehicles.
11.0	Demonstrate hazardous driving skills--The student will be able to:	
	11.01	Describe preparation for operation in cold weather, including removing snow and ice from windows, mirrors, brakes, lights, hand and toeholds, etc.; and installing tire chains when necessary.
	11.02	Demonstrate proper procedure for expelling moisture from the air tanks after each trip.
	11.03	Describe proper procedure for checking ice accumulation on brakes, slack adjuster, air hoses, electrical wiring and radiator shutters during operation.
	11.04	Describe operational adjustments necessary to maintain control in all weather conditions, including speed selection, braking and following distance.
	11.05	Describe procedures to check safe operation of brakes after driving through deep water.
	11.06	Perform proper use of windshield wipers, washers and defrosters to maintain visibility.
	11.07	Observe and evaluate changing road surface conditions.
	11.08	Demonstrate ability for recognizing conditions that produce low traction, including initial rainfall, ice, snow and mud.
	11.09	Describe procedures to avoid skidding and jackknifing.
	11.10	Describe procedures to avoid hydroplaning and describe the road and vehicle conditions that produce it.
	11.11	Describe procedures for mounting and dismounting tire chains.
	11.12	Describe procedures for extricating the vehicle from snow, sand and mud by maneuvering or towing.
	11.13	Demonstrate ability to adjust rate of change in speed and direction to accommodate road conditions to avoid skidding.
	11.14	Describe procedures required to coordinate acceleration and shifting to overcome the resistance of snow, sand and mud.
	11.15	Demonstrate ability to perform checks on brake adjustment prior to mountain driving.
	11.16	Describe procedures required to use right lane or special truck lane going up grades.
	11.17	Describe procedures required to place transmission in appropriate gear for engine braking before starting downgrade.
	11.18	Describe procedures required to use proper braking techniques and maintain proper engine braking before starting downgrades.
	11.19	Describe proper use of truck escape ramp when brakes fail on a downgrade.
	11.20	Describe procedure required for observing temperature gauge frequently when pulling heavy loads up long grades.
	11.21	Describe the effect of vehicle weight and speed upon braking and shifting ability on long downgrades.
	11.22	Identify the meaning and use of percent of grade signs.
	11.23	Demonstrate bringing the truck to a stop in the shortest possible distance while maintaining directional control on a dry surface.

11.24	Describe procedures to make an evasive turn off the roadway and return to the roadway while maintaining directional control.
11.25	Describe procedures to bring the vehicle to a stop in the event of a brake failure.
11.26	Describe procedures to maintain control of the vehicle in the event of a blowout.
11.27	Describe procedures to bring tractor-trailer to a stop in the shortest possible distance while maintaining directional control when operating on a slippery surface.
11.28	Describe procedures to recover from vehicle skids induced by snow, ice, water, oil, sand, wet leaves or other slippery surfaces.
11.29	Describe procedures to counter steer out of a skid in a way that will regain directional control and not produce another skid.
11.30	Describe procedure to operate brakes properly to provide maximum braking without loss of control.
12.0	Demonstrate mathematics knowledge and skills--The students will be able to:
12.01	Demonstrate knowledge of arithmetic operations.
12.02	Analyze and apply data and measurements to solve problems and interpret documents.
13.0	Use oral and written communication skills in creating, expressing and interpreting information and ideas--The students will be able to:
13.01	Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace.
13.02	Locate, organize and reference written information from various sources.
13.03	Interpret verbal and nonverbal cues/behaviors that enhance communication.
13.04	Apply active listening skills to obtain and clarify information.
13.05	Exhibit public relations skills that aid in achieving customer satisfaction.
14.0	Explain the importance of employability and entrepreneurship skills--The students will be able to:
14.01	Identify and demonstrate positive work behaviors needed to be employable.
14.02	Develop personal career plan that includes goals, objectives, and strategies.
14.03	Examine licensing, certification, and industry credentialing requirements.
14.04	Evaluate and compare employment opportunities that match career goals.
14.05	Identify and exhibit traits for retaining employment.
14.06	Identify opportunities and research requirements for career advancement.
14.07	Research the benefits of ongoing professional development.
14.08	Examine and describe entrepreneurship opportunities as a career planning option.
15.0	Obtain a Florida Commercial Vehicle Driver's License by passing written and performance test--The student will be able to:
15.01	Demonstrate competence in performing basic commercial vehicle driving skills utilizing the CDL testing criteria.
15.02	Demonstrate understanding and knowledge of Florida Commercial Vehicle Driving Laws as required, to safely and legally operate a commercial vehicle.

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

The purpose of this program is to prepare students for employment as tractor trailer/truck drivers, (SOC 53-3032).

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Vehicle Driving industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Students entering this program must exhibit a safe driving record, be at least 19 years of age and comply with State and Federal licensing requirements. Instruction will include 1000 miles of road driving under the supervision of a qualified commercial vehicle driver prior to completion of the program. Road driving activities will include experience on two-lane, four-lane, interstate, and city streets and highways. Twenty percent or more of the experience will occur at night on both wet and dry roads. Instruction in driving bob-tail, empty and loaded vehicles will be given.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Commercial Class "B" Driving**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	I490251
CIP Number	0649020502
Grade Level	30, 31
Standard Length	150 hours
Teacher Certification	COMM DRIV @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	53-3033 – Light Truck or Delivery Service Drivers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: operation of Class B vehicles; loading and unloading cargo; reporting delays or accidents on the road; verifying load against shipping papers; and keeping records. The course content should also include instruction in human relations, leadership, communication, and employability skills, and safe, efficient work practices.

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.

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	TRA0084	Truck Driver Heavy Florida Class “B”	150 hours	53-3033

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 vehicle safety and accident prevention procedures.
02.0 Comply with vehicle operating regulations.
03.0 Demonstrate proper cargo handling and documentation procedures.
04.0 Demonstrate pre-trip preparation procedures.
05.0 Demonstrate vehicle inspection procedures.
06.0 Perform vehicle maintenance and servicing procedures.
07.0 Demonstrate basic vehicle control procedures.
08.0 Demonstrate backing.
09.0 Demonstrate basic vehicle maneuvers.
10.0 Demonstrate road driving skills.
11.0 Describe hazardous driving skills.
12.0 Apply concepts learned for obtaining a Florida commercial driver's license (CDL).

Florida Department of Education
Student Performance Standards

Program Title: **Commercial Class "B" Driving**
PSAV Number: **I490251**

Course Number: TRA0084
Occupational Completion Point: A
Truck Driver Heavy Florida Class "B" – 150 Hours – SOC Code 53-3033

Course Description:
The Truck Driver Heavy Florida Class "B" course prepares students for entry into the trucking and logistics industry. Students explore career opportunities and requirements of a professional class "B" truck driver. Students study vehicle safety, accident prevention, operating regulations, cargo handling, documentation procedures, pre-trip preparation, vehicle inspection, maintenance, service, control procedures, backing, maneuvering, road and hazardous driving skills, and licensing requirements.

CTE Standards and Benchmarks	
01.0	Describe vehicle safety and accident prevention procedures--The student will be able to:
01.01	Understand, identify and explain the use of vehicle safety equipment.
01.02	Explain the use of fire extinguishers.
01.03	Utilize seat belts and personal protection gear appropriate to type of operation.
01.04	Describe safe lifting procedures.
01.05	Understand accident reporting requirements (company, state, federal).
01.06	Identify all information needed for accident reports to the State, the employer and the insurance company.
01.07	Complete an accident report.
01.08	Describe procedures for protecting the scene of an accident.
01.09	Identify types of hazardous cargoes.
01.10	Describe liability requirements.
01.11	Identify hazardous road conditions that are a potential threat to the safety of the truck driver.
01.12	Describe activities and characteristics of other road users that make them potentially dangerous.
01.13	Describe the potential consequences of excessive speed.
01.14	Describe the potential consequences of use of drugs or alcohol.
01.15	Describe and demonstrate safety procedures for entering and exiting vehicles.

02.0	Understand and comply with vehicle operating regulations--The student will be able to:
02.01	Understand and comply with Hours of Service regulations.
02.02	Maintain a complete, neat and accurate driver's duty status log including discussion of electronic logs.
02.03	Keep accurate records required by hours of service regulations.
02.04	Perform mathematical calculations necessary to recap and apply totals to the hours of service regulations.
02.05	Determine driving hours remaining on a particular day or tour of duty.
02.06	Fully understand and comply with applicable United States Department of Transportation regulations including Federal Motor Carrier Safety Administration rules and regulations - Compliance, Safety, and Accountability (CSA) particularly the role of drivers and motor carriers.
02.07	Understand and comply with Florida Department of Transportation regulations.
02.08	Understand and comply with state and local traffic laws including restrictions on vehicle size and weight including permits when required.
03.0	Demonstrate proper cargo handling and documentation procedures--The student will be able to:
03.01	Understand legal gross weight and axle weight.
03.02	Describe the placement of placards when carrying hazardous materials.
03.03	Describe procedure for use of common cargo handling equipment, including pallets, jacks, dollies, handtrucks, nets, slings, poles and other equipment.
03.04	Identify categories of hazardous materials and the need for specialized training to handle hazardous materials.
03.05	Identify hazardous materials documentation requirements.
03.06	Verify nature, amount and condition of cargo on both pickup and delivery.
03.07	Verify information on bill of lading and properly record and report discrepancies and damage to the cargo.
03.08	Describe appropriate signatures on delivery receipts and other required forms.
03.09	Prepare a bill of lading.
03.10	Verify door seal number against shipping document.
03.11	Comply with inspection station procedures.
04.0	Demonstrate pre-trip preparation procedures--The student will be able to:
04.01	Check accident report packets for proper contents.
04.02	Plan a route from one point to another that is optimal in terms of travel time, fuel costs, potential hazards and federal, state and local travel restrictions.
04.03	Describe the use of manual and contemporary GPG navigation systems.
04.04	Arrange a secure place for vehicle on layovers, especially when transporting hazardous materials.

	04.05 Demonstrate map reading skills.
	04.06 Estimate travel time and plan rest stops and layovers.
	04.07 Estimate fuel consumption and plan fuel stops.
05.0	Demonstrate vehicle inspection procedures--The student will be able to:
	05.01 Check vehicle for registration and permits.
	05.02 Check general appearance and condition of vehicle.
	05.03 Check fuel, oil, water levels and automatic transmission fluid level, coolant, battery, and filters.
	05.04 Check signal lights, stoplights and running lights.
	05.05 Check tires, rims and suspension.
	05.06 Check horn, windshield wipers, mirrors and reflectors.
	05.07 Check emergency bi-directional reflective triangles and fire extinguishers.
	05.08 Check instruments for normal readings.
	05.09 Check steering system, brake action and tractor protection valve.
	05.10 Check cargo blocking, bracing and tie down.
	05.11 Perform enroute inspections of mirrors, engine and power train, suspension system, tires and brakes.
	05.12 Perform post-trip inspection of vehicle and all systems.
06.0	Perform vehicle maintenance and servicing procedures--The student will be able to:
	06.01 Describe function and operation of principle vehicle systems including, engine, engine auxiliary brake, drive train, coupling, suspension and electrical system.
	06.02 Check engine fuel, oil, coolant, battery and filters.
	06.03 Check tire air pressure.
	06.04 Check for proper tire and wheel mounting.
	06.05 Drain moisture from air brake supply reservoirs.
	06.06 Check brakes.
	06.07 Clean and repair lights.
	06.08 Check fuses and reset circuit breakers.
	06.09 Clean interior and exterior of vehicle.
	06.10 Check mud/rain flaps.
07.0	Demonstrate basic vehicle control procedures--The student will be able to:

07.01	Place transmission in neutral before starting engine.
07.02	Start, warm up and shut down the engine, according to the manufacturer's specifications.
07.03	Build full pressure (120-140 PSI) in air tanks before releasing brakes.
07.04	Test parking brake and service brake before moving/driving vehicle.
07.05	Coordinate use of accelerator and clutch to achieve smooth acceleration and avoid clutch abuse.
07.06	Maintain proper engine RPM while driving.
07.07	Properly modulate air brakes to bring vehicle to a smooth stop.
07.08	Shift up and down through all gears.
07.09	Double clutch non-synchronized transmissions and time shift for smooth and fuel efficient performance.
07.10	Select proper gear for speed and highway conditions.
07.11	Operate automatic and semiautomatic transmissions.
07.12	Coordinate steering, braking and acceleration to take the vehicle through a desired path forward and backward in a straight line.
07.13	Use clutch and gears to maintain proper operating range/power/RPM of the motor while slowing the vehicle.
07.14	Park the vehicle, set brakes and shut off the engine.
07.15	Properly chock/block wheels where and when required.
08.0	Demonstrate backing skills--The student will be able to:
08.01	Check area before backing.
08.02	Properly utilize guides and mirrors.
08.03	Properly back in straight line and curved paths.
08.04	Properly back into an alley dock.
08.05	Properly Parallel Park.
08.06	Judge side, rear and overhead clearances.
09.0	Demonstrate basic vehicle maneuvers--The student will be able to:
09.01	Make a straight-in approach to an alley.
09.02	Drive forward through an alley for 100 feet.
09.03	Properly stop the unit within 12 inches of the end of the alley.
09.04	Back 100 feet through an alley.
09.05	Make proper straight in approach to multiple curves (serpentine).
09.06	Drive forward through curves (serpentine) while keeping tires inside of line.

	09.07	Properly position unit for backing into a loading dock.
	09.08	Properly back to a dock - Actual or Simulated.
	09.09	Properly stop unit within 12 inches of the dock without contacting dock - Actual or Simulated.
	09.10	Describe the proper procedures for navigating a weigh station.
10.0	Demonstrate road driving skills--The student will be able to:	
	10.01	Carefully enter traffic from parked position.
	10.02	Use clutch and gears properly.
	10.03	Proceed from a stopped position without rolling backward.
	10.04	Use mirrors properly.
	10.05	Signal intention to turn well in advance.
	10.06	Get into proper lane well in advance of turn.
	10.07	Check traffic conditions and turn only when intersection is clear.
	10.08	Restrict traffic from passing on right when preparing to complete a right hand turn.
	10.09	Execute a right hand turn maintaining 3 feet or less on right side of vehicle.
	10.10	Complete a turn promptly and safely and not impede other traffic.
	10.11	Select and shift to proper gear prior to beginning any turn.
	10.12	Obey all traffic signals.
	10.13	Plan stop in advance and adjust speed correctly.
	10.14	Use brakes properly on grades.
	10.15	Plan stops far enough in advance to avoid hard braking.
	10.16	Stop clear of crosswalks.
	10.17	Come to a complete stop at all stop signs.
	10.18	Yield right of way at intersections having yield signs.
	10.19	Check for cross traffic regardless of traffic signals.
	10.20	Enter all intersections prepared to stop if necessary.
	10.21	Stop a minimum of 15 feet but not more than 50 feet before railroad grade crossing if stop is necessary.
	10.22	Select proper gear to avoid shifting gears on railroad grade crossing.
	10.23	Determine sufficient space required for passing.
	10.24	Pass only in safe locations.

	10.25	Pass on two-lane highway, only when safe to do so.
	10.26	Pass on four or more lane highway.
	10.27	Signal lane changes before and after passing.
	10.28	Pass only when appropriate to avoid impeding other traffic.
	10.29	Return to right lane promptly, but only when safe to do so.
	10.30	Observe speed limits.
	10.31	Adjust speed properly to road, weather and traffic conditions.
	10.32	Slow down in advance of curves, danger zones and intersections.
	10.33	Maintain consistent speed where possible.
	10.34	Yield right of way.
	10.35	Allow faster traffic to pass.
	10.36	Use horn only when necessary.
	10.37	Park only in legally permissible parking areas.
	10.38	Check instruments at regular intervals.
	10.39	Maintain proper engine RPM while driving.
	10.40	Determine minimum front-to-rear distances when following other vehicles using industry recognized standards.
11.0	Demonstrate hazardous driving skills--The student will be able to:	
	11.01	Describe preparation for operation in cold weather, including removing snow and ice from windows, mirrors, brakes, lights, hand and toe holds, etc; when necessary.
	11.02	Demonstrate proper procedure for expelling moisture from the air tanks after each trip.
	11.03	Describe proper procedure for checking ice accumulation on brakes, slack adjuster, air hoses, electrical wiring during operation.
	11.04	Describe operational adjustments necessary to maintain control in all weather conditions, including speed selection, braking and following distance.
	11.05	Describe procedures to check safe operation of brakes after driving through deep water.
	11.06	Perform proper use of windshield wipers, washers and defrosters to maintain visibility.
	11.07	Observe and evaluate changing road surface conditions.
	11.08	Demonstrate or describe ability for recognizing conditions that produce low traction, including initial rainfall, ice, snow and mud.
	11.09	Describe procedures to avoid skidding.
	11.10	Describe procedures to avoid hydroplaning and describe the road and vehicle conditions that produce it.
	11.11	Describe procedures for extricating the vehicle from snow, sand and mud by maneuvering or towing.

11.12	Demonstrate ability to adjust rate of change in speed and direction to accommodate road conditions to avoid skidding.
11.13	Describe procedures required to coordinate acceleration and shifting to overcome the resistance of snow, sand and mud.
11.14	Demonstrate ability to perform checks on brake adjustment prior to mountain driving.
11.15	Describe procedures required to use right lane or special truck lane going up grades.
11.16	Describe procedures required to place transmission in appropriate gear for engine braking before starting downgrade.
11.17	Describe procedures required to use proper braking techniques and maintain proper engine braking before starting downgrades.
11.18	Describe proper use of truck escape ramp when brakes fail on a downgrade.
11.19	Describe procedure required for observing temperature gauge frequently when pulling heavy loads up long grades.
11.20	Describe the effect of vehicle weight and speed upon braking and shifting ability on long downgrades.
11.21	Identify the meaning and use of percent of grade signs.
11.22	Demonstrate bringing the truck to a stop in the shortest possible distance while maintaining directional control on a dry surface.
11.23	Describe procedures to make an evasive turn off the roadway and return to the roadway while maintaining directional control.
11.24	Describe procedures to bring the vehicle to a stop in the event of a brake failure.
11.25	Describe procedures to maintain control of the vehicle in the event of a blowout.
11.26	Describe procedures to bring truck to a stop in the shortest possible distance while maintaining directional control when operating on a slippery surface.
11.27	Describe procedures to recover from vehicle skids induced by snow, ice, water, oil, sand, wet leaves or other slippery surfaces.
11.28	Describe procedures to countersteer out of a skid in a way that will regain directional control and not produce another skid.
11.29	Describe procedure to operate brakes properly to provide maximum braking without loss of control.
12.0	Apply concepts learned for obtaining a Florida commercial driver's license (CDL)--The student will be able to:
12.01	Demonstrate competence in performing basic commercial vehicle driving skills utilizing the Florida CDL testing criteria.
12.02	Demonstrate understanding and knowledge of Florida Commercial Vehicle Driving Laws as required, to safely and legally operate a commercial vehicle.

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

The purpose of this program is to prepare students for a Florida Class B License Truck Driver Heavy.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Vehicle Driving industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Students entering this program must exhibit a safe driving record, be at least 19 years of age and comply with State and Federal licensing requirements. Instruction will include 200 miles of road driving under the supervision of a qualified commercial vehicle driver prior to completion of the program. Road driving activities will include experience on two-lane, four-lane, interstate, and city streets and highways. Twenty percent or more of the experience will occur at night on both wet and dry roads.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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: **Global Logistics and Supply Chain Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T300100
CIP Number	0652020300
Grade Level	30, 31
Standard Length	600 hours
Teacher Certification	BUS ED 1 LOG TECH 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	11-3071 – Transportation, Storage, and Distribution Managers 43-5071 – Shipping, Receiving, and Traffic Clerks 13-1081 – Logisticians 15-1151 – Computer User Support Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to: the global supply chain, the logistics environment, safety principles, quality control principles, work communication practices, teamwork-workplace behavior- and problem solving, supply chain computer systems, supply chain life cycle, product receiving and stocking, product order processing, product shipment, safe operation and use of equipment, inventory control, safe handling of hazardous materials, customs process/free trade, modes of transportation (air, sea, truck, and rail), dispatch operations, routing and tracking operations, and customer relations.

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

Program Structure

This program is a planned sequence of instruction consisting of four occupational completion points.

Students who successfully complete Information Technology Assistant (OTA0040) may be used as an equivalent substitute for **Material Handler (Course Number - TRA0181)**.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	TRA0180	Packer	150 hours	11-3071
B	TRA0181	Material Handler	150 hours	15-1151
C	TRA0182	Shipping, Receiving and Traffic Clerk	150 hours	43-5071
D	TRA0183	Logistics Technician	150 hours	13-1081

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate an understanding of global logistics and supply chain
02.0 Demonstrate an understanding of transportation systems
03.0 Demonstrate professional communication skills
04.0 Demonstrate customer service skills
05.0 Demonstrate knowledge and skill of information technology applications related to logistics and supply chain management.
06.0 Demonstrate knowledge and skill of common software applications.
07.0 Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication skills utilizing word processing applications.
08.0 Demonstrate knowledge and skill in using technology to enhance communication skills utilizing presentation applications.
09.0 Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication utilizing spreadsheet and database applications.
10.0 Demonstrate knowledge and skill in using technology to enhance communication skills utilizing electronic mail.
11.0 Demonstrate proficiency using computer networks, internet, and online databases to facilitate collaborative communication.
12.0 Develop an awareness of emerging technologies.
13.0 Investigate individual assessment and job/career exploration and individual career planning that reflect the transition from school to work, lifelong learning, and personal and professional goals.
14.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
15.0 Demonstrate an understanding of warehouse operations
16.0 Demonstrate an understanding of storage and control operations
17.0 Demonstrate an understanding of protection skills
18.0 Demonstrate an understanding of economics
19.0 Demonstrate an understanding of career readiness
20.0 Demonstrate employability skills
21.0 Demonstrate competencies in a specific career
22.0 Demonstrate career acquisition
23.0 Demonstrate career retention
24.0 Demonstrate integrated learning and life skills
25.0 Demonstrate technology and information

Florida Department of Education
Student Performance Standards

Program Title: **Global Logistics and Supply Chain Technology**
PSAV Number: **T300100**

Course Number: TRA0180
Occupational Completion Point: A
Packer – 150 Hours – SOC Code 11-3071

Course Description:
The Packer course prepares students for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes beginning skills key to the success of working in the logistics and supply chain industry. Students study and gain a basic understanding of global logistics and supply chain technology, transportation systems, communication skills, and customer service skills.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of global logistics and supply chain--The student will be able to:
01.01	Discuss the history, career fields, and benefits of the global supply chain industry.
01.02	Describe principal elements of the logistics environment and logistics systems.
01.03	Explore career pathways within global logistics and supply chain.
01.04	Explain ways in which handling of product throughout supply chain logistics affects company's viability and profitability.
01.05	Define basic principles of cost effectiveness throughout supply chain logistics.
01.06	Define basic principles of just-in-time purchasing and inventory control.
01.07	Identify major security requirements applicable to the logistics environment.
01.08	Cite examples of environmental and financial impacts of logistics activities.
01.09	Describe the alignment between the supply chain strategy and business strategy.
01.10	Define basic principles of customs, free trade and international issues in Supply Chain Management.
02.0	Demonstrate an understanding of transportation systems--The student will be able to:
02.01	Identify various transportation modes.
02.02	Describe and contrast the different modes of transportation and their advantages/disadvantages.
02.03	List the main considerations in determining the best mode.
02.04	Explain how to use the information on performance and costs for mode selection to enhance rapid decision making.

CTE Standards and Benchmarks	
	02.05 Give examples of transportation documentation, dispatch, routing and tracking.
	02.06 Describe and assess global freight transportation systems.
	02.07 Describe the government's involvement in transportation and explain freight transportation laws, regulations, and policies.
	02.08 Determine which transportation method is most appropriate for various situations.
03.0	Demonstrate professional communication skills--The student will be able to:
	03.01 Show effective methods for communications between shifts.
	03.02 Identify effective communications to both internal and external customers.
	03.03 Identify ways to elicit clear statements of customer requirements and specifications.
	03.04 Provide examples of effective written communications in logistics/supply chain workplace.
	03.05 Provide examples of effective oral communications in logistics/supply chain workplace.
	03.06 Demonstrate an understanding of teamwork and good professional workplace behavior to solve problems.
	03.07 Describe a high-performance team.
	03.08 List characteristics of an effective team member.
	03.09 Explain ways to set team goals.
	03.10 Identify use of team environment to solve problems and resolve conflicts.
	03.11 Describe typical requirements for good workplace conduct.
	03.12 Read and comprehend technical and non-technical reading assignments related to course content, including, books, magazines and electronic sources.
	03.13 Use listening, speaking, telecommunication and nonverbal skills and strategies to communicate effectively with supervisors, co-workers, and customers.
	03.14 Apply the writing process to the creation of appropriate documents following designated business formats. (e.g., note taking, research, MLA/APA)
	03.15 Demonstrate an awareness of project management concepts and tools. (e.g., timelines, deadlines, resource allocation, time management, delegation of tasks, collaboration)
04.0	Demonstrate customer service skills--The student will be able to:
	04.01 Exhibit acceptable workplace dress or attire.
	04.02 Exhibit punctuality, initiative, courtesy, loyalty, and honesty.
	04.03 Use a personality inventory for personal improvement.
	04.04 Exhibit the ability to get along with others.

CTE Standards and Benchmarks	
04.05	Discuss the importance of human relations.
04.06	Develop and demonstrate the unique human relations skills needed for successful entry and progress in the customer service occupations or marketing occupations selected as a career objective.
04.07	Differentiate between an acceptable and an unacceptable code of business ethical conduct.

Florida Department of Education
Student Performance Standards

Course Number: TRA0181
Occupational Completion Point: B
Material Handler – 150 Hours – SOC Code 11-3071

Course Description:
The Material Handler course is designed to build on the skills and knowledge students learned in the Packer course for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes knowledge and skills of information technology applications, common software applications, word processing, presentation, spreadsheet, and database applications. Additionally, content knowledge and skills related to electronic communication methods, understanding computer networking, awareness of emerging technologies, college and career readiness, and appropriate leadership techniques.

CTE Standards and Benchmarks	
05.0	Demonstrate knowledge and skill of information technology applications related to logistics and supply chain management. – The student will be able to:
05.01	Describe the impact of technology on society.
05.02	Develop keyboarding skills to enter and manipulate text and data.
05.03	Explain main uses of computer systems by front-line workers.
05.04	Identify technologies used to capture and store logistics information.
05.05	Explain the concepts and use of various information technologies in logistics.
05.06	Research, describe, access, and evaluate Internet-based business models.
05.07	Describe and use current and emerging computer technologies and software to perform business tasks.
05.08	Identify and describe types of file systems and classify common file extensions based on software application programs.
05.09	Use reference materials. (e.g. on-line help, tutorials, manuals, vendor bulletin boards)
05.10	Demonstrate basic computer file management skills and file naming conventions to accurately organize files into hierarchies by labeling file folders for easy accessibility.
05.11	Describe and understand the general architecture of a microcomputer system.
05.12	Discuss the process of troubleshooting problems with computer hardware, input and output devices.
05.13	Differentiate between diagnosing and troubleshooting.
05.14	Explain the need for and use of peripherals.

CTE Standards and Benchmarks	
	05.15 Describe ethical issues and problems associated with computers and information systems, including federal laws against anti-piracy with computers and PC software security protection.
	05.16 Demonstrate proficiency with file management and structure. (e.g., folder creation file creation, backup copy, delete, open, save)
	05.17 Compare and contrast various computer operating systems.
	05.18 Select and apply an information technology application for procurement, acquisition, logistics, and supply chain management.
06.0	Demonstrate knowledge and skill of common software applications. – The student will be able to:
	06.01 Compare and contrast the appropriate use of various software applications. (e.g., word processing, desktop publishing, graphics design, web browser, e-mail, presentation, database, scheduling, financial management, Java applet, music)
	06.02 Demonstrate the use of various software applications. (e.g., word processing, desktop publishing, graphics design, web browser, e-mail, presentation, database, scheduling, financial management, Java applet, music).
	06.03 Describe and identify language terminology. (e.g., HTML, Python, Java, flash, Basic, etc.)
07.0	Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication skills utilizing word processing applications. – The student will be able to:
	07.01 Select and use word processing software and accompanying features to enhance written business communications.
	07.02 Share and maintain documents by applying different views and protection to a document and manage document versions.
	07.03 Share and save a document and apply a template. (e.g., pdf, html, blog, hyperlinks)
	07.04 Format content to a document by applying font, paragraph attributes, indent and tab settings to text and paragraphs.
	07.05 Apply spacing settings to text and paragraphs.
	07.06 Navigate and search through a document, create and manipulate tables.
	07.07 Apply page layout and reusable content by editing and manipulating page setup settings and applying themes.
	07.08 Create and manipulate page backgrounds, headers and footers.
	07.09 Use image design theory and software to create illustrations, shapes, and graphics and include a selection in a document.
	07.10 Insert and format pictures, shapes, and clipart.
	07.11 Apply and manipulate text boxes.
	07.12 Proofread documents by validating content through the use of spell and grammar check.
	07.13 Configure autocorrect settings, insert and modify comments in a document.
	07.14 Apply references and hyperlinks, create end and footnotes, and create a table of contents in a document.
	07.15 Perform various mail merge options, macros and tracking revisions
08.0	Demonstrate knowledge and skill in using technology to enhance communication skills utilizing presentation applications. – The student will be able to:

CTE Standards and Benchmarks	
08.01	Manage and configure the presentation software environment, including: adjusting views, manipulating window, configuring toolbar and file options.
08.02	Create slide presentations utilizing various project development elements, including: adding and removing slides, slide layouts, format slide design, insert or format placeholders.
08.03	Locate, create and incorporate graphical and multimedia elements, including: shapes, graphics, images, bullets, hyperlinks, video, and audio into a slide presentation appropriate for the project.
08.04	Explore and apply design and color theory to create dynamic and appealing visuals.
08.05	Create and manipulate graphical and multimedia elements to improve or develop new contacts appropriate for the project, including: creation of images, color selections, tone, hue and contrast.
08.06	Demonstrate various business-related elements that can be created, embedded and manipulated in a slide presentation, including: charts, graphs, tables, spreadsheets, flowcharts, and organizational charts.
08.07	Apply slide transitions and create custom animations to slide presentations appropriate for the target audience.
08.08	Demonstrate different delivery methods for slide presentations, including: packaging for CD delivery, video projection – on mouse click, rehearsed timings, printing options - outlines, handouts, slides and notes.
09.0	Demonstrate knowledge and skill in using technology to enhance the effectiveness of communication utilizing spreadsheet and database applications. – The student will be able to:
09.01	Manage the worksheet environment by navigating through and printing a worksheet.
09.02	Personalize the environment by manipulating the ribbon tabs, group settings, importing data/database, manipulating properties, files and folders.
09.03	Create cell data, apply auto fill and hyperlinks.
09.04	Format cells and worksheets by applying cell formats, merging and splitting cells, create row and column titles, hide and unhide column titles, rows and columns.
09.05	Manipulate page set up options.
09.06	Create and apply cell styles.
09.07	Manage worksheets and workbooks by creating and formatting worksheets and manipulating views/themes.
09.08	Apply formulas and functions by creating formulas, enforcing precedence and cell formula references.
09.09	Apply conditional formula logic, name and cell ranges.
09.10	Demonstrate data visually by creating and modifying charts and images. (e.g., pivot tables)
09.11	Share worksheet data through email, changing file type and different versions. (e.g., mail merge)
09.12	Analyze and organize data through filters, sorting and applying conditional formatting. (e.g., macros)
09.13	Create different forms for inputting data into a database application.
09.14	Interpret queries for specialized reports using a database application.
09.15	Interpret data on line graphs, pie charts, diagrams, and tables commonly used in spreadsheet software applications that incorporate industry data.

CTE Standards and Benchmarks	
10.0	Demonstrate knowledge and skill in using technology to enhance communication skills utilizing electronic mail. – The student will be able to:
10.01	Describe and perform e-mail capabilities and functions.
10.02	Create and send messages, manage signature and automated messages.
10.03	Save, send, schedule, and manage junk mail, e-mail and spam.
10.04	Configure message sensitivity, security and delivery options.
10.05	Use the Internet to perform e-mail activities, including: attaching external files, saving e-mail attachments, viewing mailbox details, establishing appointments, creating contact groups, and sending a meeting to a contact group to communicate in the workplace.
10.06	Manage tasks and organize information. (e.g., forward e-mail)
11.0	Demonstrate proficiency using computer networks, internet, and online databases to facilitate collaborative communication. – The student will be able to:
11.01	Demonstrate how to connect to the Internet and use appropriate Internet protocol.
11.02	Identify and describe web terminology, addresses and how browsers work.
11.03	Demonstrate proficiency using basic features of GUI browsers, including: bookmarks, basic configurations, e-mail configurations, and address books.
11.04	Describe appropriate browser security configurations.
11.05	Describe information technology terminology, including Internet, intranet, ethics, copyright laws, and regulatory control.
11.06	Demonstrate proficiency using search engines and search tools.
11.07	Use various web tools, including: downloading files, transfer of files, telnet, PDF, plug-ins, and data compression.
11.08	Identify and use Boolean search strategies.
11.09	Understand and apply level one Universal Resource Locator (URL) and associated protocols (e.g., .com, .org, .edu, .gov, .net, etc.)
11.10	Explain the need for web-based applications. (dangers of piracy, copyright, plagiarism)
11.11	Describe appropriate use of social networking sites and applications, blogs and collaborative tools for file sharing and using listservers.
11.12	Describe web applications, including sharing photos and video clips, messaging, chatting and collaborating.
12.0	Develop an awareness of emerging technologies. – The student will be able to:
12.01	Compare and contrast emerging technologies and describe how they impact business in the global marketplace. (e.g., wireless, wireless web, cell phones, portables/handhelds, smart appliances, home networks, peer-to-peer)
13.0	Investigate individual assessment and job/career exploration and individual career planning that reflect the transition from school to work, lifelong learning, and personal and professional goals. – The student will be able to:
13.01	Analyze personal skills and aptitudes in comparison with various business related job and career options.

CTE Standards and Benchmarks	
13.02	Use career resources to develop an information base that reflects local and global business related occupations and opportunities for continuing education and workplace experience.
13.03	Demonstrate job-seeking skills required for entry-level employment, including resume, cover letter, thank you letter, online/hard copy application, mock interview, and follow-up call.
13.04	Design, initiate, refine and implement a plan to facilitate growth and skill development related to anticipated job requirements and career expectations.
13.05	Demonstrate an awareness of specific job requirements and career paths (e.g., requirements, characteristics needed) in business environments.
13.06	Demonstrate an awareness of the potential impact of local and global trends on career plans and life goals.
13.07	Describe the importance of building community and mentor relationships in a variety of professional and workplace situations.
13.08	Simulate work-based projects in an information technology environment.
14.0	Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance. – The student will be able to:
14.01	Demonstrate awareness of the following workplace essentials: Quality customer service; business ethics; confidentiality of information; copyright violations; accepted workplace rules, regulations, policies, procedures, processes, and workplace safety, and appropriate attire and grooming.
14.02	Demonstrate ways of accepting constructive criticism on team projects within the workplace.
14.03	Apply appropriate strategies to manage and resolve conflicts in work situations.
14.04	Demonstrate human relations, personal and interpersonal skills appropriate for the workplace, including: responsibility, dependability, punctuality, integrity, positive attitude, initiative, respect for self and others, and professional dress.

Florida Department of Education
Student Performance Standards

Course Number: TRA0182
Occupational Completion Point: C
Shipping, Receiving and Traffic Clerk – 150 Hours – SOC Code 43-5071

Course Description:
The Shipping, Receiving and Traffic Clerk course is designed to build on the skills and knowledge students learned in the Packer and the Materials Handler courses for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes an understanding of warehouse operations, storage and control operations, protection, and economics.

CTE Standards and Benchmarks	
15.0	Demonstrate an understanding of warehouse operations--The student will be able to:
15.01	Identify and discuss the characteristics, purpose and importance of warehouse operations and supply chain management.
15.02	Define material handling logistics as it applies to the warehousing function.
15.03	Describe procedures for using computerized warehouse data.
15.04	Define movement in a warehouse and explain the concept of movement and the vital role that efficient movement of materials plays in the total functionality of the warehouse.
15.05	Define "logical" in terms of the term logistics.
15.06	Define movement in a warehouse and identify the various locations within the warehouse where planned efficient movement of materials takes place.
15.07	Explain channels of distribution.
15.08	Discuss safety regulatory requirements and procedures.
15.09	Explain the importance of storage in a warehouse.
15.10	Define control as it applies to warehousing.
15.11	Explain the relationship between physical structure and protection.
15.12	Identify various types of equipment available to enhance the efficient movement of materials within a warehouse.
15.13	Identify the various types of loading docks and cross docking.
15.14	Define the term "peaks and valleys" as it applies to warehouse activity.
15.15	Explain the importance of staging and JIT.
15.16	Identify the primary types of hand-operated pieces of warehouse equipment.

CTE Standards and Benchmarks	
15.17	Identify the important characteristics of industrial trucks.
15.18	Explain the concept of "balancing" as it applies to counterbalanced lift trucks.
15.19	Define the term narrow aisle as it applies to fork trucks.
15.20	Identify warehouse documents (e.g., pick tickets, special orders, inventory forms).
15.21	Display and interpret inventory screens, receive, inspect, and stock inventory.
15.22	Apply basic computer systems operations.
16.0	Demonstrate an understanding of storage and control operations--The student will be able to:
16.01	Explain the concepts involved in determining the best method for storage and the equipment needed to facilitate a cost effective and efficient warehouse.
16.02	Identify the factors that are involved with the calculating and estimating of the storage area needed for retention of materials in a warehouse.
16.03	Identify the possibilities and combinations of systems and equipment that can be used for storage areas in a warehouse.
16.04	Define the following storage related terms: Size, Volume, Density, Pallet, and Case.
16.05	Define the terms packaging, SKU, stacking frame, term "Logistics Execution Systems" (LES), signage and signposting, "real time" and barcoding.
16.06	Explain how the volume of materials, space usage, and control affect the design of storage space in a warehouse design.
16.07	Explain inventories and their importance.
16.08	Identify and analyze various warehouse storage systems.
16.09	Identify the two key issues in planning block stacking.
16.10	Identify the basic configuration for pallet rack.
16.11	Explain the concept of control in the broadest possible context and the importance of keeping track of materials and goods.
16.12	Identify the various types of technologies developed over the years to keep track of goods within the warehouse.
16.13	Identify various labeling and packaging schemes available for securing and tracking the movement of items through a warehouse.
16.14	Define the components of an LES.
16.15	Explain the importance of addresses in signage.
16.16	Define information-filled labeling.
16.17	Identify key magnetic devices used in automatic data capture.
16.18	Define radio frequency identification (RFID).
16.19	Explain the importance of automation in warehousing.

CTE Standards and Benchmarks	
	16.20 Identify the value of emerging technologies related to warehouse operations.
17.0	Demonstrate an understanding of protection skills--The student will be able to:
	17.01 Identify the role that protection plays in the total concept of "warehousing".
	17.02 Identify the various forms of unit load formation equipment that is used for protecting materials.
	17.03 Identify the types of load containment materials which include the machinery that dispenses them.
	17.04 Situations where they are most advantageously used.
	17.05 Explain the following: the need and means for protecting warehouse personnel and materials as they go about their duties.
	17.06 Identify the advantages and disadvantages of open-air or soft-wall warehousing for protection of warehoused items.
	17.07 Compliance issues.
18.0	Demonstrate economics--The student will be able to:
	18.01 Demonstrate understanding of goals, resources and structure of an organization.
	18.02 Understand the concepts and contributions of entrepreneurship.
	18.03 Compare and contrast the advantages and disadvantages of the various forms of business ownership.
	18.04 Understand economic principles affecting business cycles and the workforce.
	18.05 Analyze possible solutions to specific business problems.
	18.06 Apply economic decisions related to personal financial affairs, the successful operation of organizations and within a global economy.
	18.07 Understand the role of a consumer, producer, saver and investor in the market system.
	18.08 Understand the concepts and laws pertaining to customs and free trade.

Florida Department of Education
Student Performance Standards

Course Number: TRA0183
Occupational Completion Point: D
Logistics Technician – 150 Hours – SOC Code 13-1081

Course Description:
The Logistics Technician course is designed to build on the skills and knowledge students learned in the Packer, Materials Handler, and Shipping, Receiving and Traffic Clerk courses for entry into the logistics and supply chain industry. Students explore career opportunities and requirements of a professional logistician. Content emphasizes knowledge, skills, and understanding of college and career readiness, employability skills, career acquisition and retention, life skills, and technological literacy.

CTE Standards and Benchmarks	
19.0	Demonstrate an understanding of career readiness--The student will be able to:
19.01	Explain the importance of life-long learning.
19.02	Evaluate/research occupational interests.
19.03	Demonstrate attitudes/ethics needed for career success.
19.04	Assess personal strengths, talents, values and interests to appropriate jobs and careers to maximize career potential.
19.05	Use a variety of research tools (e.g., computer-assisted programs, newspapers, books, industry tours, job shadows, career fairs and the Internet) in the career exploration process.
19.06	Evaluate postsecondary training opportunities related to career interests, including certification, licensing, apprenticeships, college and military options.
19.07	Relate and identify career interests and transferable skills necessary for opportunities in the global workforce.
19.08	Develop an individual career plan and portfolio.
19.09	Analyze needs of business and industry on labor and economic trends.
19.10	Describe the changing roles including non-traditional occupations in the workplace.
20.0	Demonstrate employability skills--The student will be able to:
20.01	Identify and utilize resources used in a job search (e.g., newspaper, Internet, networking).
20.02	Discuss importance of drug tests and criminal background checks in identifying possible employment options.
20.03	Identify steps in the job application process including arranging for references and proper documentation.
20.04	Identify procedures and complete documents required when applying for a job (e.g., application, W-4, I-9).

CTE Standards and Benchmarks	
	20.05 Prepare a resume (electronic and traditional), cover letter, letter of application, follow-up letter, acceptance/rejection letter, and letter of resignation.
	20.06 Demonstrate appropriate dress and grooming for employment.
	20.07 Demonstrate effective interviewing skills (e.g., behavioral).
	20.08 Describe methods for handling illegal interview and application questions.
	20.09 Discuss state and federal labor laws regulating the workplace (e.g., Child Labor Law, sexual harassment, EEOC, ADA, FMLA).
	20.10 Identify positive work attitudes and behaviors such as honesty, compassion, respect, responsibility, fairness, trustworthiness, and caring.
	20.11 Describe importance of producing quality work and meeting performance standards.
	20.12 Identify personal and business ethics (e.g., preventing theft, pilfering, and unauthorized discounting).
	20.13 Demonstrate orderly and systematic behavior by creating and maintaining a personal planner.
	20.14 Identify qualities typically required for promotion (e.g., productivity, dependability, responsibility).
	20.15 Identify how to prepare for job separation and re-employment.
	20.16 Create and maintain a career portfolio (e.g., resume, letters of recommendation, awards, evidence of participation in school/community/volunteer activities, employer evaluations).
21.0	Demonstrate competencies in a specific career--The student will able to:
	21.01 Demonstrate job performance skills as outlined in the training plan
	21.02 Exhibit effective workplace safety practices including use of protective devices
	21.03 Display an acceptable level of productivity and quality control
	21.04 Demonstrate effective written and oral communication and listening skills when interacting with customers, co-workers, and managers
	21.05 Demonstrate decision making and problem solving processes and techniques used in the workplace.
	21.06 Demonstrate acceptable work habits and conduct in the workplace as defined by company policy
	21.07 Demonstrate an understanding of the company's vision and mission statements.
	21.08 Demonstrate an understanding of the company's goals and objectives
	21.09 Demonstrate familiarity with the company's products and services
	21.10 Demonstrate the ability to identify authority, rights, and responsibilities of both employers and employees
22.0	Demonstrate career acquisition--The student will be able to:
	22.01 Participate in work-based learning opportunities such as: mentoring, cooperative work, job shadows, apprenticeships and internships.

CTE Standards and Benchmarks	
	22.02 Demonstrate effective oral and written communication skills necessary for employment.
	22.03 Demonstrate job search skills using a variety of resources.
	22.04 Apply the decision-making process to the various stages of the work life cycle.
	22.05 Identify and demonstrate employability skills including job search, selection, the interviewing process, proper dress and presentation.
	22.06 Compare and contrast compensation packages that include varying levels of wages and benefits.
23.0	Demonstrate career retention--The student will be able to:
	23.01 Demonstrate positive personal qualities and self-management skills (i.e. time management, organization, punctuality and attendance).
	23.02 Describe how productivity, work ethic and quality affect job stability.
	23.03 Demonstrate communication team-building and leadership skills.
	23.04 Demonstrate personal health and workplace safety procedures.
	23.05 Identify biases, harassment and discriminatory behaviors impacting job success and advancement.
	23.06 Acknowledge and respond to constructive criticism and employment evaluation.
	23.07 Understand the importance of following company policy and procedures and the legal ramifications of labor laws impacting employment.
	23.08 Understand the role of compromise in conflict resolution.
24.0	Demonstrate integrated learning and life skills--The student will be able to:
	24.01 Demonstrate the integration and application of academic and occupational skills in school, work and personal lives.
	24.02 Use communication, mathematical and technical skills to compare compute, and analyze complex information.
	24.03 Discuss how personal choices, experiences, technology, education/training and other factors correlate with earning a living.
	24.04 Discuss how income from employment is affected by factors such as supply and demand, geographic location, level of education, type of industry, union membership, productivity skill level and work ethic.
	24.05 Compare and contract strategies for personal finance and risk management.
	24.06 Demonstrate the ability to set, monitor and achieve clearly defined goals.
25.0	Demonstrate technology and information--The students will be able to:
	25.01 Apply knowledge of technology to identify and solve problems.
	25.02 Identify and evaluate how information technology developments have changed the way people work.
	25.03 Select, apply and troubleshoot software and hardware as they apply to a variety of work applications.
	25.04 Describe how new developments in varied fields or technology affect the job market and the level of worker‘s responsibilities.

CTE Standards and Benchmarks	
25.05	Analyze the ethical issues surrounding access, privacy and confidentiality of information in emerging technologies.
25.06	Explore current and future positions and career paths in field of technology.
25.07	Identify job tasks that presently are and will be in the future performed in the specified occupation (training plan).
25.08	Create a training plan indicating competencies mastered.
25.09	Maintain a record of employment hours and wages for auditing and budgetary purposes (e.g., time cards, budget sheets).
25.10	Maintain an up-to-date, signed training agreement.

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)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Automotive Collision Repair and Refinishing 1**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400100
CIP Number	0647060303
Grade Level	30, 31
Standard Length	750 hours
Teacher Certification	AUTO BODY @7 7G AUTO IND @7 %7 %G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3021 – Automotive Body and Related Repairers
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: basic trade skills; refinishing skills; sheetmetal repair skills; frame and unibody squaring and aligning; use of fillers; paint systems and undercoats; related welding skills; related mechanical skills; trim-hardware maintenance; glass servicing; and other miscellaneous repairs. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	ARR0210 ARR0213	Paint and Body Helper Paint and Body Assistant	250 hours 250 hours	49-3021
B	ARR0020	Auto Collision Estimator	100 hours	49-3021
C	ARR0313	Frame and Body Repairman	150 hours	49-3021

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Automotive Collision Repair and Refinishing program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate vehicle and industry knowledge, business management, and shop and occupational safety skills.
02.0 Prepare vehicles for repair and refinishing by applying creative techniques.
03.0 Creatively repair, replace and adjust outer body panels.
04.0 Perform welding operations that apply creativity and interpretation.
05.0 Evaluate and prepare surfaces for refinishing.
06.0 Select and apply appropriate polishing compounds and detail techniques.
07.0 Setup vehicle for measuring and pulling.
08.0 Calculate, measure and repair unibody vehicles.
09.0 Inspect and creatively repair frame type vehicle bodies.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Collision Repair and Refinishing 1**
PSAV Number: **T400100**

Course Number: ARR0210
Occupational Completion Point: A (1 of 2)
Paint and Body Helper – 250 Hours – SOC Code 49-3021

Course Description:
The Paint and Body Helper course prepares students for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study vehicle and industry knowledge, business management, occupational safety, vehicle preparation, and outer body panels.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:
01.01	Comply with safety rules established by OSHA, NIOSH, EPA, and DER regarding chemicals and hazardous materials.
01.02	Comply with safety rules established by OSHA and NIOSH regarding personal clothing and devices.
01.03	Comply with safety rules regarding hand tools and power equipment and use them properly, including fire extinguishers.
01.04	Comply with locally developed shop safety rules and regulations.
01.05	Identify sources of airborne contamination and other hazards.
01.06	Select proper spray mask; inspect the spray mask to insure proper fit and operation; inspect the condition of the mask filters and other components.
01.07	Explain the "Right to Know Law" as applicable to auto body repair occupations.
01.08	Identify vehicle parts by name, location and function.
01.09	Read and explain damage reports.
02.0	Prepare vehicles for repair and refinishing by applying creative techniques--The student will be able to:
02.01	Remove, replace and align damaged outside trim and moldings.
02.02	Remove, replace and align damaged or necessary inside trim and moldings.
02.03	Remove, replace and align damaged, non-structural body panels and components that may interfere with or be damaged during repair.
02.04	Protect panels and parts adjacent to repair area to prevent damage.
02.05	Remove dirt, grease and wax from those areas to be repaired.

CTE Standards and Benchmarks	
	02.06 Remove dirt, corrosion, under coatings, sealers, and/or other protective coatings necessary to perform repairs to structural areas.
	02.07 Remove, replace, and align repairable plastics and other parts that are recommended for off-car repair.
	02.08 Locate, read and interpret automobile manufacturers' data plates.
03.0	Creatively repair, replace and adjust outer body panels--The student will be able to:
	03.01 Remove, replace and adjust a bolted panel or panel assembly.
	03.02 Remove, replace and align hoods, hood hinges and hood latches.
	03.03 Remove, replace and align deck lids, lid hinges and lid latches.
	03.04 Remove, replace and align doors, tailgates, and hatches, lift gates and hinges.
	03.05 Remove and replace bumpers, reinforcements, guards, isolators, and mounting hardware (release pressure from gas- and oil-filled energy-absorbing-type bumper isolators that are being discarded).
	03.06 Check door hinge condition, replace hinge pins and bushings as needed, check door frames, check and adjust door clearances (where adjustable) along quarter panels, doors, rocker panels, fenders and tops.
	03.07 Check and adjust latch assemblies on all hinged components.

Course Number: ARR0213
Occupational Completion Point: A (2 of 2)
Paint and Body Assistant – 250 Hours – SOC Code 49-3021

Course Description:
The Paint and Body Assistant course is designed to build on the skills and knowledge students learned in the Paint and Body Helper course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study welding operations, surface evaluation and preparation, polishing and detail techniques.

CTE Standards and Benchmarks	
04.0	Perform welding operations that apply creativity and interpretation--The student will be able to:
	04.01 Demonstrate welding safety procedures.
05.0	Evaluate and prepare surfaces for refinishing--The student will be able to:
	05.01 Inspect and identify types of finishes and surface conditions and develop a plan for refinishing using one paint system from start to finish in conformance with paint system manufacturer specifications.
	05.02 Gain access to, remove and store trim and molding.
	05.03 Remove dirt, wax and road grime from areas to be refinished and adjacent surfaces including complete washing of the vehicle.
	05.04 Mask and protect other areas that will not be refinished.

CTE Standards and Benchmarks	
05.05	Mix primer, primer surfacer or primer sealer and spray onto the surface of repaired areas including two components and self-etching primers.
05.06	Apply glazing putty to minor surface imperfections.
05.07	Select proper abrasives and dry or wet sand area to which primer-surfacer and glazing putty have been applied.
05.08	Compound around the edges of repaired areas to be refinished.
05.09	Remove dust from areas to be refinished including cracks or moldings of adjacent areas.
05.10	Clean area to be refinished with a proper solution.
05.11	Remove, with a tack rag, any dust or lint particles from the areas to be refinished.
06.0	Select and apply appropriate polishing compounds and detail techniques--The student will be able to:
06.01	Sand, buff and polish finishes.
06.02	Clean and detail a vehicle after completion of refinishing.

Florida Department of Education
Student Performance Standards

Course Number: ARR0020
Occupational Completion Point: B
Auto Collision Estimator – 100 Hours – SOC Code 49-3021

Course Description:
The Auto Collision Estimator course is designed to build on the skills and knowledge students learned in the Paint and Body Assistant course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study industry knowledge, business management, occupational safety, and vehicle preparation.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management, and shop and occupational safety skills--The student will be able to:
01.10	Operate basic office machines.
01.11	Demonstrate basic keyboarding skills and computer usage.
01.12	Determine acceptable parts to use: new, used or aftermarket.
01.13	Prepare damage reports manually to industry standards.
01.14	Prepare damage reports to industry standards using a computer.
02.0	Prepare vehicles for repair and refinishing by applying creative techniques--The student will be able to:
02.09	Use specification and crash manuals including "P" pages.

Florida Department of Education
Student Performance Standards

Course Number: ARR0313
Occupational Completion Point: C
Frame and Body Repairman – 150 Hours – SOC Code 49-3021

Course Description:
The Frame and Body Repairman course is designed to build on the skills and knowledge students learned in the Auto Collision Estimator course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study industry knowledge, business management, occupational safety, outer body panel adjustment, measuring, pulling, unibody vehicle repair, and frame repair.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:
01.15	Perform structural damage analysis and determine repair procedures.
03.0	Creatively repair, replace and adjust outer body panels--The student will be able to:
03.08	Determine the extent of damage to structural body panels; repair, weld, or replace in accordance with manufacturers' specifications.
07.0	Setup vehicle for measuring and pulling--The student will be able to:
07.01	Determine and plan methods and order of repair.
07.02	Mount vehicle on anchoring equipment.
07.03	Measure vehicle damage using manufacturers' specifications.
07.04	Attach pulling equipment, pull and re-measure.
08.0	Calculate, measure and repair unibody vehicles--The student will be able to:
08.01	Precisely measure unibody vehicles.
08.02	Diagnose and measure unibody damage using self-centering and tram gauges.
08.03	Diagnose and measure unibody damage using a datum plane.
08.04	Determine the location of all suspension, steering and power train component attaching point to the body.
08.05	Clean, prime and apply protective coat to repaired unibody structural areas.
08.06	Determine the extent of the direct and indirect damage and the direction of impact and plan the method and order of repair.
08.07	Precisely measure unibody vehicles, check and adjust suspension mount points that effect four-wheel alignment.

CTE Standards and Benchmarks	
08.08	Diagnose and measure unibody damage using a dedicated (fixture) measuring system.
08.09	Diagnose and measure unibody damage using a universal measuring system or a laser.
08.10	Attach proper body anchoring devices.
08.11	Identify procedures to straighten and align cowl assemblies.
08.12	Identify procedures to straighten and align roof pillars and roof panels.
08.13	Identify procedures to straighten and align doorposts, sills, floor pans and rocker panels.
08.14	Identify procedures to straighten and align quarter panels, wheel-housing assemblies and rear body sections (including rail, suspension and power train panels).
08.15	Identify procedures to straighten/align front-end sections (aprons, strut towers, upper/lower rails, steering, suspension and power train mounting points).
08.16	Recognize the limitations of applying heat to high strength steel structural components, use proper heat stress relief methods on high strength steel and weld in accordance with manufacturers' specifications.
08.17	Use proper cold stress relief methods.
08.18	Remove folds, curves, creases and dents using power tools and hand tools to restore damaged areas to proper contours and dimensions.
08.19	Determine the extent of damage to structural steel body panels and repair, weld or replace them in accordance with manufacturers' specifications.
08.20	Determine the extent of damage to structural aluminum body panels in accordance with manufacturers' specifications.
08.21	Cut out damaged sections of structural steel body panels and weld in new and/or used replacement in accordance with accepted industry standards.
08.22	Recheck panel contour and alignment after pulling and correct or adjust as necessary.
09.0	Inspect and creatively repair frame type vehicle bodies--The student will be able to:
09.01	Diagnose and measure frame damage using self-centering and tram gauge.
09.02	Determine the extent of direct and indirect damage and the direction of impact and plan methods and order of repairs.
09.03	Clean, prime and protective coat repaired frame areas.
09.04	Identify procedures to straighten and align mash damage.
09.05	Identify procedures to straighten and align sag damage.
09.06	Identify procedures to straighten and align side sway damage.
09.07	Identify procedures to straighten and align twist damage.
09.08	Identify procedures to straighten and align kickup damage.
09.09	Identify procedures to straighten and align broadside damage.

CTE Standards and Benchmarks	
09.10	Identify procedures to straighten and align diamond frame damage.
09.11	Identify procedures to remove and replace damaged frame horns, side rails, cross members and front or rear frame sections and weld cracks in frame members.
09.12	Repair, reinforce or replace weakened frame members in accordance with vehicle manufacturers' recommendations.

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)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Automotive Collision Repair and Refinishing 2**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400200
CIP Number	0647060304
Grade Level	30, 31
Standard Length	650 hours
Teacher Certification	AUTO BODY @7 7G AUTO IND @7 %7 %G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3021 – Automotive Body and Related Repairers
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: basic trade skills; refinishing skills; sheetmetal repair skills; frame and unibody squaring and aligning; use of fillers; paint systems and undercoats; related welding skills; related mechanical skills; trim-hardware maintenance; glass servicing; and other miscellaneous repairs. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	ARR0127	Automotive Refinishing	325 hours	49-3021
B	ARR0240	Automobile Body Repairer	325 hours	49-3021

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Automotive Collision Repair and Refinishing program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate vehicle and industry knowledge, business management, and shop and occupational safety skills.
02.0 Prepare vehicles for repair and refinishing by applying creative techniques.
03.0 Creatively repair, replace and adjust outer body panels.
04.0 Perform welding operations that apply creativity and interpretation.
05.0 Evaluate and prepare surfaces for refinishing.
06.0 Select and apply appropriate polishing compounds and detail techniques.
07.0 Maintain and operate spray equipment.
08.0 Finish defects, causes and cures.
09.0 Prepare metal parts and panels for creative finishing.
10.0 Prepare and apply body fillers.
11.0 Perform miscellaneous repairs.
12.0 Repair fiberglass and plastic components.

Florida Department of Education
Student Performance Standards

Course Number: ARR0127
Occupational Completion Point: A
Automotive Refinishing – 325 Hours – SOC Code 49-3021

Course Description:
The Automotive Refinishing course is designed to build on the skills and knowledge students learned in the Frame and Body Repairman course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study industry knowledge, business management, occupational safety, surface evaluation and preparation, polishing, detail techniques, spray equipment, and finishing.

CTE Standards and Benchmarks	
01.0	Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills--The student will be able to:
01.01	Inspect air makeup and exhaust systems (including intake filters, exhaust filters, fans and other mechanical components of the system) to insure proper filtering and ventilation.
05.0	Evaluate and prepare surfaces for refinishing--The student will be able to:
05.01	Inspect and identify type of substrate, and surface condition; develop a plan for refinishing.
05.02	Chemically, and mechanically safely remove paint finishes.
05.03	Dry and wet sand areas to be refinished.
05.04	Artistically featheredge broken areas to be refinished.
05.05	Determine when sealing is needed or desirable and apply suitable sealer to the area being refinished.
05.06	Creatively scuff sand to remove nibs or overspray from a sealer.
05.07	Apply adhesion promoter over areas to be painted and blend into adjacent areas.
05.08	Apply stone chip resistant coating.
05.09	Restore corrosion resistant coatings, caulking and seam sealers to repaired areas.
06.0	Select and apply appropriate polishing compounds and detail techniques--The student will be able to:
06.01	Select the proper spray mask, inspect the spray mask to insure proper fit and operation, and inspect the condition of the mask filters and other components.
06.02	Interpret the type and color of paint already on a vehicle and identify alternates.
06.03	Measure, shake, stir, thin or reduce, and strain paint.

CTE Standards and Benchmarks	
06.04	Verify color match before applying and adjust if needed.
06.05	Creatively apply urethane enamel for spot, panel and overall refinishing.
06.06	Creatively apply urethane clear coat for spot, panel and overall repairs.
06.07	Apply decals, transfers, tapes, wood-grains, pinstripes (painted and taped), etc.
06.08	Properly dispose of hazardous waste.
06.09	Identify the types of plastic parts to be finished and determine the proper refinishing procedure.
06.10	Apply a finish coat to plastic parts.
06.11	Clean, condition and refinish vinyl (e.g. upholstery, dashes and tops).
06.12	Apply a tri-coat paint system using visual and artistic techniques.
07.0	Maintain and operate spray equipment--The student will be able to:
07.01	Explain, adjust and use a variety of spray guns including siphon feed, pressure feed, gravity feed and HVLP.
07.02	Check and adjust air pressure at the spray gun.
07.03	Adjust spray gun fluid and pattern control valves.
07.04	Appropriately use creative and artistic spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.
07.05	Inspect, clean and determine the condition and adequacy of spray guns and related equipment (air hoses, regulators, airlines, air sources and spray environment).
07.06	Maintain and properly use the spray booth.
08.0	Finish defects, causes and cures--The student will be able to:
08.01	Check for rust spots; determine the cause(s) and correct the condition.
08.02	Identify and interpret paint cracking (crowsfeet or line-checking, micro checking, etc); correct the condition.
08.03	Identify poor adhesion; determine the cause(s) and correct the condition.
08.04	Identify blistering appearance in the paint surface; determine the cause(s) and correct the condition.
08.05	Identify water spotting on paint surface, interpret and correct the condition.
08.06	Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.
08.07	Identify finish damage caused by airborne contaminants (acids, soot, and other industrial-related causes); correct the condition.
08.08	Identify die-back conditions (dulling of the paint film showing haziness and/or film distortion showing shrinking); correct the condition.
08.09	Identify chalking (oxidation); correct the condition.
08.10	Identify body filler bleed-through; correct the condition.

CTE Standards and Benchmarks
08.11 Identify pin holing; correct the condition.

Florida Department of Education
Student Performance Standards

Course Number: ARR0240
Occupational Completion Point: B
Automobile Body Repairer – 325 Hours – SOC Code 49-3021

Course Description:
The Automobile Body Repairer course is designed to build on the skills and knowledge students learned in the Automotive Refinishing course for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study repair and refinishing techniques, outer body panel adjustment, welding operations, metal preparation, body fillers, miscellaneous repair techniques, fiberglass, and plastics.

CTE Standards and Benchmarks	
02.0	Prepare vehicles for repair and refinishing by applying creative techniques--The student will be able to:
02.01	Diagnose and analyze damage to determine appropriate methods for overall repair.
02.02	Locate, remove and replace to specifications, those vehicle electrical/electronic devices that might be damaged during repair.
02.03	Explain proper air bag operation and passive restraint handling.
03.0	Creatively repair, replace and adjust outer body panels--The student will be able to:
03.01	Remove, replace and align a welded (non-structural) steel panel or panel assembly.
03.02	Straighten roughed out contours of damaged panels to a surface condition for body filling or metal finishing.
03.03	Weld cracked or torn steel body panels; reweld broken welds.
03.04	Apply protective coatings and sealants to structural panels.
03.05	Heat shrink stretched panel areas back to contour.
03.06	Cold shrink stretched panel areas back to contour.
03.07	Repair or replace door skins and intrusion beams.
04.0	Perform welding operations that apply creativity and interpretation--The student will be able to:
04.01	Identify metal types prior to welding.
04.02	Setup, operate and maintain metal inert gas (MIG) welding equipment.
04.03	Creatively perform various welds with MIG equipment including plug, butt and lap.
04.04	Setup and maintain oxyacetylene welding equipment.

CTE Standards and Benchmarks	
04.05	Explain various welding, cutting and heating techniques with oxyacetylene equipment.
04.06	Describe plasma cutting.
04.07	Remove, replace and align damaged, structural body panels and components that may interfere with or be damaged during repairing.
04.08	Identify procedures to Weld aluminum.
04.09	Explain electric compression spot welding.
04.10	Set up and perform plasma-cutting operations.
09.0	Prepare metal parts and panels for creative finishing--The student will be able to:
09.01	Identify specification(s) of metals used in automobiles.
09.02	Identify heat effects on metals.
09.03	Identify the importance of maintaining the structural integrity of an vehicle body.
09.04	Remove the paint from the damaged area of a body panel.
09.05	Pick and file the damaged area of a body panel to eliminate surface irregularities.
09.06	Disc sand the repaired body panel to produce final smoothness.
10.0	Prepare and apply body fillers--The student will be able to:
10.01	Mix plastic filler.
10.02	Creatively apply plastic body filler and cheese grate during curing.
10.03	Block sand cured plastic body fillers to creatively and artistically contour and then finish sand.
11.0	Perform miscellaneous repairs--The student will be able to:
11.01	Align headlamps.
11.02	Apply rust repair methods including grinding, sandblasting and metal preparation.
11.03	Remove and replace headliners, carpets, seats and other interior components and trim.
11.04	Inspect, repair or replace weather stripping.
11.05	Identify procedures to perform two- and four- wheel alignments.
11.06	Diagnose and repair water leaks, dust leaks and wind noises.
11.07	Identify procedures to remove and replace all stationary glass (including windshield, back lights, etc.) using manufacturers' recommended installation materials and procedures including electrically heated glass.
11.08	Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanism and related controls.
11.09	Repair/replace all power driven accessories and related controls.

CTE Standards and Benchmarks	
11.10	Inspect, repair or replace and adjust removable manually operated or electrically operated roof panels, hinges, latches, guides, handles, retainers and controls of sunroof.
11.11	Diagnose and repair damaged circuits, wires and electrical components.
11.12	Remove, replace and cap off air conditioner components.
11.13	Evacuate, recycle and recharge air conditioning systems.
11.14	Identify procedures to remove and replace engines and mounts.
11.15	Identify procedures to remove and replace transmissions and mounts.
11.16	Identify procedures to remove and replace suspension parts.
11.17	Identify procedures to remove and replace brake parts.
11.18	Identify procedures to bleed brakes.
11.19	Identify procedures to remove and replace fuel system components.
11.20	Demonstrate an understanding of ABS braking systems.
11.21	Inspect, adjust or repair steering, suspension and power-train components that affect four-wheel alignment.
12.0	Repair fiberglass and plastic components--The student will be able to:
12.01	Differentiate between fiberglass and sheet molded compound (SMC) to be repaired and the appropriate creative repair procedures (including plastic welding, chemical bonding and the use of structural adhesives).
12.02	Creatively repair deep gouges and cracks in fiberglass panels and sheet molded compound (SMC).
12.03	Repair holes in fiberglass panels and SMC.
12.04	Repair fiberglass body panels and straighten/align panel supports.
12.05	Remove damaged areas from fiberglass panels and SMC and repair with partial panel installation.
12.06	Prepare the surfaces of and repair damage to, thermoplastic parts.
12.07	Prepare the surfaces of and repair damage to thermosetting-plastic parts.

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

The purpose of this program is to prepare students for employment as automotive body, related repairers, automobile body repairers (SOC 49-3021).

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues, and health, safety and environmental issues.

The standard length of this program is 650 hours. **Automotive Collision Repair and Refinishing 1** is a core program. It is recommended students complete **Automotive Collision Repair and Refinishing 1,** or demonstrates mastery of the outcomes in that program, prior to enrollment in **Automotive Collision Repair and Refinishing 2.**

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Marine Service Technologies**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400210
CIP Number	0647061611
Grade Level	30,31
Standard Length	1350
Teacher Certification	DIESEL MECH @7 7G GASENG RPR @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3051 – Motorboat Mechanics and Service 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: service, repair and overhaul of four-stroke and two-stroke cycle engines and outboard motors; and service and repair of boating accessories. With regard to the above, course content will include electrical systems, fuel systems, power transfer systems, ignition systems, cooling systems, lubrication systems, drive systems and boat and trailer rigging.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

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

Program Structure

This program is a planned sequence of instruction consisting of six 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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	MTE0003	Marine Rigger	300 hours	49-3051
B	MTE0090	Outboard Engine Technician	300 hours	49-3051
C	MTE0074	Outboard Engine Diagnostics Technician	150 hours	49-3051
D	MTE0092	Inboard Gas Engine Technician	300 hours	49-3051
E	MTE0093	Drive Train Technician	150 hours	49-3051
F	MTE0056	Inboard Diesel Technician	150 hours	49-3051

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate an understanding of workplace safety and workplace organization.
02.0 Adjust and repair trailers.
03.0 Use marine woods, metals, and fiberglass.
04.0 Maintain and repair basic two-stroke cycle outboard engines.
05.0 Maintain and repair fuel systems on boats.
06.0 Maintain and repair electrical systems.
07.0 Prepare delivery checklist.
08.0 Maintain and repair outboard capacitor discharge ignition systems.
09.0 Maintain and repair outboard fuel systems.
10.0 Parts specialist and computer skills to industry standards.
11.0 Maintain and repair basic four-stroke cycle outboard engines.
12.0 Maintain and repair outboard charging systems.
13.0 Maintain and repair outboard battery ignition systems.
14.0 Maintain and repair outboard cranking systems.
15.0 Maintain and repair outboard lubrication systems.
16.0 Maintain and repair outboard cooling systems.
17.0 Maintain and repair outboard lower gear cases.
18.0 Assemble and maintain outboard lower units and housing assemblies.
19.0 Demonstrate employability skills.
20.0 Demonstrate an understanding of entrepreneurship.
21.0 Apply basic computer skills.
22.0 Troubleshoot and solve problems with outboard engines using industry recognized computer-based diagnostic equipment.
23.0 Set up electric and digital control box, and gauges.
24.0 Maintain and repair basic four-stroke cycle inboard gas engine.
25.0 Maintain and repair inboard fuel systems.
26.0 Maintain and repair inboard gas cooling systems.
27.0 Maintain and repair inboard gas lubrication systems.
28.0 Maintain and repair battery ignition systems.
29.0 Maintain and repair capacitor discharge ignition systems.
30.0 Maintain and repair stern drive upper gear cases.
31.0 Maintain and repair stern drive lower gear cases.
32.0 Maintain and repair stern drive intermediate housing.
33.0 Maintain and repair inboard gas transmissions.
34.0 Maintain and repair inboard diesel fuel systems.
35.0 Maintain and repair inboard diesel cooling systems.
36.0 Maintain and repair inboard diesel lubrication systems.
37.0 Maintain and repair inboard diesel charging systems.

Florida Department of Education
Student Performance Standards

Program Title: **Marine Service Technologies**
PSAV Number: **T400210**

Course Number: MTE0003
Occupational Completion Point: A
Marine Rigger – 300 Hours – SOC Code 49-3051

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of workplace safety and organization, trailer service, various boat materials, 2-stroke cycle outboard engines, fuel systems on boats, marine electrical systems, procedures for preparing boats to customers, capacitor discharge ignition systems, outboard engine fuel systems, and proper use of computer systems related to parts specialization.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of workplace safety and workplace organization--The student will be able to:
01.01	Identify safety requirements for manual, electrical-powered, and pneumatic tools.
01.02	Demonstrate, apply, and provide evidence of safely using manual, electrical-powered, and pneumatic tools.
01.03	Identify safety requirements for operation of automated machines and equipment.
01.04	Demonstrate, apply, and provide evidence of safely operating automated machines and equipment.
01.05	Set up and use precision measurement tools.
01.06	Drill and remove broken studs and install helicoils.
01.07	Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
01.08	Demonstrate appropriate heating techniques and skills.
01.09	Read, interpret, and apply service manuals.
01.10	Identify the safe use of paints, chemicals, fiberglass, and compounds
01.11	Demonstrate, apply, and provide evidence of safely using paints, chemicals, fiberglass, and compounds.
01.12	Identify the safe use of electrical connectors and cords.
01.13	Demonstrate, apply, and provide evidence of safely using electrical connectors and cords.
01.14	Identify, demonstrate, apply, and provide evidence of understanding of shop safety rules on an ongoing basis.
01.15	Research and identify class A, B, and C type fires.

CTE Standards and Benchmarks	
01.16	Demonstrate and apply the proper procedures for extinguishing class A, B, and C type fires.
01.17	Identify various workplace injuries related to the marine industry.
01.18	Demonstrate and practice knowledge of first aid and first response procedures appropriate for this course.
01.19	Identify and apply safety procedures in case of smoke or chemical inhalation.
01.20	Demonstrate and apply material handling techniques to safely move materials.
01.21	Demonstrate and apply proper techniques for lifting loads.
01.22	Research and identify Occupational Safety Health Administration (OSHA) safety standards related to the marine industry.
01.23	Demonstrate, apply, and provide evidence of understanding Occupational Safety Health Administration (OSHA) safety standards related to the marine industry.
01.24	Demonstrate knowledge of safety requirements for material handling equipment such as rigging, ladders, and scaffolds related to the marine industry.
01.25	Demonstrate knowledge of National Institute of Occupational Safety and Health (NIOSH), Environmental Protection Agency (EPA) and other regulatory agencies recommendations, guidelines and best practices.
01.26	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200)
01.27	Locate Safety Data Sheets (SDS).
01.28	Demonstrate understanding and knowledge of using and applying the information located on Safety Data Sheets (SDS).
01.29	Proactively respond to a safety concern and then document occurrences.
01.30	Identify and report unsafe conditions.
01.31	Determine the appropriate corrective action after an unsafe condition is identified.
01.32	Demonstrate knowledge of various emergency alarms and procedures.
01.33	Demonstrate knowledge and apply clean-up procedures for spills.
01.34	Identify and apply procedures for handling hazardous material.
01.35	Perform safety and environmental inspections.
01.36	Perform leak checks to determine if toxic or hazardous material is escaping from a piece of equipment.
01.37	Demonstrate knowledge of proper and safe installation techniques as described in manuals, checklists, and regulations.
01.38	Demonstrate and apply proper equipment shutdown procedures.
01.39	Identify, select, and use personal protective equipment (PPE).
01.40	Identify, demonstrate, and apply ergonomic work techniques.
01.41	Train other students to use and apply safety skills outlined in this standard.

CTE Standards and Benchmarks	
02.0	Adjust and repair trailers--The student will be able to:
02.01	Make boat to trailer adjustments.
02.02	Remove and replace lighting systems.
02.03	Remove, inspect, repack, and replace wheel bearings and springs.
02.04	Remove and replace brakes.
02.05	Check lug nuts on trailer for correct torque.
03.0	Use marine woods, metals, and fiberglass--The student will be able to:
03.01	Explain the hazards of a marine environment to woods, metals and fiberglass.
03.02	Explain a galvanic series.
03.03	Explain the theory for using given materials in boat repair activities.
04.0	Maintain and repair basic two-stroke cycle outboard engines--The student will be able to:
04.01	Explain the basic principles of the operation of two-stroke cycle internal combustion engines.
04.02	Identify types of two-stroke cycle engines.
04.03	Locate engine serial and model numbers.
04.04	Identify engine assemblies and systems.
04.05	Disassemble engines.
04.06	Remove, clean and inspect heads for cracks, warpage and damaged spark plug threads.
04.07	Diagnose head problems by use of the visual inspection method.
04.08	Diagnose head problems by use of the compression tester method.
04.09	Diagnose head problems by use of the stethoscope method.
04.10	Remove, clean and inspect piston rods and assemblies.
04.11	Measure out-of-round of pistons and cylinders.
04.12	Hone cylinders.
04.13	Check the total bearing surface of connecting rod bearings.
04.14	Measure piston skirts and ring grooves.
04.15	Measure the piston ring gap in cylinder bores.
04.16	Install piston pins according to manufacturer's specifications.

CTE Standards and Benchmarks	
04.17	Check rod and piston assembly alignment.
04.18	Install rings on pistons.
04.19	Install piston rod assemblies.
04.20	Measure and check crankshafts with a micrometer.
04.21	Check needle bearings.
04.22	Inspect crankshafts and install seal.
04.23	Inspect, clean and/or replace reed valves.
04.24	Reassemble engines.
05.0	Maintain and repair fuel systems on boats--The student will be able to:
05.01	Identify and locate fuel system components (fuel tanks, lines, filters, etc.).
05.02	Sketch and label the parts of total fuel systems.
05.03	Service fuel lines and primer bulbs (vacuum test).
05.04	Describe or demonstrate the process for removing, cleaning, inspecting and installing fuel tanks.
05.05	Locate and identify fuel pumps and test the vacuum and pressure.
05.06	Determine and make appropriate fuel oil mixtures.
06.0	Maintain and repair electrical systems--The student will be able to:
06.01	Locate and match electrical units by their symbols on a wiring diagram.
06.02	Set up and use voltmeters, ammeters and ohmmeters.
06.03	Locate and identify electrical circuit components.
06.04	Sketch a typical circuit using a single wire system.
06.05	Test storage batteries using proper industry recognized battery testing equipment.
06.06	Charge storage batteries.
06.07	Remove and replace batteries and service battery boxes.
06.08	Repair damaged wire and electrical harnesses.
06.09	Diagnose circuit troubles using continuity or a test light and low reading voltmeters to record voltage drop.
06.10	Sketch and label typical fuel gage systems.
06.11	Remove and replace ammeters or indicating lights.

CTE Standards and Benchmarks	
06.12	Remove and replace fuel gages.
06.13	Remove and replace fuel-sending units.
06.14	Diagnose gages and accessory system troubles using voltmeters, ammeters or detached sending units.
06.15	Sketch typical circuits such as those for auto bilge pumps or navigation lights.
06.16	Locate opens, shorts and grounds.
06.17	Demonstrate proficiency in applying industry standard wire terminal practices.
06.18	Demonstrate proper installation of 2 position and 3 position battery switches.
06.19	Demonstrate correct procedure for connecting batteries in series and parallel.
06.20	Check alternator output voltage with engine running compare with specifications.
07.0	Prepare delivery checklist--The student will be able to:
07.01	Make center line measurements for outboard motor installation.
07.02	Locate manufacturers' I.D. plates.
07.03	Mount control boxes at the helm.
07.04	Place wiring and cables in a neat and orderly manner.
07.05	Adjust the control cables from the engine to the control box.
07.06	Center the steering cable to the engine.
07.07	Find suitable locations for accessories and mount them to the boat.
07.08	Lubricate shafts, install propellers and fasten both securely.
07.09	Check for proper levels.
07.10	Check manufacturers' specifications.
07.11	Describe how to or test-run boats.
07.12	Recheck work completed.
07.13	Check manufacturers' installation procedures for stern drive units.
07.14	Lubricate shafts and install propellers securely.
07.15	Demonstrate proper procedures for checking oil level capacity.
07.16	Install or connect drain plugs, petcocks, hose clamps, hoses, etc.
07.17	Remove and replace running lights.

CTE Standards and Benchmarks	
	07.18 Troubleshoot lighting systems and accessories.
	07.19 Check and adjust throttles, cables, horns, lights and tachometers.
	07.20 Check steering system for proper operation.
08.0	Maintain and repair outboard capacitor discharge ignition systems--The student will be able to:
	08.01 Sketch and label electrical symbols.
	08.02 Set up and use ohmmeters.
	08.03 Set up and use a DVA tester or equivalent.
	08.04 Set up and use spark testers.
	08.05 Set up and use neon test lights.
	08.06 Set up and use low/high ammeters.
	08.07 Set up and use voltmeters.
	08.08 Locate and identify parts of capacitor discharge ignition systems.
	08.09 Locate and match electrical units by their symbols on a wiring diagram.
	08.10 Sketch and label complete C/D ignition systems.
	08.11 Check coil resistance, shorts and grounds with an ohmmeter.
	08.12 Check stator windings with an ohmmeter.
	08.13 Check sensor coils, charge coils, ignition coils and shorts to ground with a DVA tester or equivalent.
	08.14 Check power packs with an ohmmeter and a DVA tester or equivalent.
09.0	Maintain and repair outboard fuel systems--The student will be able to:
	09.01 Identify the major types of carburetors.
	09.02 Check and adjust throttle.
	09.03 Identify and service different types of EFI systems.
	09.04 Remove, service, and replace air cleaners.
	09.05 Identify basic carburetor circuits (chokes, floats, fuel inlets; idle, intermediate and high speeds; mains, etc.)
	09.06 Diagnose carburetor problems.
	09.07 Remove, clean, overhaul, replace and make final adjustments to carburetors.
	09.08 Diagnose exhaust problems such as back pressure and scavenging.

CTE Standards and Benchmarks	
	09.09 Remove, service, and replace flame arrestors.
10.0	Parts specialist and computer skills to industry standards--The student will be able to:
	10.01 Identify the skills needed to be a service writer.
	10.02 Identify the skills needed to be a parts specialist.
	10.03 Demonstrate appropriate computer skills.
	10.04 Demonstrate knowledge of different parts and accessories.

Florida Department of Education
Student Performance Standards

Course Number: MTE0090
Occupational Completion Point: B
Outboard Engine Technician – 300 Hours – SOC Code 49-3051

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of outboard 4-stroke cycle engines, charging systems, battery ignition systems, cranking systems, lubrication systems, cooling systems, lower gear cases, lower units and housing assemblies, employability, and entrepreneurship.

CTE Standards and Benchmarks	
11.0	Maintain and repair basic four-stroke cycle outboard engines--The student will be able to:
11.01	Explain the basic principles of the operation of four-stroke cycle internal combustion engines.
11.02	Identify types of four-stroke cycle engines.
11.03	Locate engine serial and model numbers.
11.04	Identify engine assemblies and systems.
11.05	Diagnose valve and head problems by use of the visual inspection method.
11.06	Diagnose valve and head problems by use of the compression tester method.
11.07	Disassemble engines and inspect parts.
11.08	Clean and inspect heads for cracks, warpage and damaged spark plug threads.
11.09	Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.
11.10	Adjust valves.
11.11	Remove and inspect camshafts and lifters.
11.12	Clean and inspect lifters for wear.
11.13	Time valve drive assemblies.
11.14	Remove pistons from rod assemblies.
11.15	Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
11.16	Check piston pins and bosses for wear.
11.17	Measure piston ring lands width, out-of-round and taper.

CTE Standards and Benchmarks	
11.18	Measure the piston ring gap in cylinder bores.
11.19	Install and fit piston pins.
11.20	Check rod and piston assembly alignment.
11.21	Remove and replace rod bearings.
11.22	Hone and clean cylinders.
11.23	Install rings on pistons.
11.24	Measure and check crankshafts with a micrometer.
11.25	Check for end play.
11.26	Check bearing bores with a telescoping gage.
11.27	Reassemble engines.
11.28	Install oil seals.
11.29	Inspect/replace timing belt/chain.
12.0	Maintain and repair outboard charging systems--The student will be able to:
12.01	Sketch and label the units of complete charging circuits.
12.02	Disassemble charging systems and identify the components.
12.03	Perform stator and rectifier testing on charging systems.
12.04	Reassemble and test charging systems.
12.05	Set up and use ohmmeters.
12.06	Reassemble and test complete units.
13.0	Maintain and repair outboard battery ignition systems--The student will be able to:
13.01	Locate and identify parts of battery ignition systems.
13.02	Locate and match electrical units by their symbols on a wiring diagram.
13.03	Sketch and label complete battery ignition systems.
13.04	Check coil resistance with an ohmmeter.
13.05	Set up and use test equipment.
13.06	Set timing using timing light.
13.07	Clean and regap spark plugs.
14.0	Maintain and repair outboard cranking systems--The student will be able to:
14.01	Disassemble recoil starters.

CTE Standards and Benchmarks	
	14.02 Inspect components of recoil starters.
	14.03 Reassemble recoil starters.
	14.04 Identify components of electrical starting systems.
	14.05 Bench test switches.
	14.06 Troubleshoot starting systems using multimeter.
	14.07 Locate opens, short and grounds.
15.0	Maintain and repair outboard lubrication systems--The student will be able to:
	15.01 Identify the types and functions of lubrication systems.
	15.02 Explain the principles of lubrication systems.
	15.03 Identify and locate components of lubrication systems.
	15.04 Check engines for oil leaks.
	15.05 Change engine oil and filters.
	15.06 Check engine oil pressure and level.
	15.07 Recognize and use only recommended oil.
	15.08 Inspect and service oil metering systems.
16.0	Maintain and repair outboard cooling systems--The student will be able to:
	16.01 Explain the principles of cooling systems.
	16.02 Trace water flow through cooling systems.
	16.03 Disassemble, examine for problems and reassemble water pumps.
	16.04 Remove, check and replace thermostats.
	16.05 Service poppet valves.
	16.06 Service or replace thermostat and thermostat housings.
17.0	Maintain and repair outboard lower gear cases--The student will be able to:
	17.01 Remove and replace lower gear cases.
	17.02 Identify the components of lower gear case.
	17.03 Refill lower gear cases with specified oil.
	17.04 Determine propeller pitch diameter and hub type.
18.0	Assemble and maintain outboard lower units and housing assemblies--The student will be able to:
	18.01 Disassemble and reassemble steering handle groups.

CTE Standards and Benchmarks	
18.02	Disassemble and assemble exhaust housings and water tube assemblies.
18.03	Replace motor mounts and shock absorbers.
18.04	Lubricate all fittings.
18.05	Pressure and vacuum test gear cases.
18.06	Remove and service cylinders and rams.
18.07	Adjust the trim and tilt.
18.08	Determine the differences between mechanical, electrical and hydraulic shifting units.
18.09	Explain the shifting theory of the lower unit.
18.10	Perform correct procedure for filling trim and tilt with hydraulic oil.
19.0	Demonstrate employability skills--The student will be able to:
19.01	Conduct a job search using periodicals and the internet.
19.02	Secure information about a job.
19.03	Identify documents that may be required when applying for a job interview.
19.04	Complete a job application form correctly.
19.05	Demonstrate competence in job interview techniques.
19.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
19.07	Identify acceptable work habits.
19.08	Demonstrate knowledge of how to make appropriate job changes.
19.09	Demonstrate acceptable employee health habits.
19.10	Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200).
20.0	Demonstrate an understanding of entrepreneurship--The student will be able to:
20.01	Define entrepreneurship.
20.02	Describe the importance of entrepreneurship to the American economy.
20.03	List the advantages and disadvantages of business ownership.
20.04	Identify and explain the risks involved in ownership of a business.
20.05	Identify and explain the necessary personal characteristics of a successful entrepreneur.
20.06	Identify and explain the business skills needed to operate a small business efficiently and effectively.
20.07	Identify and explain the various types of business structures, e.g. sole proprietor, S-Corporation, etc.

Florida Department of Education
Student Performance Standards

Course Number: MTE0074
Occupational Completion Point: C
Outboard Engine Diagnostics Technician – 150 Hours – SOC Code 49-3051

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of basic computer skills, computer-based diagnostic equipment, electrical, control box, and gauges.

CTE Standards and Benchmarks	
21.0	Apply basic computer skills--The student will be able to:
21.01	Identify and apply the proper procedures for turning on, and turning off a computer.
21.02	Identify and apply the proper procedures for logging on, and logging off a computer.
21.03	Demonstrate knowledge of properly using and navigating operating systems.
21.04	Identify and properly use various peripheral devices. (e.g., printers, scanners, external storage devices)
21.05	Demonstrate and apply the process for locating, copying, pasting, saving, and backing up a file and folder
21.06	Demonstrate the process for opening and saving a file using program specific extensions. (e.g., .docx, .pdf, .txt)
21.07	Identify and apply the proper procedures for securely uploading and downloading files over external and internal networks.
21.08	Demonstrate the proper procedures for using and navigating e-mail programs.
21.09	Create and send electronic messages using proper e-mail communication etiquette.
21.10	Show understanding for properly attaching a file within an e-mail message.
22.0	Troubleshoot and solve problems with outboard engines using industry recognized computer-based diagnostic equipment--The student will be able to:
22.01	Demonstrate and understand the proper procedures for connecting diagnostic equipment to an outboard engine.
22.02	Identify and demonstrate the proper procedures for opening and closing diagnostic programs.
22.03	Use multiple research techniques to identify faults and data to be used to solve outboard engine trouble.
22.04	Formulate a plan to repair outboard engines given the data found.
22.05	Download, save, and print output data from an outboard engine.
23.0	Set up electric and digital control box, and gauges--The student will be able to:

CTE Standards and Benchmarks
23.01 Assign position to outboard engines.
23.02 Set up trim and tilt limits.
23.03 Set up digital gauges.

Florida Department of Education
Student Performance Standards

Course Number: MTE0092
Occupational Completion Point: D
Inboard Gas Engine Technician – 300 Hours – SOC Code 49-3051

Course Description:
Students will learn skills for the inboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student an understanding of basic four-stroke cycle engines, fuel systems, cooling systems, lubrication systems, ignition systems, and capacitor discharge ignition systems.

CTE Standards and Benchmarks	
24.0	Maintain and repair basic four-stroke cycle inboard gas engines--The student will be able to:
24.01	Diagnose valve and head problems by use of the visual inspection method.
24.02	Diagnose valve and head problems by use of the compression tester method.
24.03	Disassemble engines and inspect parts.
24.04	Clean and inspect heads for cracks, warpage and damaged spark plug threads.
24.05	Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.
24.06	Adjust valves.
24.07	Remove and inspect camshafts and lifters.
24.08	Clean and inspect lifters for wear.
24.09	Time valve drive assemblies.
24.10	Remove pistons from rod assemblies.
24.11	Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
24.12	Check piston pins and bosses for wear.
24.13	Measure piston ring lands width, out-of-round and taper.
24.14	Measure the piston ring gap in cylinder bores.
24.15	Install and fit piston pins.
24.16	Check rod and piston assembly alignment.
24.17	Remove and replace rod bearings.

CTE Standards and Benchmarks	
	24.18 Hone and clean cylinders.
	24.19 Install rings on pistons.
	24.20 Measure and check crankshafts with a micrometer.
	24.21 Check for end play.
	24.22 Check bearing bores with a telescoping gage.
	24.23 Reassemble engines.
	24.24 Install oil seals.
	24.25 Inspect/replace timing belt/chain.
25.0	Maintain and repair inboard fuel systems--The student will be able to:
	25.01 Identify and locate fuel system components (fuel tanks, lines, filters, etc.).
	25.02 Sketch and label the parts of total fuel systems.
	25.03 Service fuel lines.
	25.04 Describe or demonstrate the process for removing, cleaning, inspecting and installing fuel tanks.
	25.05 Vacuum test fuel system.
	25.06 Remove, replace service and check the pressure of fuel pumps.
	25.07 Remove, clean and replace in-line filters.
	25.08 Identify the major types of carburetors.
	25.09 Check and adjust throttle linkages.
	25.10 Identify and service different types of EFI systems.
	25.11 Identify and understand different types of Vapor Separator Tank (VST) systems.
	25.12 Remove, service, and replace flame arrestors.
26.0	Maintain and repair inboard gas cooling systems--The student will be able to:
	26.01 Explain the principles of cooling systems, including fresh water cooling systems.
	26.02 Trace water flow through cooling systems.
	26.03 Disassemble and reassemble water pumps.
	26.04 Remove, check and replace thermostats.
	26.05 Check thermostat pressure relief systems.

CTE Standards and Benchmarks	
	26.06 Service manifolds, risers and thermostat housings.
27.0	Maintain and repair inboard gas lubrication systems--The student will be able to:
	27.01 Identify the types and functions of lubrication systems.
	27.02 Explain the principles of lubrication systems.
	27.03 Identify and locate components of lubrication systems.
	27.04 Check engines for oil leaks.
	27.05 Change engine oil and filters.
	27.06 Check engine oil pressure and level.
	27.07 Recognize and use only recommended oil.
28.0	Maintain and repair battery ignition systems--The student will be able to:
	28.01 Locate and match electrical units by their symbols on a wiring diagram.
	28.02 Sketch and label complete battery ignition systems.
	28.03 Set up and use test equipment.
	28.04 Set timing using a timing light
29.0	Maintain and repair capacitor discharge ignition systems--The student will be able to:
	29.01 Sketch and label electrical symbols.
	29.02 Set up and use ohmmeters.
	29.03 Set up and use appropriate test equipment.
	29.04 Set up and use spark testers.
	29.05 Set up and use neon test lights.
	29.06 Set up and use low/high ammeters.
	29.07 Set up and use voltmeters.
	29.08 Locate and identify parts of capacitor discharge ignition systems.
	29.09 Locate and match electrical units by their symbols on a wiring diagram.
	29.10 Check coil resistance, shorts and grounds with an ohmmeter.
	29.11 Check sensor coils, charge coils, ignition coils and shorts to ground with appropriate test equipment.

Florida Department of Education
Student Performance Standards

Course Number: MTE0093
Occupational Completion Point: E
Drive Train Technician – 150 Hours – SOC Code 49-3051

Course Description:
Students will learn entry-level skills for the outboard marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of stern drive upper and lower cases, intermediate housings, and inboard gas transmissions.

CTE Standards and Benchmarks	
30.0	Maintain and repair stern drive upper gear case--The student will be able to:
30.01	Identify components of upper gear case.
30.02	Use the proper oil to refill upper and lower gear cases.
31.0	Maintain and repair stern drive lower gear cases--The student will be able to:
31.01	Identify components of lower gear case.
31.02	Remove and replace lower gear cases.
31.03	Refill lower gear cases with specified oil.
31.04	Determine propeller pitch, diameter and hub type.
32.0	Maintain and repair stern drive intermediate housings--The student will be able to:
32.01	Check engine alignment.
32.02	Check electrical components with proper test equipment.
32.03	Remove and replace "U" joints.
32.04	Identify components of transom plates.
32.05	Service, install, and adjust trim and tilt systems.
33.0	Maintain and repair inboard gas transmissions--The student will be able to:
33.01	Remove and replace transmissions.
33.02	Drain transmissions.
33.03	Determine capacity using the transmission service manuals.
33.04	Refill transmissions according to manufacturers' specifications.

Florida Department of Education
Student Performance Standards

Course Number: MTE0056
Occupational Completion Point: F
Inboard Diesel Technician – 150 Hours – SOC Code 49-3051

Course Description:
Students will learn entry-level skills for the diesel marine service industry. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of diesel fuel, cooling, lubrication, and charging systems.

CTE Standards and Benchmarks	
34.0	Maintain and repair inboard diesel fuel systems--The student will be able to:
34.01	Identify and locate fuel system components (fuel tanks, lines, filters, etc.).
34.02	Sketch and label the parts of total fuel systems.
34.03	Service fuel lines.
34.04	Describe or demonstrate the process for removing, cleaning, inspecting and installing fuel tanks.
34.05	Identify and locate fuel control devices.
34.06	Remove, clean and replace in-line filters.
34.07	Check and adjust throttle and governor linkages.
34.08	Check fuel systems for leaks.
34.09	Bleed systems for starting.
34.10	Set the injection pump angle (timing).
34.11	Check or replace glow plugs.
34.12	Check; stop solenoids.
35.0	Maintain and repair inboard diesel cooling systems--The student will be able to:
35.01	Disassemble and reassemble water pumps.
35.02	Remove, check and replace thermostats.
35.03	Use thermostat pressure relief systems.
35.04	Service manifolds, risers and thermostat housings.
35.05	Service water-cooling systems for diesel engines.

CTE Standards and Benchmarks	
36.0	Maintain and repair inboard diesel lubrication systems--The student will be able to:
36.01	Identify the types and functions of lubrication systems.
36.02	Explain the principles of lubrication systems.
36.03	Identify and locate components of lubrication systems.
36.04	Check engines for oil leaks.
36.05	Change engine oil and filters.
36.06	Check engine oil pressure and level.
36.07	Recognize and use only recommended oil.
37.0	Maintain and repair inboard diesel charging systems--The student will be able to:
37.01	Inspect, remove and replace alternator belts.
37.02	Check the output of charging systems.
37.03	Analyze malfunctions.

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)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Avionics Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Avionics Systems Technician (T400310).

PSAV – Career Preparatory	
Program Number	T400300
CIP Number	0647060902
Grade Level	30, 31
Standard Length	600 hours
Teacher Certification	AVIONICS @7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2091 – Avionics Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students for employment as avionics installation and repair technicians.

The course content includes, but is not limited to, troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters

and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product 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 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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AVS0095	Basic Electronics Troubleshooter	150 hours	49-2091
B	AVS0096	Advanced Electronics Troubleshooter	150 hours	49-2091
C	AVS0097	Avionics Installation Technician	150 hours	49-2091
D	AVS0098	Avionics Communication Technician	150 hours	49-2091

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Avionics Technology program can be found using the following links:

www.faa.gov/
www.eta-i.org/

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate proficiency in soldering and basic laboratory practices.
02.0 Demonstrate proficiency in basic DC circuits.
03.0 Demonstrate employability skills.
04.0 Demonstrate an understanding of entrepreneurship.
05.0 Demonstrate proficiency in knowledge of basic computer usage.
06.0 Demonstrate proficiency in advanced DC circuits.
07.0 Demonstrate proficiency in AC circuits.
08.0 Demonstrate proficiency in analog circuits.
09.0 Demonstrate proficiency in solid state devices.
10.0 Demonstrate proficiency in digital circuits.
11.0 Demonstrate proficiency in fundamental micro-processors.
12.0 Demonstrate appropriate understanding of basic math skills.
13.0 Demonstrate an understanding of basic science skills.
14.0 Demonstrate skills in technical recording.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate competency in adherence to Federal Aviation Regulations including FAA form 337 and FAR 43.13.
17.0 Demonstrate proficiency with Aircraft Drawings CAD and wiring diagrams.
18.0 Demonstrate proficiency in Aircraft fundamentals.
19.0 Demonstrate proficiency in aircraft electrical systems and ground safety.
20.0 Demonstrate proficiency in installing avionics systems, including, Comm, Nav, GPS, Traffic Avoidance, audio integrating etc.
21.0 Demonstrate proficiency in sheet metal applications.
22.0 Demonstrate proficiency in AM and FM transmitters.
23.0 Demonstrate proficiency in AM and FM receivers.
24.0 Demonstrate proficiency in AM and FM transceivers.
25.0 Demonstrate proficiency in electromagnetic wave emissions.
26.0 Demonstrate proficiency in line maintenance of airborne radio navigation systems and equipment.
27.0 Demonstrate proficiency in line maintenance of airborne communication systems.
28.0 Demonstrate proficiency in primary and secondary airborne radar systems.
29.0 Demonstrate proficiency with In-Flight Entertainment Systems.
30.0 Demonstrate proficiency with Engine Monitoring displays, purpose and function.
31.0 Pitot-Static Systems
32.0 Foundations
33.0 UAS Development
34.0 UAV Flight Operations
35.0 UAS Operations

Florida Department of Education
Student Performance Standards

Program Title: **Avionics Technology**
PSAV Number: **T400300**

Course Number: AVS0095
Occupational Completion Point: A
Basic Electronics Troubleshooter – 150 Hours – SOC Code 49-2091

Course Description:
The Basic Electronics Troubleshooter course prepares students for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study basic laboratory practices, direct current (DC), employability, entrepreneurship, computer literacy, advanced direct current (DC), and alternating current (AC).

CTE Standards and Benchmarks	
01.0	Demonstrate proficiency in soldering basic laboratory practices--The student will be able to:
01.01	Apply proper Occupational Safety Health Administration (OSHA) safety standards.
01.02	Make electrical connections.
01.03	Identify and use hand tools properly.
01.04	Identify and use power tools properly.
01.05	Demonstrate acceptable soldering techniques.
01.06	Demonstrate acceptable desoldering techniques.
01.07	Demonstrate electrostatic discharge (ESD) safety procedures.
01.08	Describe the construction of printed circuit boards (PCB's).
01.09	Explain the theoretical concepts of soldering.
01.10	Demonstrate rework and repair techniques.
02.0	Demonstrate proficiency in basic direct current (DC) circuits--The student will be able to:
02.01	Demonstrate proficiency in basic DC circuits.
02.02	Solve problems in electronic units utilizing metric prefixes.
02.03	Identify sources of electricity.
02.04	Define voltage, current, resistance, power and energy.
02.05	Apply Ohm's law and power formulas.

CTE Standards and Benchmarks	
02.06	Read and interpret color codes and symbols to identify electrical components and values.
02.07	Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.
02.08	Compute conductance and compute and measure resistance of conductors and insulators.
02.09	Apply Ohm's law to series circuits.
02.10	Analyze and troubleshoot series circuits.
02.11	Apply Ohm's law to parallel circuits.
02.12	Analyze and troubleshoot parallel circuits.
03.0	Demonstrate employability skills--The student will be able to:
03.01	Discuss elements of a job search.
03.02	Develop sources of information about a job.
03.03	Identify documents that may be required when applying for a job.
03.04	Complete a job application form correctly.
03.05	Demonstrate competence in job interview techniques.
03.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
03.07	Identify acceptable work habits.
03.08	Demonstrate knowledge of how to make appropriate job changes.
03.09	Demonstrate acceptable employee health habits.
03.10	Demonstrate knowledge of the “Right-to-Know Law” as recorded in (29 CFR-1910.1200).
03.11	Resume writing
04.0	Demonstrate an understanding of entrepreneurship--The student will be able to:
04.01	Define entrepreneurship.
04.02	Describe the importance of entrepreneurship to the American economy.
04.03	List the advantages and disadvantages of business ownership.
04.04	Identify the risks involved in ownership of a business.
04.05	Identify the necessary personal characteristics of a successful entrepreneur.
04.06	Identify the business skills needed to operate a small business efficiently and effectively.
04.07	Corporate structure “S”,”C”, Sole Proprietor, “LLC”

CTE Standards and Benchmarks	
05.0	Demonstrate proficiency in knowledge of basic computer usage--The student will be able to:
05.01	Demonstrate proficiency in the knowledge of basic computer use.
05.02	Demonstrate the use of computer application programs (i.e., word processing, data base, Excel).
06.0	Demonstrate proficiency in advanced DC circuits--The student will be able to:
06.01	Solve algebraic problems to include exponentials to DC.
06.02	Relate electricity to the nature of matter.
06.03	Apply Ohm's law to series-parallel and parallel-series circuits.
06.04	Construct and verify the operation of series-parallel and parallel-series and bridge circuits.
06.05	Troubleshoot series-parallel and parallel-series and bridge circuits.
06.06	Identify and define voltage divider circuits (loaded and unloaded).
06.07	Construct and verify the operation of voltage divider circuits (loaded and unloaded).
06.08	Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
06.09	Describe magnetic properties of circuits and devices.
06.10	Determine the physical and electrical characteristics of capacitors and inductors.
06.11	Define resistor-capacitor (R-C) and resistor-inductor (R-L) time constants
06.12	Set up and operate power supplies for DC circuits.
07.0	Demonstrate proficiency in AC circuits--The student will be able to:
07.01	Solve basic trigonometric problem as applicable to electronics.
07.02	Define the characteristics of AC capacitive circuits.
07.03	Analyze and troubleshoot AC capacitive circuits.
07.04	Define the characteristics of AC inductive circuits.
07.05	Analyze and troubleshoot AC inductive circuits.
07.06	Define and apply the principles of transformers to AC circuits.
07.07	Analyze and troubleshoot AC circuits utilizing transformers.
07.08	Analyze and troubleshoot differentiator and integrator circuits.
07.09	Define the characteristics of resistive, Inductive, and Capacitive (RLC) circuits (series, parallel and complex).
07.10	Define the characteristics of series and parallel resonant circuits.

CTE Standards and Benchmarks
07.11 Analyze and troubleshoot R-C, R-L, and RLC circuits.
07.12 Define the characteristics of frequency selective filter circuits.
07.13 Analyze and troubleshoot frequency selective filter circuits.
07.14 Define the characteristics of polyphase circuits.
07.15 Define basic motor theory and operation.
07.16 Define basic generator theory and operation.
07.17 Set up and operate power supplies for AC circuits.
07.18 Analyze and measure power in AC circuits.

Florida Department of Education
Student Performance Standards

Course Number: AVS0096
Occupational Completion Point: B
Advanced Electronics Troubleshooter– 150 Hours – SOC Code 49-2091

Course Description:
The Advanced Electronics Troubleshooter course prepares students for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study analog circuitry, solid state devices, digital circuitry, micro-processors, math, science, technical recording, communication skills, FAA and FAR regulations, aircraft CAD and wiring diagrams, and aircraft fundamentals.

CTE Standards and Benchmarks	
08.0	Demonstrate proficiency in analog circuits--The student will be able to:
08.01	Identify and define operational characteristics and applications of multistage amplifiers.
08.02	Analyze and troubleshoot multistage amplifiers.
08.03	Identify and define operating characteristics and applications of linear integrated circuits.
08.04	Identify and define operating characteristics and applications of basic power supplies and filters.
08.05	Identify and define operating characteristics and applications of differential and operational amplifiers.
08.06	Analyze and troubleshoot differential and operational amplifier circuits.
08.07	Identify and define operating characteristics of audio power amplifiers.
08.08	Analyze and troubleshoot audio power amplifiers.
08.09	Identify and define operating characteristics and applications of power supply regulator circuits.
08.10	Analyze and troubleshoot power supply regulator circuits.
08.11	Identify and define operating characteristics and applications of active filters.
08.12	Analyze and troubleshoot active filter circuits.
08.13	Identify and define operating characteristics and applications of sinusoidal and non-sinusoidal oscillator circuits.
08.14	Analyze and troubleshoot oscillator circuits.
08.15	Identify and define operating characteristics and applications of cathode ray tubes.
08.16	Identify and define operating characteristics and applications of optoelectronic devices.
08.17	Set up and operate measuring instruments for analog circuits.

CTE Standards and Benchmarks	
09.0	Demonstrate proficiency in solid state devices--The student will be able to:
09.01	Identify and define properties of semiconductor materials.
09.02	Identify and define operating characteristics and applications of junction diodes.
09.03	Identify and define operating characteristics and applications of special diodes.
09.04	Analyze and troubleshoot diode circuits.
09.05	Identify and define operating characteristics and applications of bipolar transistors,
09.06	Identify and define operating characteristics and applications of field effect transistors.
09.07	Identify and define operating characteristics and applications of single-stage amplifiers.
09.08	Analyze and troubleshoot single-stage amplifiers.
09.09	Analyze and troubleshoot thyristor circuitry.
09.10	Set up and operate DVM for solid-state devices.
09.11	Set up and operate power supplies for solid-state devices.
09.12	Set up and operate oscilloscopes for solid-state devices.
09.13	Set up and operate function generators for solid-state devices.
09.14	Demonstrate transistor testing techniques.
10.0	Demonstrate proficiency in digital circuits--The student will be able to:
10.01	Define and apply numbering systems to codes and arithmetic operations.
10.02	Analyze and minimize logic circuits using Boolean operations.
10.03	Set up and operate logic probes for digital circuits.
10.04	Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
10.05	Set up and operate pulsers for digital circuits.
10.06	Set up and operate oscilloscopes for digital circuits.
10.07	Set up and operate logic analyzers for digital circuits.
10.08	Set up and operate pulse generators for digital circuits.
10.09	Identify types of logic gates and their truth tables.
10.10	Construct combinational logic circuits using integrated circuits.
10.11	Troubleshoot logic circuits.

CTE Standards and Benchmarks	
10.12	Analyze types of flip-flops and their truth tables.
10.13	Troubleshoot flip-flops.
10.14	Identify, define and measure characteristics of integrated circuit (IC) logic families.
10.15	Identify types of registers and counters.
10.16	Troubleshoot registers and counters.
10.17	Analyze clock and timing circuits.
10.18	Troubleshoot clock and timing circuits.
10.19	Identify types of arithmetic-logic circuits.
10.20	Troubleshoot arithmetic-logic circuits.
10.21	Identify types of encoding and decoding devices.
10.22	Troubleshoot encoders and decoders.
10.23	Identify types of multiplexer and demultiplexer circuits.
10.24	Troubleshoot multiplexer and demultiplexer circuits.
10.25	Identify types of memory circuits.
10.26	Relate the uses of digital-to-analog and analog-to-digital conversions.
10.27	Troubleshoot digital-to-analog and analog-to-digital circuits.
10.28	Identify types of digital displays.
10.29	Troubleshoot digital display circuits.
11.0	Demonstrate proficiency in fundamental micro processors--The student will be able to:
11.01	Identify central processing unit (CPU) building blocks and their uses (architecture).
11.02	Analyze bus concepts.
11.03	Analyze various memory schemes.
11.04	Use memory devices in circuits.
11.05	Set up and operate oscilloscopes for microprocessor systems.
11.06	Identify types of input and output devices and peripherals.
11.07	Interface input and output ports to peripherals.
11.08	Analyze and troubleshoot input and output ports.

CTE Standards and Benchmarks	
12.0	Demonstrate appropriate understanding of basic math skills--The student will be able to:
12.01	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares and cylinders.
12.02	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
12.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
12.04	Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05	Demonstrate and understanding of federal, state, and local taxes and their computation.
13.0	Demonstrate an understanding of basic science skills--The student will be able to:
13.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02	Draw conclusions or make interferences from data.
13.03	Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04	Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
14.0	Demonstrate skills in technical recording--The student will be able to:
14.01	Draw and interpret electronic schematics.
14.02	Write reports and make oral presentations.
14.03	Maintain test logs.
14.04	Make equipment failure reports.
14.05	Specify and requisition simple electronic components.
14.06	Compose technical letters and memoranda.
14.07	Write formal reports of laboratory experiences.
14.08	Draft preventive maintenance procedures.
15.0	Demonstrate appropriate communication skills--The student will be able to:
15.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03	Read and follow written instructions.
15.04	Answer and ask questions coherently and concisely.
15.05	Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06	Demonstrate appropriate telephone/communication skills.

CTE Standards and Benchmarks	
16.0	Demonstrate competency in adherence to federal aviation regulations--The student will be able to:
16.01	Maintenance Technician-General Privileges and Limitations.
16.02	Maintenance Forms and Records including FAA Form 337.
16.03	Maintenance Publications.
16.04	Use and analysis of technical data.
17.0	Demonstrate proficiency with aircraft drawings--The student will be able to:
17.01	Aircraft Drawings and Diagrams, Flowcharts, Symbols, and Lines
17.02	Reading and interpreting Aircraft Drawings and Blueprints
17.03	Preparation and sketches of repairs and alterations
17.04	Use of charts and graphs
17.05	Familiarization and usage of CAD Systems
18.0	Demonstrate proficiency in aircraft fundamentals--The student will be able to:
18.01	Aerodynamic Forces and Aircraft Structures and Components
18.02	Aircraft Flight Controls and Aircraft Flight Operations.

Florida Department of Education
Student Performance Standards

Course Number: AVS0097
Occupational Completion Point: C
Avionics Installation Technician – 150 Hours – SOC Code 49-2091

Course Description:
The Avionics Installation Technician course prepares students for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study electrical systems, grounding safety, avionics systems, sheet metal applications, AM and FM transmitters, receivers, transceivers, electromagnetic wave emissions, and airborne radio navigation systems.

CTE Standards and Benchmarks	
19.0	Demonstrate proficiency in aircraft electrical systems and ground safety--The student will be able to:
19.01	Circuit Protective Devices, Switches, Lamps, and Relays.
19.02	Safety and Handling of Aircraft Electrical Wires and Cables.
19.03	Cutting, Stripping, Splicing, Soldering, and Stamping/Identifying Wires and Cables for Installation in an Aircraft.
19.04	Preparation, Use, Installation, and Inspection of General Purpose Connectors.
19.05	AN-MS Connectors for Aircraft Electrical Systems
19.06	Lead-Acid and Nickel Cadmium (NiCad) Aircraft Batteries-Identification, Construction, Installation and Service.
19.07	Familiarization with Aircraft Alternator and Generator Systems.
20.0	Demonstrate proficiency in installing avionics systems--The student will be able to:
20.01	Installation Planning
20.02	Design wiring interconnection for Comm, Nav, GPS, Traffic Avoidance, Audio Integrating etc.
20.03	Fabricate Wiring Harnesses
20.04	Corrosion Control in Avionics
20.05	Mechanical Installation
20.06	Electrical Installation
20.07	Installation of Manufacturers Equipment
20.08	Antenna Placement and Noise interference
21.0	Demonstrate proficiency in sheet metal applications--The student will be able to:

CTE Standards and Benchmarks	
	21.01 Selection, Installation, and Removal of Conventional Rivets
	21.02 Selection, Installation, and Removal of Special Rivets (Fasteners)
	21.03 Layout, Forming, and Bending Sheet Metal
	21.04 Inspecting and Repairing Sheet Metal Structures
	21.05 Aircraft Antenna Installations and Doubler plates.
22.0	Demonstrate proficiency in AM and FM transmitters--The student will be able to:
	22.01 Define DSB, SSB and FM modulation.
	22.02 Analyze and troubleshoot AM and FM RF oscillator circuits.
	22.03 Analyze and troubleshoot buffer and multiplier circuits.
	22.04 Analyze and troubleshoot RF power amplifier circuits.
	22.05 Analyze and troubleshoot AM and FM modulation circuits.
	22.06 Analyze and troubleshoot microphone circuits.
	22.07 Analyze and troubleshoot balanced modulators and SSB filter circuits.
	22.08 Analyze and troubleshoot AM and FM power supply circuits.
	22.09 Make power, frequency and modulation measurements of AM and FM transmitters.
	22.10 Align and troubleshoot AM and FM transmitters.
	22.11 Describe FCC rules pertaining to AM and FM transmitter maintenance and operation.
23.0	Demonstrate proficiency in AM and FM receivers--The student will be able to:
	23.01 Analyze and troubleshoot receiver audio voltage and power amplifiers and speaker/headphone circuits.
	23.02 Analyze and troubleshoot AM and FM detector circuits.
	23.03 Analyze and troubleshoot AM IF amplifier circuits.
	23.04 Analyze and troubleshoot FM IF amplifier and limited circuits.
	23.05 Analyze and troubleshoot receiver oscillator and AFC circuits.
	23.06 Analyze and troubleshoot RF mixer/heterodyne circuits.
	23.07 Analyze and troubleshoot receiver RF amplifier circuits.
	23.08 Analyze and troubleshoot AVC/AGC circuits.
	23.09 Analyze and troubleshoot receiver power supplies.

CTE Standards and Benchmarks	
	23.10 Align and troubleshoot AM and FM receivers.
24.0	Demonstrate proficiency in AM and FM transceivers--The student will be able to:
	24.01 Analyze and troubleshoot transceiver control, metering and switching circuits.
	24.02 Analyze and troubleshoot transceiver frequency synthesizers and phase locked loop circuits.
	24.03 Analyze and troubleshoot squelch circuits.
	24.04 Align and troubleshoot transceivers.
25.0	Demonstrate proficiency in electromagnetic wave emissions--The student will be able to:
	25.01 Define the radio frequency spectrum.
	25.02 Define types and classification of RF emissions.
	25.03 Define the characteristics of radio waves.
	25.04 Define radio wave propagation method.
	25.05 Define the basic types of antennas.
	25.06 Draw the voltage and current relationships and radiation patterns for the basic types of antennas.
	25.07 Define methods for antenna tuning, gain and directivity.
	25.08 Define transmission lines in terms of electrical and physical properties.
	25.09 Define standing waves, cause and effect, and measure standing wave ratios.
	25.10 Define tuned transmission lines and describe applications.
	25.11 Construct transmission lines.
	25.12 Define waveguides, resonant cavities and their applications.

Florida Department of Education
Student Performance Standards

Course Number: AVS0098
Occupational Completion Point: D
Avionics Communication Technician – 150 Hours – SOC Code 49-2091

Course Description:
The Avionics Communication Technician course prepares students for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study airborne communication systems, primary and secondary airborne radar systems, In-Flight entertainment systems, engine monitoring systems, Pitot-Static systems, Foundations, UAS Development, UAV Flight, and UAS Operations.

CTE Standards and Benchmarks	
26.0	Demonstrate proficiency in line maintenance of airborne radio navigation systems and equipment--The student will be proficient in theory and operating principles of:
26.01	Global Position Satellite System
26.02	Earth Coordinate System
26.03	Great Circle Navigation
26.04	Navigation Principles
26.05	VHF Omni Range System
26.06	Distance Measuring Equipment System
26.07	Automatic Direction Finder System
26.08	Instrument Landing System
26.09	Microwave Landing Systems.
26.10	Electrical integration including
a.	Airborne Instrument System
b.	VHF Omni-directional range/instrument Landing System (ILS) and System Localizer (VOR/LOC) audio
c.	Navigation Indicators (CDI ON/OFF flag, TO/FROM flag, OBS, etc.)
d.	Radio Magnetic Indicator (RMI)
e.	Flight Director (FD) System
f.	Autopilot (AP) System
26.11	Flight Management System

CTE Standards and Benchmarks	
27.0	Demonstrate proficiency in line maintenance of airborne communication systems--The student will be able to:
	27.01 History of the Radio
	27.02 Regulatory and non-Regulatory Agencies affecting aircraft electronic systems
	27.03 Aircraft Audio Integration Systems
	27.04 VHF Communication Systems
	27.05 HF Communication Systems
	27.06 Satellite Communication Systems
	27.07 Selective Calling
	27.08 Aircraft Communication Automatic Reporting System
28.0	Demonstrate proficiency in primary and secondary radar systems--The student will be proficient in theory and operating principles of:
	28.01 Primary Radar Theory of Operation
	28.02 Block Level Primary Function
	28.03 Doppler Radar
	28.04 Secondary (ATC) Radar Transponder
	28.05 Altitude Encoding
	28.06 Lightning Detection
	28.07 XM Weather System
29.0	Demonstrate proficiency with in-flight entertainment systems--The student will be familiar with similarity and difference of various systems.
	29.01 System familiarization, purpose, function
	29.02 Installation considerations
30.0	Engine monitoring displays–The student will be able to identify and interpret data from various types of displays.
	30.01 Display types
	30.02 Purpose, function, interpretation of data
31.0	Pitot-static systems--The students will be able to test and interpret results from practical run-ups.
	31.01 Understand purpose and function of pitot-static systems
	31.02 Ability to perform integrity run-up checks
	31.03 Troubleshoot pitot-static system

CTE Standards and Benchmarks	
INTRODUCTION TO UNMANNED AIRCRAFT SYSTEMS	
32.0	Foundations–The students will be able to explain the roles, requirements, and basic function of Unmanned Aerial Systems:
	32.01 Introduction to UAS
	32.02 UAS Certifications and Requirements.
	32.03 Aerodynamics
33.0	UAS Development–The students will demonstrate a working knowledge of the airframes and powerplants utilized in Unmanned Aerial Systems:
	33.01 Parts of an Airplane, Aircraft Performance.
	33.02 Structures and Fabrication, and Aircraft Components.
	33.03 Reliability, Availability, Maintainability.
34.0	UAV Flight Operations--The students will demonstrate an understanding of the levels of autonomy currently in use as well as those under development, as well as function and purpose of Unmanned Aerial Vehicles. They will also be exposed to employment possibilities inherent to UAV operation:
	34.01 UAV Guidance, Navigation and Control.
	34.02 UAV Payloads, Power, and Communications.
	34.03 UAS Personnel, Operations, and Careers.
35.0	UAS Operations--The students will be able to explain cost and risk factors associated with and alleviated by usage of Unmanned Aerial Systems:
	35.01 UAS Missions
	35.02 Ground Control Station Components, Flight Line Safety.
	35.03 History of UAS, Systems Engineering, Engineering Design Process.

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)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Avionics Systems Technician**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400310
CIP Number	0647060905
Grade Level	30, 31
Standard Length	1200 hours
Teacher Certification	AVIONICS @7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2091 – Avionics Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students for employment as avionics installation and repair technicians.

The course content includes, but is not limited to, troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product 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 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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AVS0680	Basic Electronics Wiring Installer/Technician	150 hours	49-2091
B	AVS0681	Electrical Systems Technician	150 hours	49-2091
C	AVS0682	Analog Circuits Technician	150 hours	49-2091
D	AVS0683	Aircraft Electronics Technician	150 hours	49-2091
E	AVS0684	Avionics Installer/Technician	300 hours	49-2091
F	AVS0685	Advanced Avionics Installer/Technician	300 hours	49-2091

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Avionics Technology program can be found using the following links:

www.faa.gov/
www.eta-i.org/

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate proficiency in the fundamentals of aviation maintenance technology.
02.0 Demonstrate skills in technical communications.
03.0 Demonstrate proficiency in basic aircraft wiring and PCB practices.
04.0 Demonstrate proficiency in basic direct current (DC) circuits.
05.0 Demonstrate proficiency in advanced direct current (DC) circuits.
06.0 Demonstrate proficiency in aircraft direct current (DC) power systems.
07.0 Demonstrate proficiency in alternating current (AC) circuits.
08.0 Demonstrate proficiency in advanced alternating current (AC) circuits.
09.0 Demonstrate proficiency in alternating current (AC) circuit components.
10.0 Demonstrate proficiency in aircraft alternating current (AC) power systems.
11.0 Demonstrate proficiency with aircraft drawings.
12.0 Demonstrate proficiency in solid state devices.
13.0 Demonstrate proficiency in analog circuits.
14.0 Demonstrate an understanding of basic avionics corrosion.
15.0 Demonstrate proficiency in aircraft aerodynamic fundamentals.
16.0 Demonstrate proficiency in Unmanned Aerial Systems Foundations.
17.0 Demonstrate knowledge in Unmanned Aerial Vehicle Operations.
18.0 Demonstrate proficiency in digital circuits.
19.0 Demonstrate proficiency in fundamental microprocessors.
20.0 Demonstrate an understanding of workplace safety practices.
21.0 Demonstrate appropriate communication skills.
22.0 Demonstrate employability skills.
23.0 Demonstrate an understanding of entrepreneurship.
24.0 Demonstrate knowledge of basic avionics systems.
25.0 Demonstrate proficiency in installing avionics systems.
26.0 Demonstrate proficiency in structural applications.
27.0 Demonstrate proficiency in avionics radio station regulations and procedures.
28.0 Demonstrate proficiency in AM and FM transmitters.
29.0 Demonstrate proficiency in AM and FM receivers.
30.0 Demonstrate proficiency in AM and FM transceivers.
31.0 Demonstrate proficiency in electromagnetic wave emissions.
32.0 Demonstrate proficiency in line maintenance of airborne communication systems.
33.0 Demonstrate proficiency in line maintenance of aircraft instrument systems.
34.0 Demonstrate proficiency in aircraft data bus systems.
35.0 Demonstrate proficiency in line maintenance of airborne navigation systems and equipment.
36.0 Demonstrate proficiency in primary and secondary radar systems.
37.0 Demonstrate proficiency with in-flight entertainment systems.
38.0 Demonstrate proficiency with engine and airframe monitoring systems.

39.0 Demonstrate proficiency with pitot-static systems.
40.0 Demonstrate proficiency with aircraft safety systems.

Florida Department of Education
Student Performance Standards

Program Title: **Avionics Systems Technician**
PSAV Number: **T400310**

Course Number: AVS0680
Occupational Completion Point: A
Basic Electronics Wiring Installer/Technician – 150 Hours – SOC Code 49-2091

Course Description:
This course introduces students to the fundamentals of aviation maintenance, technical communication skills, basic aircraft wiring, PCB practices, basic and advanced DC circuits and power systems. It emphasizes troubleshooting techniques and it brings elements that help to develop fine motor skills. This course defines techniques, requirements and expectations for those seeking to enter the job market as employees or small business owners.

CTE Standards and Benchmarks	
01.0	Demonstrate proficiency in the fundamentals of aviation maintenance technology--The student will be able to:
01.01	Apply proper Occupational Safety Health Administration (OSHA) safety standards.
01.02	Research and report on a career field that supports aviation maintenance technology
01.03	Identify the parts of an aircraft.
01.04	Describe how avionics systems integrate with aircraft airframe and propulsion systems.
01.05	Research and describe the certifications associated with the avionics maintenance technician.
01.06	Research and report on a type of unmanned aerial vehicle (UAV) or unmanned aerial system (UAS).
02.0	Demonstrate skills in technical communications – The student will be able to:
02.01	Draw and interpret electronic schematics
02.02	Write reports and make oral presentations.
02.03	Maintain test logs.
02.04	Write formal reports of laboratory experiences
02.05	Read and follow written instructions.
02.06	Answer and ask questions coherently and concisely
02.07	Read critically by recognizing assumptions and implications and evaluating ideas.
03.0	Demonstrate proficiency in basic aircraft wiring and PCB practices – The student will be able to:

CTE Standards and Benchmarks	
03.01	Explain the theoretical concepts and safety precautions of soldering.
03.02	Use appropriate hand tools to cut, strip, crimp, splice, solder, and stamp/identify wires and cables to industry standards for aircraft installation.
03.03	Prepare, use, install, and inspect general purpose connectors.
03.04	Research and identify the proper AN-MS connectors for use in aircraft electrical systems.
03.05	Identify and use power tools properly.
03.06	Demonstrate acceptable PCB soldering techniques.
03.07	Demonstrate acceptable desoldering techniques.
03.08	Demonstrate electrostatic discharge (ESD) safety procedures.
03.09	Describe the construction of printed circuit boards (PCB's).
03.10	Demonstrate proficiency in reworking and repairing aircraft wiring and PCB’s.
04.0	Demonstrate proficiency in basic direct current (DC) circuits--The student will be able to:
04.01	Solve problems in electronic units utilizing metric prefixes.
04.02	Identify sources of electricity.
04.03	Define voltage, current, resistance, power and energy.
04.04	Apply Ohm's law and power formulas.
04.05	Read and interpret color codes and symbols to identify electrical components and values.
04.06	Measure properties of a DC circuit using an analog volt-ohm (VOM) meter.
04.07	Measure properties of a DC circuit using a digital multimeter (DMM).
04.08	Measure properties of a DC circuit using an oscilloscope.
04.09	Compute conductance and compute and measure resistance of conductors and insulators.
04.10	Apply Ohm's law to series circuits.
04.11	Analyze and troubleshoot series circuits.
04.12	Apply Ohm's law to parallel circuits.
04.13	Analyze and troubleshoot parallel circuits.
05.0	Demonstrate proficiency in advanced direct current (DC) circuits--The student will be able to:
05.01	Solve algebraic problems to include exponentials to DC.
05.02	Relate electricity to the nature of matter.

CTE Standards and Benchmarks	
05.03	Apply Ohm’s law to series-parallel and parallel-series circuits.
05.04	Verify the operation of series-parallel, parallel-series, and bridge circuits.
05.05	Troubleshoot series-parallel and parallel-series and bridge circuits.
05.06	Identify and define voltage divider circuits (loaded and unloaded).
05.07	Verify the operation of voltage divider circuits (loaded and unloaded).
05.08	Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
05.09	Describe magnetic properties of circuits and devices.
05.10	Determine the physical and electrical characteristics of capacitors and inductors.
05.11	Define resistor-capacitor (R-C) and resistor-inductor (R-L) time constants.
05.12	Adjust and operate power supplies for DC circuits.
06.0	Demonstrate proficiency in aircraft direct current (DC) power systems--The student will be able to:
06.01	Identify the types and construction of aircraft batteries.
06.02	Define battery shop safety features and precautions when servicing various types of aircraft batteries.
06.03	Explain the process of servicing lead-acid and nickel-cadmium batteries.
06.04	Describe the types of aircraft DC generation systems.
06.05	Describe the purpose and operation of aircraft DC current limiters, regulators, reverse current relays.

Florida Department of Education
Student Performance Standards

Course Number: AVS0681
Occupational Completion Point: B
Electrical Systems Technician – 150 Hours – SOC Code 49-2091

Course Description:
Students in the Electrical Systems Technician course will learn basic and advanced AC circuitry, components, aircraft AC power systems, and aircraft drawings.

CTE Standards and Benchmarks	
07.0	Demonstrate proficiency in alternating current (AC) circuits--The student will be able to:
07.01	Solve basic trigonometric problem as applicable to electronics.
07.02	Measure the properties of AC circuits using multimeters.
07.03	Measure the properties of an AC circuit using an oscilloscope.
07.04	Identify the sources of AC electricity.
07.05	Use a function generator to inject signals into an AC circuits.
07.06	Define frequency, cycle, Hertz, wavelength, sine wave, phase angle, and period.
07.07	Calculate peak-to-peak, average, and RMS values of an AC signal.
07.08	Identify sine waves, square waves, saw-tooth waves, and ramp waveforms.
07.09	Use Ohm's law to determine resistance in an AC circuit.
07.10	Define the characteristics of AC capacitive circuits.
07.11	Analyze and troubleshoot AC capacitive circuits.
07.12	Define the characteristics of AC inductive circuits.
07.13	Analyze and troubleshoot AC inductive circuits.
08.0	Demonstrate proficiency in advanced alternating current (AC) circuits --The student will be able to:
08.01	Define characteristics of resistive, Inductive and Capacitive (RLC) circuits (series, parallel and complex).
08.02	Define the characteristics of series and parallel resonant circuits.
08.03	Analyze and troubleshoot R-C, R-L, and RLC circuits.
08.04	Define the characteristics of frequency selective filter circuits.

CTE Standards and Benchmarks	
	08.05 Analyze and troubleshoot frequency selective filter circuits.
	08.06 Define the characteristics of polyphase circuits.
09.0	Demonstrate proficiency in alternating current (AC) circuit components--The student will be able to:
	09.01 Define and apply the principles of transformers to AC circuits.
	09.02 Calculate transformer primary and secondary voltage, turn ratio, current, and power.
	09.03 Analyze and troubleshoot step-up, step-down, and auto transformers.
	09.04 Describe the characteristics and operation of relays and switches.
	09.05 Analyze and troubleshoot relays and switches.
	09.06 Define basic AC generator theory and operation.
	09.07 Define basic AC motor theory and operation.
	09.08 Adjust and operate power supplies for AC circuits.
	09.09 Analyze and measure power in AC circuits.
10.0	Demonstrate proficiency in aircraft alternating current (AC) power systems--The student will be able to:
	10.01 Describe the types and operation of aircraft AC generation systems.
	10.02 Describe the operation of basic aircraft DC and AC power distribution systems.
	10.03 Describe the operation of aircraft multi-engine power distribution systems.
11.0	Demonstrate proficiency with aircraft drawings--The student will be able to:
	11.01 Identify and define the symbols, lines, and markings on aircraft flowcharts, drawings and diagrams.
	11.02 Read and interpret aircraft drawings and blueprints.
	11.03 Prepare sketches of aircraft repairs and alterations.
	11.04 Use of charts and graphs.
	11.05 Describe the types of CAD systems and demonstrate the basic functions of a CAD program.

Florida Department of Education
Student Performance Standards

Course Number: AVS0682
Occupational Completion Point: C
Analog Circuits Technician – 150 Hours – SOC Code 49-2091

Course Description:
Students in the Analog Circuits Technician course will learn solid state devices, analog circuits, basic avionics corrosion, aircraft aerodynamics, foundations of Unmanned Aerial Systems, and Unmanned Aerial Systems operations.

CTE Standards and Benchmarks	
12.0	Demonstrate proficiency in solid state devices--The student will be able to:
12.01	Identify and define properties of semiconductor materials.
12.02	Identify and define operating characteristics and applications of junction diodes.
12.03	Identify and define operating characteristics and applications of special diodes.
12.04	Analyze and troubleshoot diode circuits.
12.05	Identify and define operating characteristics and applications of bipolar transistors,
12.06	Identify and define operating characteristics and applications of field effect transistors.
12.07	Identify and define operating characteristics and applications of single-stage amplifiers.
12.08	Analyze and troubleshoot single-stage amplifiers.
12.09	Analyze and troubleshoot thyristor circuitry.
12.10	Set up and operate DVM for solid-state devices.
12.11	Set up and operate power supplies for solid-state devices.
12.12	Set up and operate oscilloscopes for solid-state devices.
12.13	Set up and operate function generators for solid-state devices.
12.14	Demonstrate transistor testing techniques.
13.0	Demonstrate proficiency in analog circuits--The student will be able to:
13.01	Identify and define operational characteristics and applications of multistage amplifiers.
13.02	Analyze and troubleshoot multistage amplifiers.
13.03	Identify and define operating characteristics and applications of linear integrated circuits.

CTE Standards and Benchmarks	
13.04	Identify and define operating characteristics and applications of basic power supplies and filters.
13.05	Analyze and troubleshoot differentiator and integrator circuits.
13.06	Identify and define operating characteristics and applications of differential and operational amplifiers.
13.07	Analyze and troubleshoot differential and operational amplifier circuits.
13.08	Identify and define operating characteristics of audio power amplifiers.
13.09	Analyze and troubleshoot audio power amplifiers.
13.10	Identify and define operating characteristics and applications of power supply regulator circuits.
13.11	Analyze and troubleshoot power supply regulator circuits.
13.12	Identify and define operating characteristics and applications of active filters.
13.13	Analyze and troubleshoot active filter circuits.
13.14	Identify and define operating characteristics and applications of sinusoidal and non-sinusoidal oscillator circuits.
13.15	Analyze and troubleshoot oscillator circuits.
13.16	Identify and define operating characteristics and applications of cathode ray tubes.
13.17	Identify and define operating characteristics and applications of optoelectronic devices.
13.18	Define the operating characteristics of analog-type servo motors.
13.19	Use basic electronics test equipment to measure and analyze analog circuits..
14.0	Demonstrate an understanding of basic avionics corrosion--The student will be able to:
14.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02	Describe the types of corrosion and explain their effects on avionics equipment.
14.03	Describe the preventative processes to reduce or eliminate avionics corrosion.
15.0	Demonstrate proficiency in aircraft aerodynamic fundamentals--The student will be able to:
15.01	Identify and explain the effects of aerodynamic forces on aircraft structures and components
15.02	Identify and describe the purpose aircraft flight controls and aircraft how they affect flight operations.
15.03	Define the concept of weight and balance in aircraft to include arms, weights, moments, the Law of Lever, and the center of gravity.
15.04	Describe the effects of installing equipment, modifying equipment, modifying airframe structures and repositioning equipment on weight and balance.
16.0	Demonstrate proficiency in Unmanned Aerial Systems Foundations--The students will be able to:
16.01	Compare and contrast the differences between UAS and UAV components, elements and systems.

CTE Standards and Benchmarks	
	16.02 Identify UAV structures, fabrication methods, and components.
	16.03 Describe the types of UAV aerodynamics and flight characteristics
	16.04 Define the certifications and requirements required of UAS operators and technicians
	16.05 Explain cost and risk factors associated with and alleviated by the usage of Unmanned Aerial System.
17.0	Demonstrate knowledge in Unmanned Aerial Vehicle Operations--The students will able to:
	17.01 Demonstrate an understanding of the levels of direct and autonomous control currently in use for guiding, navigating, and controlling a UAV.
	17.02 Discriminate the various types of UAV payloads, power, and communications systems.
	17.03 Understand and apply the regulatory requirements outlined by the FAA (Federal Aviation Administration) in the ownership, use, and operation of an Unmanned Aerial Vehicle.

Florida Department of Education
Student Performance Standards

Course Number: AVS0683
Occupational Completion Point: D
Aircraft Electronics Technician – 150 Hours – SOC Code 49-2091

Course Description:
Students in the Aircraft Electronics Technician course will learn digital circuitry, microprocessors, workplace safety skills, communication skills, employability skills, entrepreneurship, and the basics of avionic systems.

CTE Standards and Benchmarks	
18.0	Demonstrate proficiency in digital circuits—The student will be able to:
18.01	Define and apply numbering systems to codes and arithmetic operations.
18.02	Analyze and minimize logic circuits using Boolean operations.
18.03	Set up and operate logic probes for digital circuits.
18.04	Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
18.05	Set up and operate pulsers for digital circuits.
18.06	Set up and operate oscilloscopes for digital circuits.
18.07	Set up and operate logic analyzers for digital circuits.
18.08	Set up and operate pulse generators for digital circuits.
18.09	Identify types of logic gates and their truth tables.
18.10	Verify combinational logic circuits made up of integrated circuits.
18.11	Troubleshoot logic circuits.
18.12	Analyze types of flip-flops and their truth tables.
18.13	Troubleshoot flip-flops.
18.14	Identify, define and measure characteristics of integrated circuit (IC) logic families.
18.15	Identify types of registers and counters.
18.16	Troubleshoot registers and counters.
18.17	Analyze clock and timing circuits.
18.18	Troubleshoot clock and timing circuits.

CTE Standards and Benchmarks	
	18.19 Identify types of arithmetic-logic circuits.
	18.20 Troubleshoot arithmetic-logic circuits.
	18.21 Identify types of encoding and decoding devices.
	18.22 Troubleshoot encoders and decoders.
	18.23 Identify types of multiplexer and demultiplexer circuits.
	18.24 Troubleshoot multiplexer and demultiplexer circuits.
	18.25 Identify types of memory circuits.
	18.26 Relate the uses of digital-to-analog and analog-to-digital conversions.
	18.27 Troubleshoot digital-to-analog and analog-to-digital circuits.
	18.28 Identify types of digital displays.
	18.29 Troubleshoot digital display circuits.
	18.30 Demonstrate the operating characteristics of digital-type servo and stepper motors
19.0	Demonstrate proficiency in fundamental microprocessors—The student will be able to:
	19.01 Identify central processing unit (CPU) building blocks and their uses (architecture).
	19.02 Analyze bus concepts.
	19.03 Analyze various memory schemes.
	19.04 Verify memory device operation.
	19.05 Set up and operate oscilloscopes for microprocessor systems.
	19.06 Identify types of input and output devices and peripherals.
	19.07 Interface input and output ports to peripherals.
	19.08 Analyze and troubleshoot input and output ports.
	19.09 Develop a simple microprocessor and/or microcontroller application program.
20.0	Demonstrate an understanding of workplace safety practices--The student will be able to:
	20.01 Use Safety Data Sheets (SDS) information to determine the use, safety precautions, and disposition of chemicals used in avionics applications.
	20.02 Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
	20.03 Describe flight line safety to include foreign object elimination, situational awareness, aircraft movement precautions, fire classifications, and fire extinguishing.

CTE Standards and Benchmarks	
21.0	Demonstrate appropriate communication skills—The student will be able to:
21.01	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
21.02	Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
21.03	Demonstrate appropriate telephone/communication skills.
21.04	Make equipment failure reports.
21.05	Specify and requisition simple electronic components.
21.06	Compose technical letters and memoranda.
21.07	Draft preventive maintenance procedures.
21.08	Use an analysis of technical data to form conclusions and recommend changes.
22.0	Demonstrate employability skills – The student will be able to:
22.01	Discuss elements of job search.
22.02	Develop sources of information about a job.
22.03	Identify documents that may be required when applying for a job.
22.04	Complete a job application correctly.
22.05	Demonstrate competence in job interview techniques.
22.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
22.07	Identify acceptable work habits.
22.08	Demonstrate knowledge of how to make appropriate job changes.
22.09	Demonstrate acceptable employee health habits.
22.10	Demonstrate knowledge of the “Right-to-Know Law” as recorded in 29CFR – 1919.1200.
22.11	Write a proper resume.
23.0	Demonstrate an understanding of entrepreneurship – The student will be able to:
23.01	Define entrepreneurship.
23.02	Describe the importance of entrepreneurship to the American economy.
23.03	List the advantages and disadvantages of business ownership.
23.04	Identify the risks involved in ownership of a business.
23.05	Identify the necessary personal characteristics of an entrepreneur.

CTE Standards and Benchmarks	
	23.06 Identify the business skills needed to operate a small business efficiently and effectively.
	23.07 Define various corporate structures. (e.g., S-Corp, C-Corp, Sole Proprietor, LLC, and ESOP).
24.0	Demonstrate knowledge of basic avionics systems – The student will be able to:
	24.01 Identify and describe aircraft communications systems.
	24.02 Identify and describe aircraft short-range navigation systems.
	24.03 Identify and describe aircraft long-range navigation systems
	24.04 Identify the types of flight instruments and state their purpose.

Florida Department of Education
Student Performance Standards

Course Number: AVS0684
Occupational Completion Point: E
Avionics Installer/Technician – 300 Hours – SOC Code 49-2091

Course Description:
Students in the Avionics Installer/Technician course will learn avionic systems installation, structural applications, radio station regulation, AM and FM transmitter/receiver/transceiver principles, electromagnetic wave emission, and airborne communication systems.

CTE Standards and Benchmarks	
25.0	Demonstrate proficiency in installing avionics systems--The student will be able to:
25.01	Prepare an avionics installation plan
25.02	Design wiring interconnection for Comm, Nav, GPS, Traffic Avoidance, Audio Integrating etc.
25.03	Install circuit protective devices, switches, lamps, and relays.
25.04	Fabricate wiring harnesses
25.05	Perform a mechanical avionics installation
25.06	Perform an electrical installation
25.07	Perform an original manufacturers equipment (OEM) installation
25.08	Determine antenna placement with regards to noise interference
26.0	Demonstrate proficiency in structural applications--The student will be able to:
26.01	Select, install, and remove conventional and special fasteners
26.02	Layout, form, inspect, modify, and repair metal structures.
26.03	Fabricate, modify, and repair composite structures
26.04	Install aircraft antennas and doubler plates.
27.0	Demonstrate proficiency in avionics radio station regulations and procedures--The student will be able to:
27.01	Define repair station related regulatory and standardization agencies and their purposes.
27.02	Define repair station certification requirements.
27.03	Define requirements for certification of radio repair technicians.
27.04	Practice proper station operation procedures.

CTE Standards and Benchmarks	
	27.05 Prepare repair station reports and documentation.
	27.06 Describe FCC rules pertaining to AM and FM transmitter maintenance and operation.
28.0	Demonstrate proficiency in AM and FM transmitters--The student will be able to:
	28.01 Define Double Sideband (DSB), Single Sideband (SSB) and FM modulation.
	28.02 Analyze and troubleshoot AM and FM Radio Frequency (RF) oscillator circuits.
	28.03 Analyze and troubleshoot buffer and multiplier circuits.
	28.04 Analyze and troubleshoot RF power amplifier circuits.
	28.05 Analyze and troubleshoot AM and FM modulation circuits.
	28.06 Analyze and troubleshoot microphone circuits.
	28.07 Analyze and troubleshoot balanced modulators and SSB filter circuits.
	28.08 Analyze and troubleshoot AM and FM power supply circuits.
	28.09 Make power, frequency and modulation measurements of AM and FM transmitters.
	28.10 Align and troubleshoot AM and FM transmitters.
29.0	Demonstrate proficiency in AM and FM receivers--The student will be able to:
	29.01 Analyze and troubleshoot receiver audio voltage and power amplifiers and speaker/headphone circuits.
	29.02 Analyze and troubleshoot AM and FM detector circuits.
	29.03 Analyze and troubleshoot AM Intermediate Frequency (IF) amplifier circuits.
	29.04 Analyze and troubleshoot FM IF amplifier and limited circuits.
	29.05 Analyze and troubleshoot receiver oscillator and automatic frequency control (AFC) circuits.
	29.06 Analyze and troubleshoot RF mixer/heterodyne circuits.
	29.07 Analyze and troubleshoot receiver RF amplifier circuits.
	29.08 Analyze and troubleshoot automatic voltage control/automatic gain control (AVC/AGC) circuits.
	29.09 Analyze and troubleshoot receiver power supplies.
	29.10 Align and troubleshoot AM and FM receivers.
30.0	Demonstrate proficiency in AM and FM transceivers--The student will be able to:
	30.01 Analyze and troubleshoot transceiver control, metering and switching circuits.
	30.02 Analyze and troubleshoot transceiver frequency synthesizers and phase locked loop circuits.

CTE Standards and Benchmarks	
	30.03 Analyze and troubleshoot squelch circuits.
	30.04 Align and troubleshoot transceivers.
31.0	Demonstrate proficiency in electromagnetic wave emissions--The student will be able to:
	31.01 Define the radio frequency spectrum.
	31.02 Define types and classification of RF emissions.
	31.03 Define the characteristics of radio waves.
	31.04 Define radio wave propagation method.
	31.05 Define the basic types of antennas.
	31.06 Draw the voltage and current relationships and radiation patterns for the basic types of antennas.
	31.07 Define methods for antenna tuning, gain and directivity.
	31.08 Define transmission lines in terms of electrical and physical properties.
	31.09 Define standing waves, cause and effect, and measure standing wave ratios.
	31.10 Define tuned transmission lines and describe applications.
	31.11 Construct transmission lines.
	31.12 Define waveguides, resonant cavities and their applications.
32.0	Demonstrate proficiency in line maintenance of airborne communication systems--The student will be able to:
	32.01 Identify regulatory agencies affecting aircraft electronic systems
	32.02 Analyze and troubleshoot Aircraft Audio Integration Systems
	32.03 Analyze and troubleshoot VHF Communication Systems
	32.04 Analyze and troubleshoot HF Communication Systems
	32.05 Analyze and troubleshoot Satellite Communication Systems
	32.06 Describe the operation of a selective calling system.
	32.07 Define the operation and the types of data managed by the Aircraft Communication Automatic Reporting System (ACARS).

Florida Department of Education
Student Performance Standards

Course Number: AVS0685
Occupational Completion Point: F
Advanced Avionics Installer/Technician – 300 Hours – SOC Code 49-2091

Course Description:
Students in the Advanced Avionics Installer/Technician course will learn aircraft instrument systems, data bus systems, navigation systems, primary and secondary radar systems, in-flight entertainment systems, engine and airframe monitoring systems, pitot-static systems, and aircraft safety systems.

CTE Standards and Benchmarks	
33.0	Demonstrate proficiency in line maintenance of aircraft instrument systems--The student will be able to:
33.01	Identify and define the operation of basic flight instruments.
33.02	Identify and define the operation of electronic flight instruments.
33.03	Identify and define the operation of navigation instruments to include HSI, RMI, VOR.
33.04	Identify, and define the operation of compass systems.
34.0	Demonstrate proficiency in aircraft data bus systems --The student will be able to:
34.01	Define the operation of an aircraft digital data communications system
34.02	Compare and contrast the differences between ARINC data bus systems used in commercial aircraft.
34.03	Identify data bus systems used in general aviation aircraft and explain their operation.
34.04	Troubleshoot an aircraft data bus system.
35.0	Demonstrate proficiency in line maintenance of airborne navigation systems and equipment--The student will be able to:
35.01	Use navigation principles to understand dead-reckoning, earth coordinate system, great circle navigation, short-range navigation and long-range navigation.
35.02	Understand the operating principles of Global Position Satellite (GPS) System
35.03	Distinguish the operation principles of a VHF Omni Range (VOR) System
35.04	Define the operating characteristics of a Distance Measuring Equipment (DME) System
35.05	Explain the purpose and operation of, and the precautions when using, an Automatic Direction Finder (ADF) System
35.06	Define the elements of an Instrument Landing System (ILS) to include the characteristics of the localizer, glide slope, and marker beacon.

CTE Standards and Benchmarks	
	35.07 Explain the operating principles of a Microwave Landing System (MLS).
	35.08 Describe the purpose and operation of ADS-B/transponder systems.
	35.09 Understand the relationships of various navigation systems to the aircraft flight management system.
	35.10 Define the operation of an autopilot, auto-throttle, and auto stabilization system.
36.0	Demonstrate proficiency in primary and secondary radar systems--The student will be able to:
	36.01 Explain the theory and operation of the primary radar system.
	36.02 Given a primary radar block diagram, explain the relationship between the major components of the system.
	36.03 Describe the operation of a Doppler radar
	36.04 Secondary (ATC) Radar Transponder
	36.05 Define the purpose and operation of the altitude encoding function of radar.
	36.06 Define the purpose and operation of the lightning detection function of radar.
	36.07 Describe the operation of a XM Weather System.
	36.08 Analyze and troubleshoot a radar system.
37.0	Demonstrate proficiency with in-flight entertainment systems--The student will be able to:
	37.01 Describe the types of in-flight entertainment systems and compare their operation to each other.
	37.02 Determine installation considerations when installing or upgrading an in-flight entertainment system.
38.0	Demonstrate proficiency with engine and airframe monitoring systems–The student will be able to.
	38.01 Identify and interpret data from various types of displays.
	38.02 Define aircraft built-in test equipment systems.
	38.03 Interpret data from built-in test equipment.
39.0	Demonstrate proficiency with pitot-static systems--The students will be able to:
	39.01 Understand purpose and function of pitot-static systems
	39.02 Perform pitot-static integrity checks
	39.03 Troubleshoot pitot-static systems
40.0	Demonstrate proficiency with aircraft safety systems--The students will be able to:
	40.01 Understand purpose and function of caution, warning and advisory systems
	40.02 Understand the purpose and operation of terminal collision avoidance systems (TCAS)

CTE Standards and Benchmarks	
40.03	Understand the purpose and operation of ground proximity warning systems (GPWS).
40.04	Define the purpose and data collected by the aircraft flight data computer and voice recorder.
40.05	Describe the purpose, operation and testing of the Emergency Locator Transmitter (ELT)
40.06	Describe the operation of the stall warning and avoidance systems.

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)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Aircraft Coating and Corrosion Control Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400500
CIP Number	0647060701
Grade Level	30, 31
Standard Length	600 hours
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	51-9122 – Painters, Transportation Equipment
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 9 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution, and Logistics 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 Transportation, Distribution, and Logistics career cluster.

The content includes but is not limited to the following topics: Safety and Health, Aircraft Structures, Aircraft Corrosion, Paint Removal Systems, and Paint Application Systems.

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 (4) courses, and two (2) occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AMT0125 AMT0133	Aircraft Coating Safety, Inspection and Environmental Regulations Aircraft Surface Prep Technician	140 Hours 152 Hours	51-9122 51-9122
B	AMT0126 AMT0940	Aircraft Coatings Technician Aircraft Coatings Technician Internship	160 Hours 148 Hours	51-9122 51-9122

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate appropriate understanding of basic safety, health and science concepts.
02.0 Identify various types of aircraft structures and components that require paint/coating applications.
03.0 Identify metallic and non-metallic aircraft structural materials.
04.0 Identify various types of corrosion found on aircraft surfaces.
05.0 Demonstrate proficiency in the removal and treatment of aircraft surface corrosion.
06.0 Demonstrate proficiency in paint removal techniques.
07.0 Demonstrate understanding of masking techniques and their importance.
08.0 Describe various aircraft coating materials used on aircraft structures.
09.0 Demonstrate proficiency in preparing non-metallic and metallic aircraft surfaces for coatings application.
10.0 Demonstrate the ability to select and adjust various types of paint application equipment.
11.0 Demonstrate the ability to select and properly apply required coating materials on aircraft surfaces.
12.0 Demonstrate the ability to set-up and apply various letters, numbers, insignias and decorative decals.
13.0 Demonstrate proficiency in the inspection of applied coatings.
14.0 Demonstrate employability skills.

Florida Department of Education
Student Performance Standards

Program Title: **Aircraft Coating and Corrosion Control Technology**
PSAV Number: **T400500**

Course Number: AMT0125
Occupational Completion Point: A (1 of 2)
Aircraft Coating Safety, Inspection and Environmental Regulations – 140 Hours – SOC Code 51-9122

Course Description:
The Aircraft Coating Safety, Inspection and Environmental Regulations course prepares students for entry into the aircraft coating and corrosion control industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study basic safety, health, and science concepts.

CTE Standards and Benchmarks	
01.0	Demonstrate appropriate understanding of basic safety, health and science concepts.--The student will be able to:
01.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
01.02	Identify various chemicals used in the aircraft coatings process.
01.03	Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions, required for handling such materials.
01.04	Understand the use of personal protection equipment (PPE)
01.05	Understand the proper use of fall protection systems (ANSI Z359)
01.06	Understand pressure measurement in terms of P.S.I. and inches of mercury.
01.07	Understand the regulatory agency requirements for hazardous materials and hazardous waste.

Course Number: AMT0133
Occupational Completion Point: A (2 of 2)
Aircraft Surface Prep Technician – 152 Hours – SOC Code 51-9122

Course Description:
The Aircraft Surface Prep Technician course is designed to build on the skills and knowledge students learned in the Aircraft Coating Safety, Inspection and Environmental Regulations for entry into the aircraft coating and corrosion control industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study aircraft structures and components, metallic and non-metallic materials, types of corrosion, removal and treatment, paint removal, and masking techniques.

CTE Standards and Benchmarks	
02.0	Identify various types of aircraft structures and components that require paint/coating applications.--The student will be able to:
02.01	Identify the major sections of various sizes of fixed and rotary wing aircraft.
02.02	Identify the various removable flight controls.
02.03	Locate aircraft frame stations, butt lines and waterlines.
03.0	Identify metallic and non-metallic aircraft structural materials.--The student will be able to:
03.01	Identify aircraft materials using the applicable aircraft structural manuals.
03.02	Describe ferrous and non-ferrous aircraft materials.
03.03	Describe the various non-metallic materials used on aircraft.
03.04	Visually Identify composite materials.
03.05	Identify aircraft fabric coverings.
04.0	Identify various types of corrosion found on aircraft surfaces.--The student will be able to:
04.01	Discuss the theory of corrosion.
04.02	Describe the different types of corrosion on aircraft.
04.03	Detect corrosion on an aircraft structure.
05.0	Demonstrate proficiency in the removal and treatment of aircraft surface corrosion.--The student will be able to:
05.01	Select proper methods for the removal of various types of corrosion.
05.02	Remove corrosion from an aircraft structure.
05.03	Select the proper treatment methods for the prevention of corrosion.
05.04	Properly treat an aircraft surface.
06.0	Demonstrate proficiency in aircraft paint removal techniques.--The student will be able to:
06.01	Identify various paint removal methods for all aircraft materials.

CTE Standards and Benchmarks	
	06.02 Select proper coating removal method for specific areas and materials of aircraft.
	06.03 Demonstrate proficiency in removing coatings from an aircraft.
07.0	Demonstrate understanding of masking techniques and their importance.--The student will be able to:
	07.01 Identify areas/materials of aircraft that require protection from chemicals used in the aircraft coatings process.
	07.02 Select masking materials and techniques for various applications.
	07.03 Demonstrate proficiency in masking techniques.

Florida Department of Education
Student Performance Standards

Course Number: AMT0126
Occupational Completion Point: B (1 of 2)
Aircraft Coatings Technician – 160 Hours – SOC Code 51-9122

Course Description:
The Aircraft Coatings Technician course prepares students for entry into the aircraft coating and corrosion control industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study coating materials, surface preparation, paint application equipment, and selection of coating materials

CTE Standards and Benchmarks	
08.0	Describe various aircraft coating materials used on aircraft structures.--The student will be able to:
08.01	Identify various aircraft paints and primers required on aircraft using specific manufactures' information.
08.02	Determine coating compatibility with various aircraft materials.
08.03	Identify various sealant materials and their uses.
08.04	Determine proper mixing ratios of primers, paints and sealants in accordance with manufacturer's requirements.
09.0	Demonstrate the ability to select and adjust various types of paint application equipment.--The student will be able to:
09.01	Identify various types of equipment used in the aircraft coatings process.
09.02	Select proper equipment for specific coating systems.
09.03	Set up equipment for specific paint applications.
10.0	Demonstrate the ability to select and properly apply required coating materials on aircraft surfaces.--The student will be able to:
10.01	Select proper coatings to be applied to specific aircraft surfaces.
10.02	Properly mix coatings in accordance with manufacturer's recommendations.
10.03	Apply coatings using various types of equipment and methods.
11.0	Demonstrate the ability to set-up and apply various letters, numbers, insignias and decorative decals.--The student will be able to:
11.01	Select proper coatings to be applied to specific aircraft.
11.02	Properly mix coatings in accordance with manufacturer's recommendations.
11.03	Determine proper processes for applying coatings with acceptable results.
11.04	Apply coatings using various types of equipment and methods.

Course Number: AMT0940
Occupational Completion Point: B (2 of 2)
Aircraft Coatings Technician Internship – 148 Hours – SOC Code 51-9122

Course Description:
The Aircraft Coatings Technician Internship course is designed to build on the skills and knowledge students learned in the Aircraft Coatings Technician for entry into the aircraft coating and corrosion control industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study set-up and application of aircraft identification markings, inspection of applied coatings, and employability skills.

CTE Standards and Benchmarks	
12.0	Demonstrate proficiency in preparing non-metallic and metallic aircraft surfaces for coatings application.--The student will be able to:
12.01	Identify surface treatment methods for metallic and non-metallic surfaces.
12.02	Identify proper methods of surface treatment for various coatings.
12.03	Properly treat and prepare various surface materials for specific coating applications.
13.0	Demonstrate proficiency in the inspection of applied coatings.--The student will be able to:
13.01	Identify flaws in applied coatings
13.02	Determine acceptance criteria on applied coatings
13.03	Develop a plan to repair coating flaws.
14.0	Demonstrate Employability skills.--The student will be able to:
14.01	Conduct a job search.
14.02	Secure information about a job.
14.03	Identify documents, which may be required when applying for a job interview.
14.04	Complete a job application form correctly.
14.05	Demonstrate competence in job interview techniques.
14.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.
14.07	Identify acceptable work habits.
14.08	Demonstrate knowledge of how to make job changes appropriately.
14.09	Demonstrate acceptable employee health habits.
14.10	Demonstrate knowledge of the “right-to-know law” as recorded in (29 CFR-1910.1200)

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)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 10.0. 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: **Automotive Service Technology 1**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400700
CIP Number	0647060411
Grade Level	30, 31
Standard Length	1050 hours
Teacher Certification	AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 nine occupational completion points.

NOTE: It is recommended that students complete **OCP-A (Automobile Services Assistor)** and/or demonstrate mastery of the outcomes in **OCP-A (Automobile Services Assistor)** prior to enrolling in additional Automotive Service Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automobile Services Assistor), is at the discretion of the instructor.**

For institutions using this framework, the National Automotive Technicians Education Foundation (NATEF) highly recommends the Master Automotive Service Technology (MAST) program Certification/Accreditation. Florida Statute (F.S.) 1004.925 – Automotive service technology education programs; certification. – requires all automotive service technology education programs shall be industry certified in accordance with rules adopted by the State Board of Education.

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

When offered at the postsecondary adult career and technical level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0014	Automobile Services Assistor	300 hours	49-3023
B	AER0418	Automotive Brake System Technician	150 hours	49-3023
C	AER0453	Automobile Suspension and Steering Technician	150 hours	49-3023
D	AER0360	Automotive Electrical/Electronic System Technician	300 hours	49-3023
E	AER0110	Engine Repair Technician	150 hours	49-3023

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Automotive Service Technology program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry.
02.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry.
03.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
04.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems.
05.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires.
06.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.
07.0 Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Service Technology**
PSAV Number: **T400700**

Course Number: AER0014
Occupational Completion Point: A
Automotive Services Assistor – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Service Assistor course prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study equipment skills, safety regulations, routine maintenance, and customer service.

Abbreviations:
ASE = Required Supplemental Tasks

For every task in Automotive Services Assistor course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks		Priority Number
01.0	Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry--The student will be able to:	
01.01	Identify and apply general shop safety rules and procedures, EPA and OSHA standards.	ASE
01.02	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.	
01.03	Research, identify, and interpret the Federal 'Workers Right To Know Law'.	
01.04	Identify and use appropriate emergency first aid procedures.	
01.05	Utilize and demonstrate safe procedures for handling of tools and equipment.	ASE
01.06	Identify and use proper placement of floor jacks and jack stands.	ASE
01.07	Identify and use proper procedures for safe lift operation.	ASE
01.08	Utilize proper ventilation procedures for working within the lab/shop area.	ASE
01.09	Identify and use proper procedures for safe pit usage.	

CTE Standards and Benchmarks		Priority Number
01.10	Identify marked safety areas.	ASE
01.11	Identify the location and the types of fire extinguishers and other fire safety equipment.	ASE
01.12	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.	ASE
01.13	Identify the location and use of eye wash stations.	ASE
01.14	Identify the location of the posted evacuation routes.	ASE
01.15	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE
01.16	Identify and wear appropriate clothing for lab/shop activities.	ASE
01.17	Secure hair and jewelry for lab/shop activities.	ASE
01.18	Use proper handling procedures for automotive fluids.	
01.19	Identify and describe typical automotive lubricants and lubricant properties.	
01.20	Identify and describe the proper procedure to apply and remove automotive fasteners, including thread inserts.	
01.21	Identify and describe typical automotive seals and gaskets.	
01.22	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE
01.23	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.	
01.24	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)	ASE
01.25	Locate and demonstrate knowledge of Safety Data Sheets (SDS).	ASE
02.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry--The student will be able to:	
02.01	Identify tools and equipment and their appropriate usage in automotive applications.	ASE
02.02	Identify and use standard and metric measurement skills and designation.	ASE
02.03	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE
02.04	Demonstrate proper use of precision-measuring tools (i.e. micrometer, digital/dial-indicator, digital/dial-caliper) and torque methods.	ASE
03.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services --The student will be able to:	
03.01	Identify information needed and the service requested on a repair order.	ASE
03.02	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.	
03.03	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.	ASE

CTE Standards and Benchmarks		Priority Number
03.04	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE
03.05	Review vehicle service history.	ASE
03.06	Use computer and operate keyboard.	
03.07	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE
03.08	Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.	
03.09	Determine the presence of a Tire Pressure Monitoring System (TPMS).	
03.10	Determine the presence of wheel locks.	
03.11	Determine the presence of an air suspension system.	
03.12	Check operation and status of instrument panel warning lights and gauges.	
03.13	Locate and use the Vehicle Identification Number (VIN).	
03.14	Locate and use vehicle information placards, decals, tags, as required.	
03.15	Locate and use paper and electronic manuals.	
03.16	Locate and use technical service bulletins (TSBs).	
03.17	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.	
03.18	Use proper chemicals for cleaning and lubrication.	
03.19	Reset maintenance indicators.	
03.20	Verify status of instrument panel warning lights and gauges.	
03.21	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).	ASE
03.22	Inspect underhood area for leaks, damage, and unusual conditions.	
03.23	Determine fluid type requirements and identify fluid.	
03.24	Check engine oil level and condition; service as required.	
03.25	Check engine coolant level and condition; service as required.	
03.26	Check power steering fluid level and condition; service as required.	
03.27	Check brake fluid level and condition; service as required.	
03.28	Check hydraulic clutch fluid and condition; service as required.	
03.29	Check windshield washer fluid level and condition; service as required.	

CTE Standards and Benchmarks	Priority Number
03.30 Check automatic transmission fluid level and condition; service as required.	
03.31 Inspect undercar area for leaks, damage, and unusual conditions.	
03.32 Check differential/transfer case fluid level; note unusual conditions; service as required.	
03.33 Check manual transmission fluid level; note unusual conditions; service as required.	
03.34 Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear.	
03.35 Lubricate driveline, suspension and steering systems.	
03.36 Inspect cooling system pipes and hoses for wear, damage, and proper routing.	
03.37 Change engine oil and filter.	
03.38 Replace inline fuel filters as applicable.	
03.39 Inspect and replace air filter.	
03.40 Inspect and replace cabin air filter.	
03.41 Inspect, replace and adjust drive belts; inspect tensioners and pulleys.	
03.42 Document observed damage, unusual conditions, and concerns.	
03.43 Visually inspect struts, springs, and related components.	
03.44 Visually inspect stabilizer bar, bushings, brackets, and links.	
03.45 Visually inspect springs, torsion bars, and related components.	
03.46 Visually inspect shock absorbers and related components.	
03.47 Visually inspect constant velocity (CV) axle shaft boots.	
03.48 Identify service considerations when equipped with a Tire Pressure Monitoring System (TPMS).	
03.49 Identify nitrogen-filled tires.	
03.50 Inspect tires; inspect spare and mounting system; check and adjust tire pressure.	
03.51 Rotate tires according to recommendations.	
03.52 Balance wheel and tire assembly.	
03.53 Dismount, inspect, and remount tire on wheel.	
03.54 Repair tire according to industry standards.	
03.55 Reinstall wheel; torque wheel fasteners to specification.	
03.56 Check wheel bearings for play and other signs of wear.	

CTE Standards and Benchmarks	Priority Number
03.57 Perform a visual inspection of a brake drum system.	
03.58 Perform a visual inspection of a disc brake system.	
03.59 Check parking brake operation; check parking brake components for unusual conditions.	
03.60 Document damage, unusual conditions and concerns.	
03.61 Check wiper blades, inserts, and arms; replace wiper blades or inserts.	
03.62 Lubricate door latches and hinges.	
03.63 Inspect fuel cap and seal.	
03.64 Charge battery as needed.	
03.65 Inspect and clean battery hold-downs; repair or replace as needed.	
03.66 Inspect and clean battery and battery cable clamp connections.	
03.67 Perform battery, starting, and charging system tests using appropriate tester.	
03.68 Start vehicle using an auxiliary power supply.	
03.69 Maintain or restore electronic memory functions if required.	
03.70 Test and replace fuses; confirm proper circuit operation.	
03.71 Inspect and replace exterior and courtesy lamps.	

Florida Department of Education
Student Performance Standards

Course Number: AER0418
Occupational Completion Point: B
Automotive Brake System Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Brake System Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of brake systems, drum brakes, disc brakes, power assist units, electronic brakes, traction, and stability control.

Abbreviations:
BR = Brakes

For every task in Automotive Brake System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

BR Task List:	
P-1	**34**
P-2	**12**
P-3	**11**
Total	**57**

CTE Standards and Benchmarks		Priority Number
04.0	Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems--The student will be able to:	
04.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
04.02	Identify and interpret brake system concern; determine necessary action.	P-1
04.03	Describe procedures for performing a road test to check brake system operation; including an antilock brake system (ABS).	P-1
04.04	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
04.05	Install wheel and torque lug nuts.	P-1
04.06	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).	
04.07	Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).	P-1
04.08	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
04.09	Check master cylinder for internal/external leaks and proper operation; determine necessary action.	P-1
04.10	Remove, bench bleed, and reinstall master cylinder.	P-1
04.11	Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.	P-3
04.12	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; check for loose fittings and supports; determine necessary action.	P-1
04.13	Replace brake lines, hoses, fittings, and supports.	P-2
04.14	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	P-2
04.15	Select, handle, store, and fill brake fluids to proper level.	P-1
04.16	Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.	
04.17	Inspect, test, and/or replace components of brake warning light system.	P-3
04.18	Identify components of brake warning light system.	P-2
04.19	Bleed and/or flush brake system.	P-1
04.20	Test brake fluid for contamination.	P-1
04.21	Diagnose poor drum brake stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	P-1
04.22	Remove, clean, inspect, and measure brake drums; determine necessary action.	P-1
04.23	Refinish brake drum and measure final drum diameter; compare with specifications.	P-1
04.24	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	P-1
04.25	Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.	P-2
04.26	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments.	P-2
04.27	Install wheel, torque lug nuts, and make final checks and adjustments associated with drum brakes.	
04.28	Diagnose poor disk brake stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.	P-1
04.29	Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.	P-1
04.30	Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.	P-1
04.31	Remove, inspect, and replace pads and retaining hardware; determine necessary action.	P-1
04.32	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.	

CTE Standards and Benchmarks		Priority Number
04.33	Lubricate and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	P-1
04.34	Clean and inspect rotor; measure rotor thickness, thickness variation, and lateral run out; determine necessary action.	P-1
04.35	Remove and reinstall rotor.	P-1
04.36	Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.	P-1
04.37	Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.	P-1
04.38	Retract and re-adjust caliper piston on an integrated parking brake system.	P-3
04.39	Install wheel, torque lug nuts, and make final checks and adjustments associated with disc brakes.	
04.40	Check brake pad wear indicator; determine necessary action.	P-2
04.41	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations.	P-1
04.42	Check brake pedal travel with, and without engine running to verify proper power booster operation.	P-2
04.43	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.	P-1
04.44	Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action.	P-1
04.45	Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action.	P-3
04.46	Measure and adjust master cylinder pushrod length.	P-3
04.47	Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.	P-3
04.48	Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.	P-1
04.49	Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	P-2
04.50	Check parking brake operation and parking brake indicator light system; determine necessary action.	P-1
04.51	Check operation of brake stop light system.	P-1
04.52	Replace wheel bearing and race.	P-2
04.53	Inspect and replace wheel studs.	P-1
04.54	Remove and reinstall sealed wheel bearing assembly.	P-2
04.55	Identify and inspect electronic brake control system components; determine necessary action.	P-1
04.56	Identify traction control/vehicle stability control system components.	P-3
04.57	Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system ; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
04.58	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	P-2
04.59	Depressurize high-pressure components of the electronic brake control system.	P-3
04.60	Bleed the electronic brake control system hydraulic circuits.	P-1
04.61	Remove and install electronic brake control system electrical/electronic and hydraulic components.	
04.62	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).	P-3
04.63	Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).	P-3
04.64	Describe the operation of a regenerative braking system.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0453
Occupational Completion Point: C
Automotive Suspension and Steering Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Suspension and Steering Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of general suspension, steering systems, front suspensions, rear suspensions, wheel alignment, and tires.

Abbreviations:
SS = Suspension and Steering

For every task in Automotive Suspension and Steering Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

SS Task List:	
P-1 =	**23**
P-2 =	**22**
P-3 =	**12**
Total	**57**

CTE Standards and Benchmarks		Priority Number
05.0	Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires –The student will be able to:	
05.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
05.02	Identify and interpret suspension and steering system concerns; determine necessary action.	P-1
05.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
05.04	Locate and interpret vehicle and major component identification numbers.	
05.05	Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
05.06	Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
05.07	Inspect, remove, and install upper and lower control arms, bushings, shafts, and rebound and jounce bumpers.	P-3
05.08	Inspect, remove and install strut rods and bushings.	P-3

CTE Standards and Benchmarks		Priority Number
05.09	Inspect, remove and install upper and/or lower ball joints (with or without wear indicators).	P-2
05.10	Inspect, remove and install steering knuckle assemblies.	P-3
05.11	Inspect, remove and install short and long arm suspension system coil springs and spring insulators.	P-3
05.12	Inspect, remove and install torsion bars and mounts.	P-3
05.13	Inspect, remove and install front stabilizer bar (sway bar) bushings, brackets, and links.	P-3
05.14	Inspect, remove and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	P-3
05.15	Inspect, remove and install track bar, strut rods/radius arms and related mounts and bushings.	P-3
05.16	Inspect rear suspension system leaf spring(s), bushings, center pins/bolts and mounts.	P-1
05.17	Inspect, remove, and replace shock absorbers; inspect mounts and bushings.	P-1
05.18	Remove, inspect, and service or replace front and rear wheel bearings.	P-1
05.19	Describe the function of the power steering pressure switch.	P-3
05.20	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concern; determine necessary action.	P-1
05.21	Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	P-1
05.22	Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber and toe as required; center steering wheel.	P-1
05.23	Check toe-out-on-turns (turning radius); determine necessary action.	P-2
05.24	Check SAI (steering axis inclination) and included angle; determine necessary action.	P-2
05.25	Check rear wheel thrust angle; determine necessary action.	P-1
05.26	Check for front wheel setback; determine necessary action.	P-2
05.27	Check front and/or rear cradle (sub-frame) alignment; determine necessary action.	P-3
05.28	Reset steering angle sensor.	P-2
05.29	Disable and enable supplemental restraint system (SRS).	P-1
05.30	Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).	P-1
05.31	Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.	P-2
05.32	Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
05.33	Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; perform necessary action.	P-2
05.34	Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.	P-2
05.35	Adjust non-rack and pinion worm bearing preload and sector lash.	
05.36	Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.	P-2
05.37	Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed.	P-2
05.38	Determine proper power steering fluid type; inspect fluid level and condition.	P-1
05.39	Flush, fill, and bleed power steering system.	P-2
05.40	Inspect for power steering fluid leakage; determine necessary action.	P-1
05.41	Remove, inspect, replace, and adjust power steering pump drive belt.	P-1
05.42	Remove and reinstall power steering pump.	P-2
05.43	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	P-2
05.44	Inspect and replace power steering hoses and fittings.	P-2
05.45	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	P-2
05.46	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	P-1
05.47	Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action.	P-3
05.48	Inspect electric power-assisted steering.	P-3
05.49	Identify hybrid vehicle power steering system electrical circuits and safety precautions.	P-2
05.50	Inspect tire condition; identify tire wear patterns; check of correct tire size and application (load and speed rating) and adjust air pressure; determine necessary action.	P-1
05.51	Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	P-2
05.52	Rotate tires according to manufacturer’s recommendations.	P-1
05.53	Measure wheel, tire, axle flange, and hub run out; determine necessary action.	P-2
05.54	Diagnose tire pull problems; determine necessary action.	P-2
05.55	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).	P-1
05.56	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	P-2
05.57	Reinstall wheel; torque lug nuts.	

CTE Standards and Benchmarks		Priority Number
05.58	Inspect tire and wheel assembly for air loss; perform necessary action.	P-1
05.59	Repair tire using internal patch.	P-1
05.60	Identify and test pressure monitor system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lambs.	P-2
05.61	Demonstrate knowledge of steps required to remove and replace sensor in a tire pressure monitoring system.	P-1

Florida Department of Education
Student Performance Standards

Course Number: AER0360
Occupational Completion Point: D
Automotive Electrical/Electronic System Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Electrical/Electronic System Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of electrical/electronics, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.

Abbreviations:
EE = Electrical/Electronic Systems

For every task in Automotive Electrical/Electronic System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EE Task List:	
P-1 =	**36**
P-2 =	**14**
P-3 =	**8**
Total	**58**

CTE Standards and Benchmarks			**Priority Number**
06.0		Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems--The student will be able to:	
	06.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
	06.02	Identify and interpret electrical/electronic system concern; determine necessary action.	
	06.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
	06.04	Locate and interpret vehicle and major component identification numbers.	
	06.05	Diagnose and demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).	P-1
	06.06	Use wiring diagrams during diagnosis (troubleshooting) of electrical/electronic circuit problems.	P-1
	06.07	Demonstrate the proper use of a digital multimeter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.	P-1
	06.08	Check operation of electrical circuits with a test light.	P-1

CTE Standards and Benchmarks		Priority Number
06.09	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.	P-2
06.10	Check operation of electrical circuits using fused jumper wires.	P-1
06.11	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.	P-1
06.12	Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.	P-1
06.13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1
06.14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.	P-1
06.15	Replace electrical connectors and terminal ends.	P-1
06.16	Repair wiring harness.	P-1
06.17	Perform solder repair of electrical wiring.	P-1
06.18	Repair CAN/BUS wiring harness.	P-1
06.19	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	
06.20	Perform battery state-of-charge test; determine necessary action.	P-1
06.21	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.	P-1
06.22	Maintain or restore electronic memory functions.	P-1
06.23	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.	P-1
06.24	Perform slow/fast battery charge according to manufacturer’s recommendations.	P-1
06.25	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.	P-1
06.26	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	P-3
06.27	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	P-1
06.28	Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3
06.29	Perform battery conductance test; determine necessary action.	
06.30	Perform starter current draw tests; determine necessary action.	P-1
06.31	Perform starter circuit voltage drop tests; determine necessary action.	P-1
06.32	Inspect and test starter relays and solenoids; determine necessary action.	P-2
06.33	Remove and install starter in a vehicle.	P-1

CTE Standards and Benchmarks		Priority Number
06.34	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2
06.35	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2
06.36	Perform charging system output test; determine necessary action.	P-1
06.37	Diagnose (troubleshoot) charging system for the cause of undercharge, no-charge, and overcharge conditions.	P-1
06.38	Inspect, adjust, or replace generator (alternator) drive belts, check pulleys, and tensioners for wear; check pulley and belt alignment.	P-1
06.39	Remove, inspect, and re-install generator (alternator).	P-1
06.40	Perform charging circuit voltage drop test; determine necessary action.	P-1
06.41	Diagnose (troubleshoot) the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	P-1
06.42	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving light); replace as needed.	P-1
06.43	Aim headlights.	P-2
06.44	Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.	
06.45	Identify system voltage and safety precautions associated with high intensity discharge headlights.	P-2
06.46	Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	P-2
06.47	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.	
06.48	Diagnose (troubleshoot) the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	P-2
06.49	Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action.	
06.50	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.	P-1
06.51	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	P-2
06.52	Diagnose (troubleshoot) windshield washer problems; perform necessary action.	P-2
06.53	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.	P-2
06.54	Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.	
06.55	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.	P-2
06.56	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action	P-3
06.57	Diagnose (troubleshoot) supplemental restraint system (SRS) concerns; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
06.58	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.	P-1
06.59	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.	P-3
06.60	Remove and reinstall door panel.	P-1
06.61	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.	P-3
06.62	Check for module communication (including CAN/BUS systems) using a scan tool.	P-2
06.63	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.	P-3
06.64	Describe the operation of keyless entry/remote-start systems.	P-3
06.65	Verify operation of instrument panel gauges and warning /indicator lights; reset maintenance indicator.	P-1
06.66	Verify windshield wiper and washer operation, replace wiper blades.	P-1
06.67	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0110
Occupational Completion Point: E
Engine Repair Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Engine Repair Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of general engine, cylinder heads, valve trains, engine block, lubrication, and cooling systems.

Abbreviations:
ER = Engine Repair

For every task in Engine Repair Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

ER Task List:	
	P-1 = 23
	P-2 = 17
	P-3 = 11
Total	**51**

CTE Standards and Benchmarks		**Priority Number**
07.0	Explain and apply proficiently the diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems--The student will be able to:	
07.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1
07.02	Identify and interpret engine concern; determine necessary action.	
07.03	Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.	P-1
07.04	Verify operation of the instrument panel engine warning indicator.	P-1
07.05	Locate and interpret vehicle and major component identification numbers.	
07.06	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	P-1
07.07	Diagnose engine noises and vibrations; determine necessary action.	
07.08	Diagnose the cause of excessive oil consumption, coolant consumption, unusual engine exhaust color and odor; determine necessary action.	
07.09	Perform engine vacuum tests; determine necessary action.	

CTE Standards and Benchmarks		Priority Number
07.10	Perform cylinder power balance tests; determine necessary action.	
07.11	Remove and replace timing belt; verify correct camshaft timing.	P-1
07.12	Perform cylinder cranking and running compression tests; determine necessary action.	
07.13	Perform cylinder leakage tests; determine necessary action.	
07.14	Remove and reinstall engine in an OBDII or newer vehicle; reconnect all attaching components and restore the vehicle to running condition.	P-3
07.15	Install engine covers using gaskets, seals and sealers as required.	P-1
07.16	Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.	P-1
07.17	Inspect, remove and replace engine mounts.	P-2
07.18	Identify hybrid vehicle internal combustion engine service precautions.	P-3
07.19	Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.	P-1
07.20	Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.	P-1
07.21	Inspect valve springs for squareness and free height comparison; determine necessary action.	P-3
07.22	Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action.	P-3
07.23	Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action.	P-3
07.24	Inspect valves and valve seats; determine necessary action.	P-3
07.25	Check valve spring assembled height and valve stem height; determine necessary action.	P-3
07.26	Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action.	P-2
07.27	Inspect valve lifters; determine necessary action.	P-2
07.28	Adjust valves (mechanical or hydraulic lifters).	P-1
07.29	Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing.	P-1
07.30	Inspect and/or measure camshaft for run out, journal wear and lobe wear.	P-2
07.31	Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
07.32	Establish camshaft position sensor indexing.	P-1
07.33	Remove, inspect, or replace crankshaft vibration damper (harmonic balancer).	P-2

CTE Standards and Benchmarks		Priority Number
07.34	Disassemble engine block; clean and prepare components for inspection and reassembly.	P-1
07.35	Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action.	P-2
07.36	Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action.	P-2
07.37	Deglaze and clean cylinder walls.	P-2
07.38	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
07.39	Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action.	P-1
07.40	Inspect main and connecting rod bearings for damage and wear; determine necessary action.	P-2
07.41	Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action.	P-3
07.42	Inspect and measure piston skirts and ring lands; determine necessary action.	P-2
07.43	Remove and replace piston pin.	
07.44	Determine piston-to-bore clearance.	P-2
07.45	Inspect, measure, and install piston rings.	P-2
07.46	Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.	P-2
07.47	Assemble engine block.	P-1
07.48	Perform oil pressure tests; determine necessary action.	P-1
07.49	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.	P-2
07.50	Perform cooling system pressure and dye test to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and gallery plugs; determine necessary action.	P-1
07.51	Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1
07.52	Inspect and replace engine cooling and heater system hoses.	
07.53	Remove, inspect, and replace thermostat and gasket/seal.	P-1
07.54	Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	P-1
07.55	Inspect, remove and replace water pump.	P-2
07.56	Remove and replace radiator.	P-2

CTE Standards and Benchmarks	Priority Number
07.57 Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.	P-1
07.58 Inspect auxiliary coolers; determine necessary action.	P-3
07.59 Inspect, test, and replace oil temperature and pressure switches and sensors.	P-2
07.60 Perform engine oil and filter change.	P-1
07.61 Identify causes of engine overheating.	P-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.

Special Notes

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 9.0. 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: **Automotive Service Technology 2**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400800
CIP Number	0647060412
Grade Level	30, 31
Standard Length	750 hours
Teacher Certification	AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 nine occupational completion points.

NOTE: It is recommended that students complete **OCP-A (Automobile Services Assistor) of Automotive Service Technology 1** and/or demonstrate mastery of the outcomes in **OCP-A (Automobile Services Assistor) of Automotive Service Technology 1** prior to enrolling in additional Automotive Service Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automobile Services Assistor) of Automotive Service Technology 1, is at the discretion of the instructor.**

For institutions using this framework, the National Automotive Technicians Education Foundation (NATEF) highly recommends the Master Automotive Service Technology (MAST) program Certification/Accreditation. Florida Statute (F.S.) 1004.925 – Automotive service technology education programs; certification. – requires all automotive service technology education programs shall be industry certified in accordance with rules adopted by the State Board of Education.

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0503	Automotive Engine Performance Technician	300 hours	49-3023
B	AER0257	Automatic Transmission and Transaxle Technician	150 hours	49-3023
C	AER0274	Manual Drivetrain and Axle Technician	150 hours	49-3023
D	AER0172	Automotive Heating and Air Conditioning Technician	150 hours	49-3023

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Automotive Service Technology program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems.
02.0 Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles.
03.0 Explain and apply proficiently the diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive.
04.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Service Technology 2**
PSAV Number: **T400800**

Course Number: AER0503
Occupational Completion Point: A
Automotive Engine Performance Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Engine Performance Technician course prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems.

Abbreviations:
EP = Engine Performance

For every task in Automotive Engine Performance Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EP Task List:	
P-1 =	**21**
P-2 =	**17**
P-3 =	**9**
Total	**47**

CTE Standards and Benchmarks		**Priority Number**
01.0	Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems --The student will be able to:	
01.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
01.02	Identify and interpret engine performance concern; determine necessary action.	P-1
01.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
01.04	Locate and interpret vehicle and major component identification numbers.	
01.05	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	
01.06	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	P-3
01.07	Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
01.08	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1
01.09	Perform cylinder power balance test; determine necessary action.	P-2
01.10	Perform cylinder cranking and running compression tests; determine necessary action.	P-1
01.11	Perform cylinder leakage test; determine necessary action.	P-1
01.12	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-2
01.13	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.	
01.14	Verify engine operating temperature; determine necessary action.	P-1
01.15	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	
01.16	Verify correct camshaft timing.	P-1
01.17	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1
01.18	Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	P-1
01.19	Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action.	P-1
01.20	Check for module communication (including CAN/BUS systems) errors using a scan tool.	
01.21	Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.	P-2
01.22	Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1
01.23	Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.	P-3
01.24	Perform active tests of actuators using a scan tool; determine necessary action.	P-2
01.25	Describe the importance of running all OBDII monitors for repair verification.	P-1
01.26	Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	P-2
01.27	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	
01.28	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
01.29	Remove and replace spark plugs; inspect secondary ignition components for wear and damage.	P-1
01.30	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3
01.31	Diagnose (troubleshoot) hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	P-2
01.32	Check fuel for contaminants; determine necessary action.	P-2
01.33	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	P-1
01.34	Replace fuel filters.	P-1
01.35	Inspect, service or replace air filters, filter housing and intake duct work.	P-1
01.36	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2
01.37	Inspect and test fuel injectors.	P-2
01.38	Verify idle control operation.	P-1
01.39	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action.	P-1
01.40	Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed.	P-1
01.41	Perform exhaust system back-pressure test; determine necessary action.	P-2
01.42	Check and refill diesel exhaust fluid (DEF).	P-3
01.43	Test the operation of turbocharger/supercharger systems; determine necessary action.	P-3
01.44	Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	P-3
01.45	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	P-2
01.46	Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	P-3
01.47	Diagnose emissions and driveability concerns caused by the secondary injection and catalytic converter systems; determine necessary action.	P-2
01.48	Inspect, test, service and replace components of the EGR system, including tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	P-2
01.49	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	P-2
01.50	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	
01.51	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	P-3

CTE Standards and Benchmarks		Priority Number
01.52	Inspect and test catalytic converter efficiency.	P-2
01.53	Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action.	P-2
01.54	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	P-1
01.55	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-3
01.56	Adjust valves on engines with mechanical or hydraulic lifters.	
01.57	Remove and replace timing belt; verify correct camshaft timing.	
01.58	Remove and replace thermostat and gasket/seal.	
01.59	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	
01.60	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	
01.61	Perform engine oil and filter change.	
01.62	Identify hybrid vehicle internal combustion engine service precautions.	

Florida Department of Education
Student Performance Standards

Course Number: AER0257
Occupational Completion Point: B
Automatic Transmission and Transaxle Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automatic Transmission and Transaxle Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics, repair, service, and operation of automatic transmission/transaxles.

Abbreviations:
AT = Automatic Transmission/Transaxle

For every task in Automatic Transmission and Transaxle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

AT Task List:	
P-1 =	**15**
P-2 =	**20**
P-3 =	**4**
Total	**39**

CTE Standards and Benchmarks		**Priority Number**
02.0	Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles -- The student will be able to:	
02.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
02.02	Identify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action.	P-1
02.03	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.	P-1
02.04	Locate and interpret vehicle and major component identification numbers.	
02.05	Diagnose fluid loss and condition concerns; determine necessary action.	P-1
02.06	Check fluid level in a transmission or a transaxle equipped with a dipstick.	P-1
02.07	Check fluid level in a transmission or a transaxle not equipped with a dipstick.	P-1
02.08	Perform pressure tests (including transmissions/transaxles equipped with electronic pressure control); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
02.09	Perform stall test; determine necessary action.	P-3
02.10	Perform lock-up converter system tests; determine necessary action.	P-3
02.11	Diagnose noise and vibration concerns; determine necessary action.	P-2
02.12	Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.	P-1
02.13	Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law).	P-2
02.14	Diagnose electronic transmission/transaxle control systems using appropriate test equipment and service information.	P-1
02.15	Inspect, adjust, and replace manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.	P-2
02.16	Inspect for leakage; replace external seals, gaskets, and bushings.	P-2
02.17	Inspect, test, adjust, repair, or replace electrical/electronic components and circuits, including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses.	P-1
02.18	Diagnose electronic transmission control systems using a scan tool; determine necessary action.	
02.19	Inspect, replace, and align powertrain mounts.	P-2
02.20	Drain and replace fluids and filter(s).	P-1
02.21	Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces.	P-1
02.22	Disassemble, clean, and inspect transmission/transaxle.	P-2
02.23	Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, sleeves, retainers, brackets, check valves/balls, screens, spacers, and gaskets).	P-2
02.24	Inspect servo and accumulator bores, pistons, seals, pins, springs, and retainers; determine necessary action.	P-2
02.25	Assemble transmission/transaxle.	P-2
02.26	Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings.	P-1
02.27	Inspect converter flex (drive) plate, converter attaching bolts, converter pilot, converter pump drive surfaces, converter end play, and crankshaft pilot bore.	P-2
02.28	Install and seat torque converter to engage drive/splines.	
02.29	Inspect, measure, and reseal oil pump assembly and components.	P-2
02.30	Measure transmission/transaxle end play or preload; determine necessary action.	P-1
02.31	Inspect, measure, and replace thrust washers and bearings.	P-2
02.32	Inspect oil delivery circuits, including seal rings, ring grooves, and sealing surface areas, feed pipes, orifices, and check valves/balls.	P-2

CTE Standards and Benchmarks		Priority Number
02.33	Inspect bushings; determine necessary action.	P-2
02.34	Inspect and measure planetary gear assembly components; determine necessary action.	P-2
02.35	Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action.	P-2
02.36	Diagnose and inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action.	P-2
02.37	Inspect, measure, repair, adjust or replace transaxle final drive components.	P-2
02.38	Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; determine necessary action.	P-2
02.39	Measure clutch pack clearance; determine necessary action.	P-1
02.40	Air test operation of clutch and servo assemblies.	P-1
02.41	Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; determine necessary action.	P-2
02.42	Inspect bands and drums; determine necessary action.	
02.43	Describe the operational characteristics of a continuously variable transmission (CVT).	P-3
02.44	Describe the operational characteristics of a hybrid vehicle drive train.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0274
Occupational Completion Point: C
Manual Drivetrain and Axle Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Manual Drivetrain and Axle Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of drive train, clutch, transmission, transaxle, half shaft universal, constant-velocity joint, rear axle, ring and pinion gears, differential case assemble, limited slip differential, drive shaft, and four wheel drive/all-wheel drive.

Abbreviations:
MD = Manual Drivetrain and Axles

For every task in Manual Drivetrain and Axle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

MD Task List:	
	P-1 = 17
	P-2 = 12
	P-3 = 20
Total	**49**

CTE Standards and Benchmarks		**Priority Number**
03.0	Explain and apply proficiently the diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive- -The student will be able to:	
03.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
03.02	Identify and interpret drive train concern; determine necessary action.	P-1
03.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
03.04	Check fluid condition; check for leaks; determine necessary action.	P-1
03.05	Locate and interpret vehicle and major component identification numbers.	
03.06	Diagnose fluid loss, level, and condition concerns; determine necessary action.	
03.07	Drain and refill manual transmission/transaxle and final drive unit.	P-1
03.08	Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
03.09	Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action.	P-1
03.10	Inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action.	
03.11	Check and adjust clutch master cylinder fluid level; check for leaks.	P-1
03.12	Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable).	P-1
03.13	Bleed clutch hydraulic system.	P-1
03.14	Inspect flywheel and ring gear for wear and cracks; determine necessary action.	P-1
03.15	Inspect engine block, core plugs, rear main engine oil seal, clutch (bell) housing, transmission/transaxle case mating surfaces, and alignment dowels; determine necessary action.	
03.16	Measure flywheel run out and crankshaft end play; determine necessary action.	P-2
03.17	Remove and reinstall transmission/transaxle.	
03.18	Disassemble, inspect, clean, and reassemble internal transmission/transaxle components.	P-3
03.19	Inspect transmission/transaxle case, extension housing, case mating surfaces, bores, bushings, and vents; perform necessary action.	
03.20	Diagnose noise concerns through the application of transmission/transaxle powerflow principles.	P-2
03.21	Diagnose hard shifting and jumping out of gear concerns; determine necessary action.	P-2
03.22	Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers.	P-2
03.23	Inspect, replace, and align powertrain mounts.	
03.24	Inspect and replace gaskets, seals, and sealants; inspect sealing surfaces.	
03.25	Remove and replace transaxle final drive.	
03.26	Inspect, adjust, and reinstall shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.	
03.27	Measure end play or preload (shim or spacer selection procedure) on transmission/transaxle shafts; perform necessary action.	
03.28	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.	
03.29	Diagnose transaxle final drive assembly noise and vibration concerns; determine necessary action.	P-3
03.30	Remove, inspect, measure, adjust, and reinstall transaxle final drive pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.	
03.31	Inspect lubrication devices (oil pump or slingers); perform necessary action.	
03.32	Inspect, test, and replace transmission/transaxle sensors and switches.	
03.33	Describe the operational characteristics of an electronically controlled manual transmission/transaxle.	P-3

CTE Standards and Benchmarks		Priority Number
03.34	Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action.	P-1
03.35	Diagnose universal joint noise and vibration concerns; perform necessary action.	P-2
03.36	Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.	P-1
03.37	Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.	P-1
03.38	Inspect, service, and replace shaft center support bearings.	
03.39	Check shaft balance and phasing; measure shaft run out; measure and adjust driveline angles.	P-2
03.40	Diagnose noise and vibration concerns; determine necessary action.	
03.41	Inspect and replace companion flange and pinion seal; measure companion flange run out.	P-2
03.42	Inspect ring gear and measure run out; determine necessary action.	P-3
03.43	Remove, inspect, and reinstall drive pinion and ring gear, spacers, sleeves, and bearings.	P-3
03.44	Measure and adjust drive pinion depth.	P-3
03.45	Measure and adjust drive pinion bearing preload.	P-3
03.46	Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup or shim types).	P-3
03.47	Check ring and pinion tooth contact patterns; perform necessary action.	P-3
03.48	Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.	P-3
03.49	Reassemble and reinstall differential case assembly; measure run out; determine necessary action.	P-3
03.50	Diagnose noise, slippage, and chatter concerns; determine necessary action.	P-3
03.51	Clean and inspect differential housing; check for leaks; inspect housing vent.	P-2
03.52	Check and adjust differential housing fluid level.	P-1
03.53	Drain and refill differential housing.	P-1
03.54	Inspect and reinstall limited slip differential components.	
03.55	Measure rotating torque; determine necessary action.	P-3
03.56	Diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leakage concerns; determine necessary action.	P-2
03.57	Inspect and replace drive axle wheel studs.	P-1
03.58	Remove and replace drive axle shafts.	P-1
03.59	Inspect and replace drive axle shaft seals, bearings, and retainers.	P-2

CTE Standards and Benchmarks		Priority Number
03.60	Measure drive axle flange run out and shaft end play; determine necessary action.	P-2
03.61	Diagnose noise and vibration concerns; determine necessary action.	P-2
03.62	Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.	P-3
03.63	Remove and reinstall transfer case.	
03.64	Disassemble, service, and reassemble transfer case and components.	P-3
03.65	Inspect front-wheel bearings and locking hubs; perform necessary action(s).	P-3
03.66	Check for leaks at drive assembly seals; check vents; check lube level.	P-3
03.67	Diagnose, test, adjust, and replace electrical/electronic components of four-wheel drive systems.	P-3
03.68	Diagnose noise, vibration, and unusual steering concerns; determine necessary action.	P-3
03.69	Identify concerns related to variations in tire circumference and/or final drive ratios.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0172
Occupational Completion Point: D
Automotive Heating and Air Conditioning Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Heating and Air Conditioning Technician prepare students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling.

Abbreviations:
HA = Heating and Air Conditioning

For every task in Automotive Heating and Air Conditioning Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

HA Task List:	
P-1 =	**17**
P-2 =	**17**
P-3 =	**4**
Total	**38**

CTE Standards and Benchmarks		Priority Number
04.0	Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling--The student will be able to:	
04.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
04.02	Identify and interpret heating and air conditioning problems; determine necessary action.	P-1
04.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
04.04	Locate and interpret vehicle and major component identification numbers.	
04.05	Performance test A/C system; identify problems.	P-1
04.06	Identify abnormal operating noises in the A/C system; determine necessary action.	P-2
04.07	Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.	P-1
04.08	Leak test A/C system; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
04.09	Inspect the condition of refrigerant oil removed from A/C system; determine necessary action.	P-2
04.10	Determine recommended oil and oil capacity for system application.	P-1
04.11	Using a scan tool, observe and record related HVAC data and trouble codes.	P-3
04.12	Diagnose A/C system conditions that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.	P-2
04.13	Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.	P-1
04.14	Inspect, test, service or replace A/C compressor clutch components and/or assembly; check compressor clutch air gap; adjust as needed.	P-2
04.15	Remove, inspect, and reinstall A/C compressor and mountings; determine recommended oil quantity.	P-2
04.16	Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.	P-2
04.17	Determine the need for an additional A/C system filter; perform necessary action.	P-3
04.18	Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action.	P-2
04.19	Inspect A/C condenser for airflow restrictions; perform necessary action.	P-1
04.20	Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine required oil quantity.	P-2
04.21	Remove, inspect, and install expansion valve or orifice (expansion) tube.	P-1
04.22	Inspect evaporator housing water drain; perform necessary action.	P-1
04.23	Determine procedure to remove and reinstall evaporator; determine required oil quantity.	P-2
04.24	Remove, inspect, and reinstall condenser; determine required oil quantity.	P-2
04.25	Diagnose temperature control problems in the heater/ventilation system; (determine PCM) to interpret system operation; determine necessary action.	P-2
04.26	Perform cooling system pressure tests; check coolant condition, inspect and test radiator, cap (pressure/vacuum), coolant recovery tank, and hoses; perform necessary action.	
04.27	Inspect engine cooling and heater system hoses; perform necessary action.	P-1
04.28	Determine procedure to remove, inspect, and reinstall heater core.	P-2
04.29	Inspect, test, and replace thermostat and gasket/seal.	
04.30	Determine coolant condition and coolant type for vehicle application; drain and recover coolant.	
04.31	Flush system; refill system with recommended coolant; bleed system.	
04.32	Inspect and test cooling fan, fan clutch, fan shroud, and air dams; perform necessary action.	
04.33	Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.	

CTE Standards and Benchmarks		Priority Number
04.34	Inspect and test heater control valve(s); perform necessary action.	P-2
04.35	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; perform necessary action.	P-1
04.36	Diagnose A/C compressor clutch control systems; determine necessary action.	P-2
04.37	Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action.	P-2
04.38	Inspect and test A/C-heater control panel assembly; determine necessary action.	P-3
04.39	Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action.	P-3
04.40	Inspect A/C-heater ducts, doors, hoses, cabin filters and outlets; perform necessary action.	P-1
04.41	Identify the source of A/C system odors.	P-2
04.42	Check operation of automatic or semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.	P-2
04.43	Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer's standards.	P-1
04.44	Identify and recover A/C system refrigerant.	P-1
04.45	Recycle, label, and store refrigerant.	P-1
04.46	Evacuate and charge A/C system; add refrigerant oil as required.	P-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.

Special Notes

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

The standard length of this program is 1800 hours. **Automotive Service Technology 1** is a core program. It is recommended students complete **Automotive Service Technology 1,** or demonstrate mastery of the outcomes in that program, prior to enrollment in **Automotive Service Technology 2.**

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 9.0. 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: **Automotive Service Advisor and Consultant**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T400900
CIP Number	0647060415
Grade Level	30, 31
Standard Length	390 hours
Teacher Certification	AUTO MECH @7 7G CUST SERV 7G MKTG 1 @2 MKTG MGMT @7 7G RETAILING @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	43-4051 – Customer Service Representatives 43-5081 – Stock Clerks and Order Fillers 41-2031 – Retail Salespersons 43-1011 – First-Line Supervisors of Office and Administrative Support Workers
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 that culminate in one occupational completion point.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
	AER0075	Introduction to Automotive Service Advisor	75 hours	43-5081
	AER0076	Introduction to Automotive Customer Service	75 hours	43-4051
	AER0077	Dealership Policies and Protocols	90 hours	43-1011
A	AER0945	Dealership Internship	150 hours	41-2031

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 differences between aftermarket and original equipment manufacturers (OEM) in a global economy.
02.0 Identify, explain and list the tasks/duties assigned to the service consultant.
03.0 Explain the importance of professional image, employability skills and ethics.
04.0 Explain the team structure and task associated with each team position; identify the major responsibilities of the team leader.
05.0 Describe and outline the procedures for closing out both manual and computerized work orders, and notifying the customer.
06.0 Explain the various team approaches used in the automotive service industry to offer superior customer service
07.0 Demonstrate how to properly identify and document customer concerns and requests in person or over the phone and confirm accuracy of all information.
08.0 Demonstrate how to properly open a repair order, using identifying characteristics of the vehicle, and confirm accuracy for both computerized and paper repair orders.
09.0 Identify, and recommend service and maintenance needs to the customer in a timely, professional and friendly manner.
10.0 Present a plan to manage customer appointments.
11.0 Describe methods of promoting the service profit center (provide examples).
12.0 Explain how a positive, team-based work environment is related to productivity and job satisfaction.
13.0 Explain why customer expectations, effectiveness and efficiency are critical to a business.
14.0 Explain and demonstrate safety and environmental regulation compliance related to the automotive service industry
15.0 Describe and diagram automotive related organizational structures.
16.0 Explain the legal importance of accurate written communications using a repair order and describe how information is recorded and stored.
17.0 Describe the legal and financial importance of accurate repair order history.
18.0 Explain the legal and ethical consideration of proper repair order authorization.
19.0 Identify and complete financial measures, forms and documents that are required as part of the service consultant’s duties.
20.0 Locate and use reference information such as: service bulletins, electronic service manuals, warranty procedures manuals, owner’s manuals, and electronic dealership proprietary systems.
21.0 Define and use warranty policies and procedures/parameters. Explain the difference between first time warranty, repeat repair, fleet, and customer pay at a service facility.
22.0 Explain and demonstrate how to maximize the capability of the service facility by effective scheduling of workflow through collaborative groupware applications.
23.0 Demonstrate the proper procedure and condition for delivery of the vehicle back to the customer.
24.0 Demonstrate how to respond to difficult customer situations.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive Service Advisor and Consultant**
PSAV Number: **T400900**

Course Number: AER0075
Occupational Completion Point: A (1 of 4)
Introduction to Automotive Service Advisor – 75 Hours – SOC Code 43-5081

Course Description:
The Introduction to Automotive Service Advisor course prepares students for entry into the automotive service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study aftermarket and original equipment manufacturers, duties of a service consultant, professional image, employability skills, ethics, team structures, closing manual and computerized work orders.

CTE Standards and Benchmarks	
01.0	Describe the differences between aftermarket and original equipment manufacturers (OEM) in a global economy—The student will be able to:
01.01	Describe the nature and types of business organizations.
01.02	Explain the impact of the global economy on business organizations.
01.03	Employ leadership skills to accomplish organizational goals and objectives.
01.04	Identify and define career opportunities in the automotive service industry.
01.05	Identify and apply communication skills used in automotive careers.
02.0	Identify, explain and list the tasks/duties assigned to the service consultant—The student will be able to:
02.01	List and describe quality control systems and/or practices common to the workplace.
02.02	Identify task/duties of a service consultant.
02.03	Explain the significance of each task/duty assigned to the service consultant.
03.0	Explain the importance of professional image, employability skills and ethics—The student will be able to:
03.01	Identify employment requirements for an automotive career.
03.02	Complete a job application form correctly.
03.03	Identify and adopt acceptable work habits.
03.04	Conduct a job search.
03.05	Demonstrate competence in job interview techniques.

CTE Standards and Benchmarks	
	03.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	03.07 Demonstrate knowledge of how to make job changes appropriately.
	03.08 Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.
	03.09 Explain the effects of chemical/substance abuse.
	03.10 Demonstrate principles of stress management.
	03.11 Demonstrate acceptable industry dress code.
	03.12 Identify and demonstrate proper customer relation skills.
04.0	Explain team structure and the major responsibilities of the team leader—The student will be able to:
	04.01 Identify and describe team structures within a dealership service department.
	04.02 Identify responsibilities required of the team leader.
05.0	Describe and outline the procedures for closing out both manual and computerized work orders, and notifying the customer—The student will be able to:
	05.01 Write percents add fractions and decimals.
	05.02 Solve number word problems.
	05.03 Find the percent of a number.
	05.04 Operate a calculator.
	05.05 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
	05.06 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
	05.07 Write percents, add fractions and decimals.

Course Number: AER0076
Occupational Completion Point: A (2 of 4)
Introduction to Automotive Customer Service – 75 Hours – SOC Code 43-4051

Course Description:
The Introduction to Automotive Customer Service course is designed to build on the skills and knowledge students learned in the Introduction to Automotive Service Advisor course for entry into the automotive service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study team approaches to customer service, documentation of customer concerns, opening repair orders, service and maintenance recommendations, manage customer appointments, promotions, job satisfaction and productivity, customer expectations, safety, and environmental regulation.

CTE Standards and Benchmarks	
06.0	Explain the various team approaches used in the automotive service industry to offer superior customer service—The student will be able to:
06.01	Employ critical thinking skills independently and in teams to solve problems and make decisions.
06.02	Employ critical thinking and interpersonal skills to resolve conflicts.
06.03	Employ collaborative/groupware applications to facilitate group work.
06.04	Participate in meetings to accomplish work tasks.
07.0	Demonstrate how to properly identify and document customer concerns and requests in person or over the phone and confirm accuracy of all information—The student will be able to:
07.01	Present information formally and informally for specific purposes and audiences.
07.02	Demonstrate appropriate telephone/communication skills.
07.03	Read and follow written and oral instructions.
08.0	Demonstrate how to properly open a repair order, using identifying characteristics of the vehicle, and confirm accuracy for both computerized and paper repair orders—The student will be able to:
08.01	Draft, revise, and edit written documents using correct grammar, punctuation and vocabulary.
08.02	Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.03	Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.
08.04	Determine the presence of a Tire Pressure Monitoring System (TPMS).
08.05	Determine the presence of wheel locks.
08.06	Determine the presence of an air suspension system.
08.07	Check operation and status of instrument panel warning lights and gauges.
08.08	Locate and use the Vehicle Identification Number (VIN).

CTE Standards and Benchmarks	
	08.09 Locate and use vehicle information placards, decals, tags, as required.
09.0	Identify, and recommend service and maintenance needs to the customer in a timely, professional and friendly manner—The student will be able to:
	09.01 Demonstrate appropriate telephone, electronic and in-person communication skills.
10.0	Present a plan to manage customer appointments—The student will be able to:
	10.01 Develop a plan to schedule customer appointments.
	10.02 Present a plan outlining the procedure for managing customer appointments.
11.0	Describe methods of promoting the service profit center (provide examples)—The student will be able to:
	11.01 Identify and describe various methods of promoting service.
	11.02 Create a promotional flyer for the service profit center that would be mailed to potential customers.
12.0	Explain how a positive, team-based work environment is related to productivity and job satisfaction—The student will be able to:
	12.01 Identify positive attributes of teams in relation to productivity and job satisfaction.
	12.02 Describe and model positive attributes related to team production.
13.0	Explain why customer expectations, effectiveness and efficiency are critical to a business—The student will be able to:
	13.01 Identify and describe customer expectation related to business success.
	13.02 Identify how efficiency is related to business success.
14.0	Explain and demonstrate safety and environmental regulation compliance related to the automotive service industry—The student will be able to:
	14.01 Apply shop safety rules, EPA and OSHA standards.
	14.02 Identify and use appropriate emergency first aid procedures.
	14.03 Identify and describe typical automotive lubricants and lubricant properties
	14.04 Interpret the Federal ‘Workers Right To Know Law'.
	14.05 Describe and identify supplemental restraint systems (SRS).
	14.06 Demonstrate acceptable employee health habits; including infection control of blood borne pathogens.
	14.07 Locate and use Safety Data Sheets (SDS).
	14.08 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments.
	14.09 Explain emergency procedures to follow in response to workplace accidents.

Course Number: AER0077
Occupational Completion Point: A (3 of 4)
Dealership Policies and Protocols - 90 Hours – SOC Code 43-1011

Course Description:
The Dealership Policies and Protocols course is designed to build on the skills and knowledge students learned in the Introduction to Automotive Customer Service course for entry into the automotive service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study organizational structures, and legal and ethical importance of order accuracy.

CTE Standards and Benchmarks	
15.0	Describe and diagram automotive related organizational structures—The student will be able to:
15.01	Explain the effect of key organizational systems on performance and quality.
15.02	Interpret and explain written organizational policies and procedures.
15.03	Demonstrate working knowledge and proficiency of policies and procedures based on assigned work place (Dealer).
16.0	Explain the legal importance of accurate written communications using a repair order and describe how information is recorded and stored—The student will be able to:
16.01	Locate, comprehend and evaluate key elements of oral and written information.
16.02	Answer and ask questions coherently and concisely.
16.03	Read critically by recognizing assumptions and implications and by evaluating ideas.
16.04	Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace.
17.0	Describe the legal and financial importance of accurate repair order history—The student will be able to:
17.01	Research and describe legal precedence related to repair orders.
17.02	Identify and describe the financial importance of accurate repair order history.
18.0	Explain the legal and ethical consideration of proper repair order authorization—The student will be able to:
18.01	Evaluate and justify decisions based on ethical reasoning.
18.02	Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities and employer policies.

Course Number: AER0945
Occupational Completion Point: A (4 of 4)
Dealership Internship - 150 Hours – SOC Code 43-2031

Course Description:
The Dealership Internship course is designed to build on the skills and knowledge students learned in the Dealership Policies and Protocols course for entry into the automotive service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study financial measures, forms and documentation, reference information, warranty policies, effective scheduling, collaborative groupware applications, and customer relations.

CTE Standards and Benchmarks	
19.0	Identify and complete financial measures, forms and documents that are required as part of the service consultant's duties—The student will be able to:
19.01	Describe the effect of money management on personal and career goals.
19.02	Develop a personal budget and financial goals.
19.03	Complete financial instruments for making deposits and withdrawals.
19.04	Maintain financial records.
19.05	Identify and define payroll deductions (taxes, insurance, and social security) employee benefits and pay systems.
19.06	Demonstrate principles of time management.
20.0	Locate and use reference information such as: service bulletins, electronic service manuals, warranty procedures manuals, owner's manuals, and electronic dealership proprietary systems—The student will be able to:
20.01	Use computer and operate keyboard.
20.02	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.
20.03	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.
20.04	Employ critical thinking skills independently and in teams to solve problems and make decisions.
20.05	Conduct technical research to gather information necessary for decision-making.
20.06	Identify information needed for the service requested on a repair order.
20.07	Locate and use paper and electronic manuals.
20.08	Locate and use technical service bulletins (TSBs).
20.09	Use personal information management (PIM) applications to increase workplace efficiency.
20.10	Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications.
20.11	Employ computer operations applications to access, create, manage, integrate, and store information.

CTE Standards and Benchmarks	
	20.12 Demonstrate proficiency in the use of dealership proprietary systems (based on site utilization).
21.0	Define and use warranty policies and procedures/parameters. Explain the difference between first time warranty, repeat repair, fleet, and customer pay at a service facility—The student will be able to:
	21.01 Identify policies and procedures associated with new vehicle sold in the United States.
	21.02 Identify policies and procedures related to an individual OEM.
	21.03 Identify and describe the procedure for submitting a work order under warranty conditions.
	21.04 Determine the proper procedure associated with warranty parts and claims.
22.0	Explain and demonstrate how to maximize the capability of the service facility by effective scheduling of workflow through collaborative groupware applications—The student will be able to:
	22.01 Identify and document workplace performance goals and monitor progress toward those goals.
23.0	Demonstrate the proper procedure and condition for delivery of the vehicle back to the customer—The student will be able to:
	23.01 Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.
	23.02 Ensure vehicle is prepared to return to customer per company policy (floor mats, steering wheel cover, etc.).
24.0	Demonstrate how to respond to difficult customer situations—The student will be able to:
	24.01 Identify scenarios when dealing with difficult customer situations.
	24.02 Identify and describe appropriate actions related to customer satisfaction.

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)

SkillsUSA 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.

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: **Automotive CNG / LPG Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T401100
CIP Number	0647060420
Grade Level	30, 31
Standard Length	1200 hours
Teacher Certification	AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 five occupational completion points.

NOTE: It is recommended that students complete **OCP-A (Automobile Services Assistor)** and/or demonstrate mastery of the outcomes in **OCP-A (Automobile Services Assistor)** prior to enrolling in additional Automotive CNG-LPG Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automobile Services Assistor), is at the discretion of the instructor.**

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0014	Automobile Services Assistor	300 hours	49-3023
B	AER0360	Automotive Electrical/Electronic System Technician	300 hours	49-3023
C	AER0503	Automotive Engine Performance Technician	300 hours	49-3023
D	AER0871	Automotive Compressed Natural Gas Technician	150 hours	49-3023
E	AER0872	Automotive Liquid Propane Gas Technician	150 hours	49-3023

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 Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry.
02.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry.
03.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
04.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.
05.0 Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer, engine and emission control systems.
06.0 Explain and apply proficiently the diagnosis, service and repair of Compressed Natural Gas systems**.**
07.0 Explain and apply proficiently the diagnosis, service and repair of Liquid Propane Gas systems.

Florida Department of Education
Student Performance Standards

Program Title: **Automotive CNG / LPG Technology**
PSAV Number: **T401100**

Course Number: AER0014
Occupational Completion Point: A
Automotive Services Assistor – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Service Assistor course prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study equipment skills, safety regulations, routine maintenance, and customer service.

Abbreviations:
ASE = Automotive Service Excellence task

For every task in Automotive Services Assistor course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks		Priority Number
01.0	Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry--The student will be able to:	
01.01	Identify and apply general shop safety rules and procedures, EPA and OSHA standards.	ASE
01.02	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.	
01.03	Research, identify, and interpret the Federal 'Workers Right To Know Law'.	
01.04	Identify and use appropriate emergency first aid procedures.	
01.05	Utilize and demonstrate safe procedures for handling of tools and equipment.	ASE
01.06	Identify and use proper placement of floor jacks and jack stands.	ASE
01.07	Identify and use proper procedures for safe lift operation.	ASE
01.08	Utilize proper ventilation procedures for working within the lab/shop area.	ASE
01.09	Identify and use proper procedures for safe pit usage.	

CTE Standards and Benchmarks		Priority Number
01.10	Identify marked safety areas.	ASE
01.11	Identify the location and the types of fire extinguishers and other fire safety equipment.	ASE
01.12	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.	ASE
01.13	Identify the location and use of eye wash stations.	ASE
01.14	Identify the location of the posted evacuation routes.	ASE
01.15	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE
01.16	Identify and wear appropriate clothing for lab/shop activities.	ASE
01.17	Secure hair and jewelry for lab/shop activities.	ASE
01.18	Use proper handling procedures for automotive fluids.	
01.19	Identify and describe typical automotive lubricants and lubricant properties.	
01.20	Identify and describe the proper procedure to apply and remove automotive fasteners, including thread inserts.	
01.21	Identify and describe typical automotive seals and gaskets.	
01.22	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE
01.23	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.	
01.24	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).	ASE
01.25	Locate and demonstrate knowledge of material safety data sheets (MSDS).	ASE
02.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry--The student will be able to:	
02.01	Identify tools and equipment and their appropriate usage in automotive applications.	ASE
02.02	Identify and use standard and metric measurement skills and designation.	ASE
02.03	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE
02.04	Demonstrate proper use of precision-measuring tools (i.e. micrometer, digital/dial-indicator, digital/dial-caliper) and torque methods.	ASE
03.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services --The student will be able to:	
03.01	Identify information needed and the service requested on a repair order.	ASE
03.02	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.	
03.03	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.	ASE

CTE Standards and Benchmarks		Priority Number
03.04	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE
03.05	Review vehicle service history.	ASE
03.06	Use computer and operate keyboard.	
03.07	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE
03.08	Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.	
03.09	Determine the presence of a Tire Pressure Monitoring System (TPMS).	
03.10	Determine the presence of wheel locks.	
03.11	Determine the presence of an air suspension system.	
03.12	Check operation and status of instrument panel warning lights and gauges.	
03.13	Locate and use the Vehicle Identification Number (VIN).	
03.14	Locate and use vehicle information placards, decals, tags, as required.	
03.15	Locate and use paper and electronic manuals.	
03.16	Locate and use technical service bulletins (TSBs).	
03.17	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.	
03.18	Use proper chemicals for cleaning and lubrication.	
03.19	Reset maintenance indicators.	
03.20	Verify status of instrument panel warning lights and gauges.	
03.21	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).	ASE
03.22	Inspect underhood area for leaks, damage, and unusual conditions.	
03.23	Determine fluid type requirements and identify fluid.	
03.24	Check engine oil level and condition; service as required.	
03.25	Check engine coolant level and condition; service as required.	
03.26	Check power steering fluid level and condition; service as required.	
03.27	Check brake fluid level and condition; service as required.	
03.28	Check hydraulic clutch fluid and condition; service as required.	
03.29	Check windshield washer fluid level and condition; service as required.	

CTE Standards and Benchmarks	Priority Number
03.30 Check automatic transmission fluid level and condition; service as required.	
03.31 Inspect undercar area for leaks, damage, and unusual conditions.	
03.32 Check differential/transfer case fluid level; note unusual conditions; service as required.	
03.33 Check manual transmission fluid level; note unusual conditions; service as required.	
03.34 Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear.	
03.35 Lubricate driveline, suspension and steering systems.	
03.36 Inspect cooling system pipes and hoses for wear, damage, and proper routing.	
03.37 Change engine oil and filter.	
03.38 Replace inline fuel filters as applicable.	
03.39 Inspect and replace air filter.	
03.40 Inspect and replace cabin air filter.	
03.41 Inspect, replace and adjust drive belts; inspect tensioners and pulleys.	
03.42 Document observed damage, unusual conditions, and concerns.	
03.43 Visually inspect struts, springs, and related components.	
03.44 Visually inspect stabilizer bar, bushings, brackets, and links.	
03.45 Visually inspect springs, torsion bars, and related components.	
03.46 Visually inspect shock absorbers and related components.	
03.47 Visually inspect constant velocity (CV) axle shaft boots.	
03.48 Identify service considerations when equipped with a Tire Pressure Monitoring System (TPMS).	
03.49 Identify nitrogen-filled tires.	
03.50 Inspect tires; inspect spare and mounting system; check and adjust tire pressure.	
03.51 Rotate tires according to recommendations.	
03.52 Balance wheel and tire assembly.	
03.53 Dismount, inspect, and remount tire on wheel.	
03.54 Repair tire according to industry standards.	
03.55 Reinstall wheel; torque wheel fasteners to specification.	
03.56 Check wheel bearings for play and other signs of wear.	

CTE Standards and Benchmarks	Priority Number
03.57 Perform a visual inspection of a brake drum system.	
03.58 Perform a visual inspection of a disc brake system.	
03.59 Check parking brake operation; check parking brake components for unusual conditions.	
03.60 Document damage, unusual conditions and concerns.	
03.61 Check wiper blades, inserts, and arms; replace wiper blades or inserts.	
03.62 Lubricate door latches and hinges.	
03.63 Inspect fuel cap and seal.	
03.64 Charge battery as needed.	
03.65 Inspect and clean battery hold-downs; repair or replace as needed.	
03.66 Inspect and clean battery and battery cable clamp connections.	
03.67 Perform battery, starting, and charging system tests using appropriate tester.	
03.68 Start vehicle using an auxiliary power supply.	
03.69 Maintain or restore electronic memory functions if required.	
03.70 Test and replace fuses; confirm proper circuit operation.	
03.71 Inspect and replace exterior and courtesy lamps.	
03.72 Document damage, unusual conditions, and concerns.	

Florida Department of Education
Student Performance Standards

Course Number: AER0360
Occupational Completion Point: B
Automotive Electrical/Electronic System Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Electrical/Electronic System Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics and repair of electrical/electronics, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.

Abbreviations:
EE = Electrical/Electronic Systems
P-1, P-2, P-3 = Automotive Service Excellence tasks.

For every task in Automotive Electrical/Electronic System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EE Task List:	
P-1 =	**36**
P-2 =	**14**
P-3 =	**8**
Total	**58**

CTE Standards and Benchmarks		**Priority Number**
04.0	Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems--The student will be able to:	
04.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
04.02	Identify and interpret electrical/electronic system concern; determine necessary action.	
04.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
04.04	Locate and interpret vehicle and major component identification numbers.	
04.05	Diagnose and demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).	P-1
04.06	Use wiring diagrams during diagnosis (troubleshooting) of electrical/electronic circuit problems.	P-1
04.07	Demonstrate the proper use of a digital multimeter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.	P-1

CTE Standards and Benchmarks		Priority Number
04.08	Check operation of electrical circuits with a test light.	P-1
04.09	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.	P-2
04.10	Check operation of electrical circuits using fused jumper wires.	P-1
04.11	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.	P-1
04.12	Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.	P-1
04.13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1
04.14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.	P-1
04.15	Replace electrical connectors and terminal ends.	P-1
04.16	Repair wiring harness.	P-1
04.17	Perform solder repair of electrical wiring.	P-1
04.18	Repair CAN/BUS wiring harness.	P-1
04.19	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	
04.20	Perform battery state-of-charge test; determine necessary action.	P-1
04.21	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.	P-1
04.22	Maintain or restore electronic memory functions.	P-1
04.23	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.	P-1
04.24	Perform slow/fast battery charge according to manufacturer’s recommendations.	P-1
04.25	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.	P-1
04.26	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	P-3
04.27	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	P-1
04.28	Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3
04.29	Perform battery conductance test; determine necessary action.	
04.30	Perform starter current draw tests; determine necessary action.	P-1
04.31	Perform starter circuit voltage drop tests; determine necessary action.	P-1
04.32	Inspect and test starter relays and solenoids; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
04.33	Remove and install starter in a vehicle.	P-1
04.34	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2
04.35	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2
04.36	Perform charging system output test; determine necessary action.	P-1
04.37	Diagnose (troubleshoot) charging system for the cause of undercharge, no-charge, and overcharge conditions.	P-1
04.38	Inspect, adjust, or replace generator (alternator) drive belts, check pulleys, and tensioners for wear; check pulley and belt alignment.	P-1
04.39	Remove, inspect, and re-install generator (alternator).	P-1
04.40	Perform charging circuit voltage drop test; determine necessary action.	P-1
04.41	Diagnose (troubleshoot) the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	P-1
04.42	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving light); replace as needed.	P-1
04.43	Aim headlights.	P-2
04.44	Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.	
04.45	Identify system voltage and safety precautions associated with high intensity discharge headlights.	P-2
04.46	Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	P-2
04.47	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.	
04.48	Diagnose (troubleshoot) the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	P-2
04.49	Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action.	
04.50	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.	P-1
04.51	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	P-2
04.52	Diagnose (troubleshoot) windshield washer problems; perform necessary action.	P-2
04.53	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.	P-2
04.54	Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.	
04.55	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.	P-2
04.56	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action	P-3

CTE Standards and Benchmarks		Priority Number
04.57	Diagnose (troubleshoot) supplemental restraint system (SRS) concerns; determine necessary action.	P-2
04.58	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.	P-1
04.59	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.	P-3
04.60	Remove and reinstall door panel.	P-1
04.61	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.	P-3
04.62	Check for module communication (including CAN/BUS systems) using a scan tool.	P-2
04.63	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.	P-3
04.64	Describe the operation of keyless entry/remote-start systems.	P-3
04.65	Verify operation of instrument panel gauges and warning /indicator lights; reset maintenance indicator.	P-1
04.66	Verify windshield wiper and washer operation, replace wiper blades.	P-1
04.67	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0503
Occupational Completion Point: C
Automotive Engine Performance Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Automotive Engine Performance Technician course prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer, engine and emission control systems.

Abbreviations:
EP = Engine Performance
P-1, P-2, P-3 = Automotive Service Excellence tasks.

For every task in Automotive Engine Performance Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EP Task List:	
P-1 =	**21**
P-2 =	**17**
P-3 =	**9**
Total	**47**

CTE Standards and Benchmarks		**Priority Number**
05.0	Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer, engine and emission control systems --The student will be able to:	
05.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
05.02	Identify and interpret engine performance concern; determine necessary action.	P-1
05.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
05.04	Locate and interpret vehicle and major component identification numbers.	
05.05	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	
05.06	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	P-3
05.07	Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action.	P-2
05.08	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
05.09	Perform cylinder power balance test; determine necessary action.	P-2
05.10	Perform cylinder cranking and running compression tests; determine necessary action.	P-1
05.11	Perform cylinder leakage test; determine necessary action.	P-1
05.12	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-2
05.13	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.	
05.14	Verify engine operating temperature; determine necessary action.	P-1
05.15	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	
05.16	Verify correct camshaft timing.	P-1
05.17	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1
05.18	Diagnose the causes of emissions or drivability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	P-1
05.19	Diagnose emissions or drivability concerns without stored diagnostic trouble codes; determine necessary action.	P-1
05.20	Check for module communication (including CAN/BUS systems) errors using a scan tool.	
05.21	Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.	P-2
05.22	Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1
05.23	Diagnose drivability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.	P-3
05.24	Perform active tests of actuators using a scan tool; determine necessary action.	P-2
05.25	Describe the importance of running all OBDII monitors for repair verification.	P-1
05.26	Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor drivability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	P-2
05.27	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	
05.28	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1
05.29	Remove and replace spark plugs; inspect secondary ignition components for wear and damage.	P-1

CTE Standards and Benchmarks		Priority Number
05.30	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3
05.31	Diagnose (troubleshoot) hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	P-2
05.32	Check fuel for contaminants; determine necessary action.	P-2
05.33	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	P-1
05.34	Replace fuel filters.	P-1
05.35	Inspect, service or replace air filters, filter housing and intake duct work.	P-1
05.36	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2
05.37	Inspect and test fuel injectors.	P-2
05.38	Verify idle control operation.	P-1
05.39	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action.	P-1
05.40	Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed.	P-1
05.41	Perform exhaust system back-pressure test; determine necessary action.	P-2
05.42	Check and refill diesel exhaust fluid (DEF).	P-3
05.43	Test the operation of turbocharger/supercharger systems; determine necessary action.	P-3
05.44	Diagnose oil leaks, emissions, and drivability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	P-3
05.45	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	P-2
05.46	Diagnose emissions and drivability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	P-3
05.47	Diagnose emissions and drivability concerns caused by the secondary injection and catalytic converter systems; determine necessary action.	P-2
05.48	Inspect, test, service and replace components of the EGR system, including tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	P-2
05.49	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	P-2
05.50	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	

CTE Standards and Benchmarks		Priority Number
05.51	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	P-3
05.52	Inspect and test catalytic converter efficiency.	P-2
05.53	Diagnose emissions and drivability concerns caused by the evaporative emissions control system; determine necessary action.	P-2
05.54	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	P-1
05.55	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-3
05.56	Adjust valves on engines with mechanical or hydraulic lifters.	
05.57	Remove and replace timing belt; verify correct camshaft timing.	
05.58	Remove and replace thermostat and gasket/seal.	
05.59	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	
05.60	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	
05.61	Perform engine oil and filter change.	
05.62	Identify hybrid vehicle internal combustion engine service precautions.	

Florida Department of Education
Student Performance Standards

Course Number: AER0871
Occupational Completion Point: C
Automotive Compressed Natural Gas Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Compressed Natural Gas Technician course prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study the diagnosis, service, maintenance, installation, and repair of automotive compressed natural gas systems.

For every task in Automotive Compressed Natural Gas course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks	
06.0	Explain and apply proficiently the diagnosis, service and repair of Compressed Natural Gas systems--The student will be able to:
06.01	Interpret and verify complaint, determine needed repairs for Supplemental Systems.
06.02	Analyze symptoms and perform diagnostic procedures on vehicles with supplemental on-board diagnostic computer support systems.
06.03	Diagnose and repair no starting, hard starting, engine misfire, poor drivability, power loss, poor mileage, and emissions problems on vehicle's OEM and supplemental sensors (e.g., manifold skin temperature, intake air temperature, and natural gas tank temperature).
06.04	Diagnose and repair no-starting, hard starting, engine misfire, poor drivability, power loss, poor mileage, and emissions problems on vehicles with supplemental computer support systems.
06.05	Diagnose and repair intermittent or complete failure of electric, electronic or mechanical devices (e.g., hour meters, fuel level indicators, fuel selection devices).
06.06	Interpret and verify complaint; determine needed repairs to Fuel Storage and Delivery systems.
06.07	Check all fuel system components to include fuel lock-off, valves, solenoids, manual shutoff, connections, fittings, hoses, and tubing for leaks, wear, installation and proper operation: repair/replace as needed.
06.08	Diagnose the cause of abnormal fuel flow through fuel carrying component.
06.09	Diagnose the cause of fuel odor or fuel loss by inspecting or testing the fuel supply system components such as valves, fuel supply container, pressure relief device (PRD), tubing and hoses; repair or replace as needed.
06.10	Diagnose the cause of inaccurate fuel level indicator reading; service, adjust, repair as needed.

CTE Standards and Benchmarks	
06.11	Perform cylinder leakage test; determine necessary action.
06.12	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.
06.13	Interpret and verify complaint; determine needed repairs AIF Management system.
06.14	Verify engine operating temperature; determine necessary action.
06.15	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.
06.16	Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine, misfire, power loss, stalling, poor mileage, and lean or rich mixture, problems on vehicles with variable or fixed venturi type fuel, and fumigation or infection type fuel systems; determine needed repairs.
06.17	Inspect and test cold enrichment system components; adjust or replace as needed.
06.18	Inspect and test fuel injectors; service or replace as needed.
06.19	Inspect and test vacuum and electrical components and connections of fuel system; repair or replace as needed.
06.20	Perform diagnostic procedures on vehicles with on-board computer/electronic fuel system support.
06.21	Follow manufacturer's maintenance schedule to ensure fluids and lubricants are at proper levels and serviced with recommended products.
06.22	Identify the process of recertification or replacement of fuel supply container(s) according to most current regulations (e.g., NGV-2, DOT); complete documentation; remove and replace fuel supply container, if required.
06.23	Inspect fuel supply container(s) and brackets as it relates to certification: data plate, working pressures, fuel supply container damage, valves, bolts, torque specifications, and all sealing and venting equipment.
06.24	Inspect air filters and fuel filter; service or replace as needed.
06.25	Inspect and ensure that all required emission control devices are present and functional.
06.26	Inspect, adjust, and test manual shut-off valve, service valve, check-valves, and solenoid valves; repair or replace as needed.
06.27	Empty fuel supply container according to manufacturer's procedures and all local, state and federal regulations. (Local procedures will vary and extreme care must be exercised if using actual fuel. Use of inert gas is recommended for this task.).
06.28	Inspect and test fuel selection system components; repair or replace as needed.
06.29	Select and install swage, compression, flare, captive 0-ring, NPT, and other fittings using manufacturer's recommended sealants when required.
06.30	Check for fuel system problems caused by fuel contamination.
06.31	Check air/fuel system integrity (e.g., fuel leaks, air leaks, components compatibility/application); determine needed repairs.
06.32	Inspect and test fuel pressure regulation system components; adjust, repair or replace as needed.
06.33	Remove, clean, and reinstall throttle assemblies; adjust related linkages as needed.
06.34	Check/adjust idle speed and fuel mixtures according to manufacturer's procedures.

CTE Standards and Benchmarks	
06.35	Perform safe fueling procedures and determine fuel level.
06.36	Identify working pressures and demonstrate an understanding of fuel characteristics as they relate to temperature and fill procedures.
06.37	Inspect the vehicle for pre-existing conditions that may adversely affect the performance of the vehicle.
06.38	Document pre-conversion conditions and complete all necessary reports.
06.39	Prepare vehicle for conversion according to manufacturer's directions.
06.40	Install fuel supply container with mounting hardware, valving, shielding, fuel level indicator, and remote fill assembly, as needed, using manufacturer's specifications and required local, state and federal regulations.
06.41	Install pressure relief device (PRD) and venting system.
06.42	Install gas tight enclosure around valves and fittings, vent to the outside of the vehicle.
06.43	Determine routing and protection of fuel line components according to industry standards.
06.44	Prepare tubing using proper techniques for cutting, deburring, cleaning, and bending.
06.45	Install tubing, piping, hose, and valves using appropriate chafing protection, mounting hardware, and protective shields, according to industry safety standards.
06.46	Determine appropriate location and mounting of the regulators; install the regulators using mounting brackets, fuel lock, fittings, starting aids, control valves, cooling lines, and thermostat as required and according to manufacturer's specifications.
06.47	Install fuel injection/carburetion or other fuel control components according to manufacturer's instructions.
06.48	Install electrical/electronic components using OEM or manufacturer's wire connections and wiring diagrams, applying all safety precautions.
06.49	Determine location of electrical components considering safety, serviceability, function, component protection, and esthetics according to manufacturer's specifications (when available).
06.50	Inspect and test each installed component to ensure it is connected and positioned in a safe and effective manner.
06.51	Purge and pressurize fuel system and check for system integrity through its maximum working pressure (leak test).
06.52	Perform system setup procedures according to manufacturer's specifications.
06.53	Fabricate brackets, shields, and braces according to accepted industry standards.
06.54	Complete and affix required safety/information labels.
06.55	Test vehicle for acceptable drivability and operation (on each fuel for dual fuel vehicles).
06.56	Inspect and ensure that all required emissions control devices are present and functional; confirm that the vehicle emissions meet applicable local, state, and federal requirements.
06.57	Perform pre and post conversion emissions evaluation.

Florida Department of Education
Student Performance Standards

Course Number: AER0872
Occupational Completion Point: E
Automotive Liquid Propane Gas Technician – 150 Hours – SOC Code 49-3023

Course Description:
The Automotive Liquid Propane Gas Technician prepares students for entry into the automotive service industry. Students explore career opportunities and requirements of a professional auto mechanic. Students study diagnostics, maintenance, installation, and repair of automotive liquid propane gas systems.

For every task in Liquid Propane Gas Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks	
07.0	Explain and apply proficiently the diagnosis, service and repair of Liquid Propane Gas systems--The student will be able to:
07.01	Analyze symptoms and perform diagnostic procedures on vehicles with supplemental on-board diagnostic computer support systems.
07.02	Diagnose and repair no starting, hard starting, engine misfire, poor drivability, power loss, poor mileage, and emissions problems on vehicle's OEM and supplemental sensors (e.g., manifold skin temperature, intake air temperature, etc.).
07.03	Diagnose and repair no-starting, hard starting, engine misfire, poor drivability, power loss, poor mileage, and emissions problems on vehicles with supplemental computer support systems (e.g., timing modification devices, ignition interrupt).
07.04	Diagnose and repair intermittent or complete failure of electric, electronic or mechanical devices (e.g., hour meters, fuel level indicators, fuel selection devices).
07.05	Check all fuel system components to include fuel lock-off, valves, solenoids, manual shutoff, connections, fittings, hoses and tubing for leaks, wear, installation and proper operation; repair or replace as needed.
07.06	Diagnose the cause of abnormal fuel flow through fuel carrying component.
07.07	Diagnose engine noises and vibrations; determine necessary action.
07.08	Diagnose the cause of fuel odor or fuel loss by inspecting or testing the fuel supply system components such as valves, fuel supply container, pressure relief device (PRD), tubing and hoses; repair or replace as needed.
07.09	Diagnose the cause of inaccurate fuel level indicator reading; service, adjust, repair or replace as needed.
07.10	Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine

CTE Standards and Benchmarks	
	misfire, power loss, stalling, poor mileage, and lean or rich mixture problems on vehicles with fumigation or injection type fuel systems; determine needed repairs.
07.11	Inspect and test cold enrichment system components; adjust or replace as needed.
07.12	Inspect and test fuel injectors; service or replace as needed.
07.13	Inspect and test vacuum and electrical components and connections of fuel system; repair or replace as needed.
07.14	Remove and reinstall engine in an OBDII or newer vehicle; reconnect all attaching components and restore the vehicle to running condition.
07.15	Perform diagnostic procedures on vehicles with on-board computer/electronic fuel system support.
07.16	Follow manufacturer's maintenance schedule to ensure fluids and lubricants are at proper levels and serviced with recommended products.
07.17	Identify the process of recertification or replacement of fuel supply container(s) according to most current regulations (e.g., DOD complete documentation; remove and replace fuel supply container, if required.
07.18	Inspect fuel supply container(s) and brackets as it relates to certification: data plate, pressures, supply container fuel damage, valves, bolts, torque specifications, and all sealing and venting equipment.
07.19	Inspect air filters and fuel filter; service or replace as needed.
07.20	Inspect and ensure that all required emission control devices are present and functional.
07.21	Inspect, adjust, and test manual shut-off valve, service valve, check-valves, and solenoid valves; repair or replace as needed.
07.22	Empty fuel supply container according to manufacturer's procedures and all local, state and federal regulations. (Local procedures will vary and extreme care must be exercised.)
07.23	Inspect and test fuel selection system components; repair or replace as needed.
07.24	Select and install flare, NPT, and other fittings using required sealants for LPG according to manufacturer's specifications.
07.25	Check for fuel system problems caused by fuel contamination.
07.26	Check air/fuel system integrity (e.g., fuel leaks, air leaks, components compatibility/application); determine needed repairs.
07.27	Inspect and test fuel pressure regulation system components; Adjust, repair or replace as needed.
07.28	Remove, clean, and reinstall throttle assemblies; adjust related linkages as needed.
07.29	Check/adjust idle speed and fuel mixtures according to manufacturer's procedures.
07.30	Perform safe fueling procedures and determine fuel level.
07.31	Identify working pressures and demonstrate an understanding of fuel characteristics as they relate to temperature and fill procedures.
07.32	Empty fuel system using industry practices or manufacturer's procedures and all local, state and federal regulations. (Local procedures will vary and extreme care must be exercised.)
07.33	Inspect the vehicle for pre-existing conditions that may adversely affect the performance of the vehicle.

CTE Standards and Benchmarks	
07.34	Document pre-conversion conditions and complete all necessary reports.
07.35	Prepare vehicle for conversion according to manufacturer's directions.
07.36	Install fuel supply container with mounting hardware, valving, shielding, fuel level indicator, and remote fill assembly as needed, using manufacturer's specifications and required local, state and federal regulations.
07.37	Install pressure relief device (PRD) and venting system.
07.38	Select and install flare, NPT, and other fittings using sealants for LPG according to manufacturer's specifications.
07.39	Install gas tight enclosure around valves and fittings, vent to the outside of vehicle as required.
07.40	Determine routing and protection of fuel line components according to industry standards.
07.41	Prepare tubing using proper techniques for cutting, deburring cleaning, and bending.
07.42	Install tubing, piping, hose, and valves using appropriate chafing protection, mounting hardware, and protective shields, according to industry safety standards.
07.43	Determine appropriate location and mounting of the converter/regulator; install the converter/regulator using mounting brackets, fuel lock, fittings, starting aids, control valves, cooling lines, and thermostat as required and according to manufacturer's specifications.
07.44	Install fuel injection/carburetion or other fuel control components according to manufacturer's instructions.
07.45	Install electrical/electronic components using OEM or manufacturer's wire connections and wiring diagrams, applying all safety precautions.
07.46	Determine location of electrical components considering safety, serviceability, function, component protection, and esthetics according to manufacturer's specifications (when available).
07.47	Inspect and test each installed component to ensure it is connected and positioned in a safe and effective manner.
07.48	Purge and pressurize fuel system and check for system integrity through its maximum working pressure (leak test).
07.49	Perform system setup procedures according to manufacturer's specifications.
07.50	Fabricate brackets, shields, and braces according to accepted industry standards.
07.51	Complete and affix required safety/information labels.
07.52	Test vehicle for acceptable drivability and operation (on each fuel for dual fuel vehicles).
07.53	Inspect and ensure that all required emissions control devices are present and functional; confirm that the vehicle emissions meet applicable local, state, and federal requirements.
07.54	Perform pre and post conversion emissions evaluation.

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)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 9.0. 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: **Alternative Fuels Technology**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T401200
CIP Number	0647060421
Grade Level	30, 31
Standard Length	750 hours
Teacher Certification	AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

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

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points.

NOTE: It is recommended that students complete **OCP-A (Alternative Fuel Maintenance Technician)** and/or demonstrate mastery of the outcomes in **OCP-A (Alternative Fuel Maintenance Technician)** prior to enrolling in additional Alternative Fuels Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Alternative Fuel Maintenance Technician), is at the discretion of the instructor.**

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0875	Alternative Fuels Maintenance Technician	300 hours	49-3023
B	AER0876	Advanced Alternative Fuels Technician	300 hours	49-3023
C	AER0877	CNG Fuel System Inspector	150 hours	49-3023

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 Proficiently explain and apply required shop and personal safety tasks relating to the automotive and truck industry.
02.0 Identify principles, assemblies, and systems of engine operation.
03.0 Proficiently identify different types of alternative fuels.
04.0 Identify methods and strategies for using hybrid and electric vehicles (EV).
05.0 Demonstrate proficiency in preparing an alternative fuels and EV for routine maintenance and customer services.
06.0 Explain and apply proficiently for diagnosis, service, and repair of hybrid and EV electrical/electronic system components, battery, and charging systems.
07.0 Diagnose and repair for general alternative fueled vehicles.
08.0 Explain and apply methods for using natural gas fuel system.
09.0 Demonstrate and apply methods for alternative fuels conversion.
10.0 Demonstrate methods for inspecting compressed natural gas storage containers.
11.0 Demonstrate methods for inspecting compressed natural gas components.

Florida Department of Education
Student Performance Standards

Program Title: **Alternative Fuels Technology**
PSAV Number: **T401200**

Course Number: AER0875
Occupational Completion Point: A
Alternative Fuels Maintenance Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Alternative Fuels Maintenance Technician course prepares students for entry into the Alternative Fuels Service Industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study facility and personal safety, engine operation, types of alternative fuels, hybrid, and electric vehicles. Alternative fuel and electric vehicle maintenance and customer service are included.

CTE Standards and Benchmarks	
01.0	Proficiently explain and apply required shop and personal safety tasks relating to the automotive and truck industry--The student will be able to:
01.01	Identify and apply general shop safety rules and procedures, EPA and OSHA standards.
01.02	Identify and use appropriate emergency first aid procedures.
01.03	Identify and use proper placement of floor jacks and jack stands.
01.04	Identify and use proper procedures for safe lift operation.
01.05	Utilize proper ventilation procedures for working within the lab/shop area.
01.06	Identify and use proper procedures for safe pit usage.
01.07	Identify marked safety areas.
01.08	Identify the location and the types of fire extinguishers and other fire safety equipment.
01.09	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.
01.10	Identify the location and use of eye wash stations.
01.11	Identify the location of the posted evacuation routes.
01.12	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
01.13	Secure hair and jewelry for lab/shop activities.
01.14	Use proper handling procedures for automotive fluids.
01.15	Identify and describe the proper procedure to apply and remove automotive fasteners, including thread inserts.

CTE Standards and Benchmarks	
01.16	Identify and wear appropriate clothing for lab/shop activities.
01.17	Identify and describe typical automotive lubricants and lubricant properties.
01.18	Identify and describe typical automotive seals and gaskets.
01.19	Identify and define career opportunities in the automotive service industry.
01.20	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID)) battery packs, and charging systems.
01.21	Locate and demonstrate knowledge of safety data sheets (SDS).
01.22	Demonstrate knowledge of various industry related certifications.
01.23	Demonstrate awareness of the safety aspects of hybrid vehicle high voltage circuits.
02.0	Identify principles, assemblies, and systems of engine operation--The student will be able to:
02.01	Explain the basic principles in the operation of the two-stroke-cycle engines.
02.02	Identify engine assemblies and systems for four-stroke-cycle engines.
02.03	Explain the operating principles of four-stroke-cycle engines.
02.04	Identify the equipment of four-stroke-cycle engines.
02.05	Identify governor types and their operating principles.
02.06	Identify hybrid vehicle internal combustion engine service precautions.
02.07	Describe the operational characteristics of a hybrid vehicle drive train.
02.08	Identify hybrid vehicle power electrical motors, circuits and safety precautions.
02.09	Describe the operational characteristics of electric drive.
02.10	Explain the operating principles of battery electric vehicles (BEV).
02.11	Explain the operating principles of hybrid electric vehicles (HEV).
02.12	Explain the operating principles of fuel cell electric vehicles (FCV).
02.13	Explain the operating principles of safety precautions for working on EV’s.
03.0	Proficiently identify different types of alternative fuels--The student will be able to:
03.01	Research and identify developments in industry regarding alternative fuels.
03.02	Evaluate systems used in alternatively fueled converted vehicles (CNG, LNG, LPG, hydrogen, and electric).
03.03	Research and examine the history of gaseous fuels.
03.04	Compare and differentiate between types of alternative fuel systems.

CTE Standards and Benchmarks	
03.05	Research and examine the history and characteristics of natural gas.
03.06	Compare the advantages and disadvantages of dual-fuel systems.
03.07	Explain the interrelationship of EFI alternative fuel systems.
03.08	Explain the process of converting engines to run on alternative fuels.
03.09	Research and examine the operational theory of natural gas systems.
03.10	Research the proper operation of conversion spark ignited heavy duty engines.
03.11	Explain the effects of various conversion computer controlled systems on heavy duty vehicles.
03.12	Research the maintenance of gaseous fuel equipped vehicles.
03.13	Analyze the effectiveness of conversion system repairs and procedures.
03.14	Examine and investigate a variety of common conversion problem failures.
03.15	Analyze various federal, state, and regulatory agency rules and relate them to converted vehicle installations.
03.16	Determine the composition of gaseous fuels.
03.17	Identify the different types of gaseous fuels.
03.18	Read and interpret units of pressure for gaseous fuels.
03.19	Use instruments that measure pressure for gaseous fuels.
03.20	Determine the flash point and flammability for gaseous fuels.
03.21	Identify auto ignition temperature for different types of gaseous fuels.
03.22	Identify types of leakage for the different types of gaseous fuels.
03.23	Identify the mechanical differences for the different types of gaseous fuels.
03.24	Identify the fuel management system for the different types of gaseous fuels.
03.25	Locate and demonstrate knowledge of proper personal safety equipment.
03.26	Identify and use proper procedures for tools and equipment for working with different types of gaseous fuels.
03.27	Identify and apply general shop safety rules and procedures, EPA, OSHA, and NFAP 52 standards.
03.28	Identify and apply safe working practices with different types of gaseous fuel systems.
03.29	Research and explain the different types of gaseous fuel containers.
04.0	Identify methods and strategies for using hybrid and electric vehicles (EV)--The student will be able to:
04.01	Research and categorize the different types of advanced electric vehicles.

CTE Standards and Benchmarks	
04.02	Describe the different types of advanced technology used in electric vehicles.
04.03	Research the design and performance of OEM EV's.
04.04	Research the design and performance of EV conversions.
04.05	Identify the appropriate energy requirements for a specific OEM EV; including motor size, voltage/ampere-hour requirements, and battery charging systems.
04.06	Explain electric vehicle safety procedures.
04.07	Demonstrate safety procedures required for electric vehicles.
04.08	Research high voltage systems.
04.09	Identify fire prevention methods.
04.10	Identify the different types of short circuits.
04.11	Research shock prevention techniques.
04.12	Demonstrate proper high pressure fitting installation.
04.13	Identify electrical/electronic problems with an OEM EV or advanced technology/hybrid-EV conversion.
04.14	Explain electrical theory basics.
04.15	Explain electrical terms.
04.16	Explain the different types of conductors and insulators.
04.17	Identify the different types of circuit components.
04.18	Explain the theory of electromagnetism.
04.19	Demonstrate electrical systems components.
04.20	Identify the different types of motors and generators.
04.21	Demonstrate knowledge of motor operation basics.
04.22	Explain the principles of the DC motors.
04.23	Explain the principles of the AC motors.
04.24	Explain the principles of the generators.
04.25	Demonstrate knowledge of electrical diagnostic procedures.
04.26	Identify the different types of EV controllers.
04.27	Demonstrate knowledge of battery basics.
04.28	Identify the different battery types.

CTE Standards and Benchmarks	
	04.29 Demonstrate knowledge of the different types of ultra-capacitors.
	04.30 Demonstrate how to properly maintain a battery.
05.0	Demonstrate proficiency in preparing an alternative fuel and EV for routine maintenance and customer service--The student will be able to:
	05.01 Identify vehicle according to engine location, cylinders, types of drive system, purpose, etc.
	05.02 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
	05.03 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
	05.04 Review alternative vehicle service history.
	05.05 Identify information needed and the service requested on a repair order.
	05.06 Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.
	05.07 Identify and interpret hybrid electrical/electronic system concerns; determine necessary action.
	05.08 Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.
	05.09 Document observed damage, unusual conditions, and concerns.
	05.10 Demonstrate retrieving stored diagnostic trouble codes.
	05.11 Reset product specific service indicator.
	05.12 Identify acceptable customer relations.
	05.13 Identify and demonstrate proper customer relation skills.
	05.14 Identify principles of time management.
	05.15 Utilize flat rate manuals, service manuals, service bulletins, parts numbers, and electronic service information.
	05.16 Locate and use technical service bulletins (TSB's).
	05.17 Use proper chemicals for cleaning and lubrication.
	05.18 Check operation and status of instrument panel warning lights and gauges.
	05.19 Inspect under hood area for leaks, damage, and unusual conditions.
	05.20 Inspect undercar area for leaks, damage, and unusual conditions.
	05.21 Inspect engine assembly for fuel, oil, coolant, and other leaks.
	05.22 Determine fluid type requirements and identify fluid.
	05.23 Check engine oil level and condition; service as required.
	05.24 Change oil and filter.

CTE Standards and Benchmarks	
05.25	Check engine filter condition; service as required.
05.26	Inspect, replace and adjust drive belts; inspect tensioners and pulleys.
05.27	Demonstrate how to check and inspect the batteries.
05.28	Demonstrate how to replace batteries.
05.29	Check and inspect the charging system.
05.30	Compile a list of components for an electric vehicle conversion sorted by manufacturer.

Florida Department of Education
Student Performance Standards

Course Number: AER0876
Occupational Completion Point: B
Advanced Alternative Fuels Technician – 300 Hours – SOC Code 49-3023

Course Description:
The Advanced Alternative Fuels Technician course includes the diagnosis, service, and repair of hybrid, electric vehicle system components, battery, charging systems, and general alternative fuel vehicles. Methods for using natural gas fuel systems and alternative fuel conversions are included.

CTE Standards and Benchmarks	
06.0	Explain and apply proficiently for diagnosis, service, and repair of hybrid and EV electrical/electronic system components, battery, and charging systems --The student will be able to:
06.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
06.02	Identify and interpret hybrid electrical/electronic system concern; determine necessary action.
06.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
06.04	Locate and interpret vehicle and major component identification numbers.
06.05	Diagnose and demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
06.06	Use wiring diagrams during diagnosis (troubleshooting) of electrical/electronic circuit problems.
06.07	Demonstrate the proper use of digital multimeter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.
06.08	Check operation of electrical circuits with a test light.
06.09	Differentiate between electrical and engine mechanical problems
06.10	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
06.11	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
06.12	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.
06.13	Replace electrical connectors and terminal ends.
06.14	Identify location of hybrid vehicle high voltage circuit disconnects (service plug) location and safety procedures.
06.15	Perform battery state-of-charge test; determine necessary action.

CTE Standards and Benchmarks	
06.16	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
06.17	Maintain or restore electronic memory functions.
06.18	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
06.19	Perform slow/fast battery charge according to manufacturer's recommendations.
06.20	Jump-start vehicle using jumper cables and booster battery or an auxiliary power supply.
06.21	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.
06.22	Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.
06.23	Perform battery conductance test; determine necessary action.
06.24	Inspect and test switches, connectors, and control circuits; perform necessary action.
06.25	Perform charging system output test; determine necessary action.
06.26	Diagnose (troubleshoot) charging system for the cause of undercharge, no-charge, and overcharge conditions.
06.27	Inspect, adjust, or replace generator (alternator) drive belts, check pulleys, and tensioners for wear; check pulley and belt alignment.
06.28	Remove, inspect, and re-install generator (alternator).
06.29	Perform charging circuit voltage drop test; determine necessary action.
06.30	Check for module communication (including CAN/BUS systems) using a scan tool.
06.31	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.
06.32	Service and repair hybrid product specific electrical/electronic systems.
06.33	Perform hybrid product specific diagnostic procedures.
07.0	Diagnose and repair for general alternative fuel vehicles--The student will be able to:
07.01	Inspect fuel, oil, and coolant levels and condition, and consumption; determine needed action.
07.02	Diagnose causes of engine fuels, oil, coolant, air, and other leaks; determine needed action.
07.03	Interpret engine noises; determine needed action.
07.04	Observe engine exhaust smoke color and quantity; determine needed action.
07.05	Perform air intake system restriction and leakage tests; determine needed action.
07.06	Perform intake manifold pressure (boost) test; determine needed action.
07.07	Perform exhaust back pressure test; determine needed action.
07.08	Perform crankcase pressure test; determine needed action.

CTE Standards and Benchmarks	
07.09	Diagnose a no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action.
07.10	Diagnose surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed action.
07.11	Determine engine vibration problems; determine needed action.
07.12	Check, record, and clear electronic diagnostic (fault) codes; monitor electronic data; determine needed action.
07.13	Perform cylinder compression test; determine needed action.
07.14	Check air induction system: piping, hoses, clamps, and mounting; check for air restrictions and leaks; service or replace air filter as needed.
07.15	Inspect intake manifold, gaskets, and connections; replace as needed.
07.16	Inspect, clean, and test charge air cooler assemblies; replace as needed.
07.17	Inspect exhaust manifold, piping, mufflers, and mounting hardware; repair or replace as needed.
07.18	Check alternative fuel level, quality, and consumption; determine needed action.
07.19	Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action.
07.20	Check alternative fuel system for leaks; determine needed action.
07.21	Perform on-engine inspections, tests, adjustments to alternative fuel system; check and adjust pressure; determine needed action.
07.22	Inspect and adjust throttle control linkage; determine needed action.
07.23	Inspect air/fuel ratio control systems; determine needed action.
07.24	Inspect, test, and adjust engine fuel shut-down devices and controls; determine needed action.
07.25	Inspect alternative fuel high pressure injection lines, hold downs, fittings and seals; determine needed action.
07.26	Inspect and test power and ground circuits and connections; measure and interpret voltage, voltage drop, amperage, and resistance readings using a digital multimeter (DMM); determine needed action.
07.27	Interface with vehicle’s on-board computer; perform diagnostic procedures using recommended electronic diagnostic equipment and tools (to include PC based software and/or data scan tools); determine needed action.
07.28	Locate and use relevant service information (to include diagnostic procedures, flow charts, and wiring diagrams.
07.29	Inspect and replace electrical connector terminals, seals, and locks.
07.30	Inspect and test alternative fuel system switches, sensors, controls, actuator components, and circuits; adjust or replace as needed.
07.31	Perform cylinder contribution test utilizing recommended electronic diagnostic tool.
07.32	Demonstrate the proper use of a high pressure gas meter when measuring operating pressure.
07.33	Inspect the general over-all-state of alternative fuel system.

CTE Standards and Benchmarks	
08.0	Explain and apply methods for using natural gas fuel system--The student will be able to:
08.01	Research CNG transportation vehicles.
08.02	Analyze the future of alternative transportation.
08.03	Explain the basics of physics and power.
08.04	Demonstrate CNG safety practices.
08.05	Assess the various federal, state, and regulatory agency rules for specific vehicle installations.
08.06	Research NFPA-52, DOT and EPA regulations.
08.07	Locate and interpret the CNG codes and standards.
08.08	Locate and interpret the CNG cylinder labeling on containers.
08.09	Research applicable CNG cylinder requirements.
08.10	Identify proper safe practices when servicing and installing the CNG tank.
08.11	Research applicable valve requirements for CNG container.
08.12	Demonstrate valve adjustments on a CNG container.
08.13	Explain the need for external CNG venting.
08.14	Research pressure relief device requirements CNG container.
08.15	Explain the safety use for vehicle CNG markings.
08.16	Analyze venting system requirements for defueling and refueling for CNG.
08.17	Analyze the proper installation of a CNG system.
08.18	Examine the proper operation of a CNG system.
08.19	Check the operation and maintenance of advanced emission control devices.
08.20	Evaluate how computer controls effect vehicle emissions.
08.21	Develop a diagnostic strategy using a hand-held scanner to diagnose.
08.22	Demonstrate the proper use of a DVOM in diagnosing computer systems.
08.23	Perform diagnostic routines and analysis on vehicles and emissions system.
08.24	Prepare to properly diagnose and analyze vehicles average exhaust emissions.
08.25	Demonstrate the process to diagnose OEM engines that run on alternative fuel.
08.26	Organize and collect the proper engine diagnostic procedures.

CTE Standards and Benchmarks	
08.27	Demonstrate the effects of computer controlled systems on heavy duty vehicles.
08.28	Assess the effectiveness of OEM system repairs and procedures.
08.29	Examine, investigate and repair a variety of common OEM problem failures.
09.0	Demonstrate and apply methods for alternative fuel conversion--The student will be able to:
09.01	Demonstrate shop safety aspects while installing and working with CNG.
09.02	Research CNG conversions and locations for each part of the system.
09.03	Locate and interpret valve ratings & classifications.
09.04	Set up and perform adjustment procedures to various CNG systems.
09.05	Identify and apply conversion components to engines.
09.06	Demonstrate the ability to install correct after market system on vehicle.
09.07	Explain tank design, fabrication & testing methods.
09.08	Illustrate the correct use of soldering wires and benefits of using the Versus Plug & Play system.
09.09	Locate and read diagrams of the OEM schematic.
09.10	Locate correct wires on the OEM system for a CNG conversion.
09.11	Demonstrate wiring the OBD monitoring.
09.12	Demonstrate the correct technique to solder the wires system.
09.13	Install gas injection ports and injector adapters.
09.14	Demonstrate the proper tightening of adapters to avoid vacuum leaks.
09.15	Identify the appropriate CNG regulator and sensor areas for secure mounting.
09.16	Demonstrate proper procedures for bending stainless steel high pressure gas lines.
09.17	Check and inspect pressure release devices.
09.18	Secure and safe mount CNG tank installation.
09.19	Check and inspect tank shield installation.
09.20	Check and verify tank valve position on CNG container.
09.21	Installation of high pressure parts to lines from the tank to the regulator.
09.22	Install and check in-line quarter turn emergency shut-off valve.
09.23	Check and inspect high pressure tank and line installation.

CTE Standards and Benchmarks	
09.24	Check and inspect under-the-hood CNG component installation.
09.25	Demonstrate the proper use of CNG inspection equipment.
09.26	Determine procedure to calibrate vehicle & computer to CNG conversion kit.
09.27	Check and verify CNG working pressure and tank expiration.
09.28	Demonstrate fueling a vehicle with CNG fuel.
09.29	Identify typical problems and solutions when diagnosing CNG systems.
09.30	Demonstrate a leak tests in high and low pressure lines.
09.31	Check and verify any leaks and unusual engine noise; determine necessary action.
09.32	Evaluate and test CNG system to determine any repair procedures.
09.33	Demonstrate the ability to troubleshoot a variety of common problem failures.
09.34	Demonstrate installing, servicing, and/or repairing a CNG conversion assembly sequences, understanding the individual parts and programming.

Florida Department of Education
Student Performance Standards

Course Number: AER0877
Occupational Completion Point: C
CNG Fuel System Inspector – 150 Hours – SOC Code 49-3023

Course Description:
The CNG Fuel System Inspector course includes methods for inspecting CNG storage containers, and CNG components. Students study safety inspection methods for compressed natural gas storage containers, system installations, vehicle components, fuel delivery systems and types of potential damage.

CTE Standards and Benchmarks	
10.0	Demonstrate methods for inspecting CNG storage containers --The student will be able to:
10.01	Identify the different container design types and descriptions.
10.02	Locate installation and mounting areas for NGV fuel containers.
10.03	Explain the different container labeling information.
10.04	Demonstrate container and installation knowledge.
10.05	Demonstrate and explain container inspection knowledge.
10.06	Demonstrate gas and technical knowledge.
10.07	Check equipment inspection for mounting containers.
10.08	Demonstrate the use of equipment inspection for containers.
10.09	Research and examination intervals techniques.
10.10	Explain the preparation for inspecting different container types.
10.11	Explain additional inspections of metal containers – Type 1 and metallic portions of Type 2.
10.12	Explain the differences in all steel and steel composite containers – Type 1 and Type 2.
10.13	Explain the differences in all aluminum and aluminum composite containers – Types 1,2,3.
10.14	Explain the advantages of a full composite container – Type 4
10.15	Explain additional inspections composite containers (Type 2, 3, 4).
10.16	Demonstrate how to examine valves and relief devices – all container types.
10.17	Identify different container labeling – all container types.

CTE Standards and Benchmarks	
10.18	Demonstrate the inspection of record/check list – all container types.
10.19	Check and examine final disposition – all container types.
10.20	Check and examine final disposition – all equipment.
10.21	Identify alternative methods to visual inspections.
10.22	Research and explain In-situ acoustic emission testing.
10.23	Research and explain traditional nondestructive testing methods.
10.24	Identify methods of disposing condemned containers.
10.25	Demonstrate knowledge of NFAP-52.
11.0	Demonstrate methods for inspecting compressed natural gas components--The student will be able to:
11.01	Check and inspect the construction of CNG containers.
11.02	Identify CNG cylinder valve requirements.
11.03	Explain the use of pressure relief valves and location.
11.04	Research and identify CNG fitting requirements.
11.05	Research and identify CNG hose requirements.
11.06	Explain the guidelines for fuel lines, tubing, and fittings in CNG systems.
11.07	Research manual shut-off valve requirements for CNG.
11.08	Research check valves requirements for CNG.
11.09	Research fuel lock-off device requirements for CNG.
11.10	Research pressure regulatory requirements for CNG.
11.11	Identify fuel injection system requirements for CNG.
11.12	Demonstrate CNG maintenance and repair on system.
11.13	Explain pressure relief devices and construction.
11.14	Demonstrate knowledge of CNG standards and labels.
11.15	Explain applicable cylinder standards from cylinder labels.
11.16	Demonstrate CNG cylinder defueling procedures.
11.17	Explain emergency defueling procedures to the atmosphere.
11.18	Research how to develop scheduled defueling procedures.

CTE Standards and Benchmarks	
11.19	Demonstrate CNG cylinder inspections.
11.20	Explain the conditions requiring immediate inspection.
11.21	Research and explain the different types of testing for CNG containers.
11.22	Explain the guidelines for visual inspections.
11.23	Utilize the tools used for visual inspections.
11.24	Explain the types of surface damage that can occur to a CNG container.
11.25	Identify the different types of corrosion CNG containers may be exposed to.
11.26	Identify heat and fire damage to CNG containers.
11.27	Explain how to inspect pressure relief devices.
11.28	Explain how to inspect CNG fuel line piping.
11.29	Explain how to inspect CNG vent lines.
11.30	Demonstrate how to classify visual damage.
11.31	Identify methods to decommission CNG cylinders.
11.32	Demonstrate how to perform inspection reports.

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)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Power Equipment Technologies**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T410300
CIP Number	0647060604
Grade Level	30,31
Standard Length	900 hours
Teacher Certification	GASENG RPR @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3053 – Outdoor Power Equipment and Other Small Engine Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 8 Language: 8 Reading: 8

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The purpose of this program is to prepare students for employment or advanced training in the power and equipment technology industry and for a career as a small gas engine mechanic.

The content includes but is not limited to all aspects of the gasoline engine services technology industry, and demonstrates such elements of the industry as planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3) (b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	SER0080	Power Equipment Service Technician 1	300 hours	49-3053
B	SER0081	Power Equipment Service Technician 2	300 hours	49-3053
C	SER0082	Power Equipment Service Technician 3	300 hours	49-3053

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate an understanding of workplace safety and workplace organization.
02.0 Demonstrate proficiency in performing pre-delivery maintenance services and set-up procedures
03.0 Demonstrate industry-related math skills
04.0 Demonstrate industry-related science skills
05.0 Demonstrate industry-related communication skills.
06.0 Demonstrate proficiency in parts inventory identification and repair order processing.
07.0 Perform basic fuel and exhaust system service.
08.0 Perform basic engine service and minor repairs.
09.0 Perform basic tune-up service.
10.0 Perform power transfer system service and engine controls adjustments.
11.0 Service and repair lubrication systems.
12.0 Diagnose, service, repair and adjust electrical systems
13.0 Service and repair cooling and exhaust systems.
14.0 Service and repair starting systems.
15.0 Diagnose and repair ignition systems.
16.0 Service, repair and adjust engine controls.
17.0 Understand basic two-stroke and four-stroke engines.
18.0 Demonstrate proficiency in repairing and maintaining two-stroke cycle engines.
19.0 Demonstrate proficiency in repairing and maintaining four-stroke cycle engines.
20.0 Demonstrate proficiency in repairing engine interior components.
21.0 Demonstrate proficiency in diagnosing and repairing power transfer systems.
22.0 Demonstrate proficiency in servicing, repairing, and adjusting various types of industry-related power and equipment
23.0 Demonstrate employability skills.
24.0 Demonstrate proficiency in acceptable employee behavior.
25.0 Demonstrate an understanding of entrepreneurship.
26.0 Diagnose, service, repair and adjust portable generators.
27.0 Demonstrate and identify basic principles of electronic fuel management (EFI) systems.

Florida Department of Education
Student Performance Standards

Program Title: **Power and Equipment Technology**
PSAV Number: **T410300**

Course Number: SER0080
Occupational Completion Point: A
Power Equipment Service Technician 1 – 300 Hours – SOC Code 49-3053

Course Description:
The Power Equipment Service Technician 1 course prepares students for entry into Power Equipment Service Technician 2. Students will learn entry-level skills for entry into the outdoor power equipment and other small engine mechanical industries. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of workplace safety and organization; pre-service maintenance and set-up procedures; industry related math, science, and communication skills; part inventory identification; basic fuel and exhaust systems; basic engine service; basic tune-up; transfer systems and engine controls; lubrication; electrical systems; cooling and exhaust systems; starting and ignition systems; and basic two-stroke and four-stroke engines.

For every task in Power Equipment Service Technician 1, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of workplace safety and workplace organization--The student will be able to:
01.01	Identify federal and state standards for health and safety, including the “Right-to-Know” law, as recorded in (29 CFR-1910.1200).
01.02	Identify, demonstrate, apply, and provide evidence of understanding shop safety requirements, organization and management on an ongoing basis.
01.03	Identify safety requirements for manual, electrical-powered, and pneumatic tools.
01.04	Demonstrate, apply, and provide evidence of safely using manual, electrical-powered, and pneumatic tools.
01.05	Identify safety requirements for operation of automated machines and equipment.
01.06	Demonstrate, apply, and provide evidence of safely operating automated machines and equipment.
01.07	Identify the safe use of fuels, chemicals, and compounds
01.08	Demonstrate, apply, and provide evidence of safely using fuels, chemicals, and compounds.
01.09	Identify and apply electrical-safety procedures.

CTE Standards and Benchmarks	
01.10	Identify the safe use of electrical connectors and cords.
01.11	Demonstrate, apply, and provide evidence of safely using electrical connectors and cords.
01.12	Identify and apply fire-safety precautions.
01.13	Research and identify class A, B, and C type fires.
01.14	Demonstrate and apply the proper procedures for extinguishing class A, B, and C type fires.
01.15	Identify various workplace injuries.
01.16	Demonstrate and practice knowledge of first aid and first response procedures appropriate for this course.
01.17	Identify and apply safety procedures in case of smoke or chemical inhalation.
01.18	Demonstrate and apply material handling techniques to safely move materials.
01.19	Demonstrate and apply proper techniques for lifting loads.
01.20	Research and identify Occupational Safety Health Administration (OSHA) safety standards.
01.21	Demonstrate, apply, and provide evidence of understanding Occupational Safety Health Administration (OSHA) safety standards.
01.22	Locate Safety Data Sheets (SDS).
01.23	Demonstrate understanding and knowledge of using and applying the information located on Safety Data Sheets (SDS).
01.24	Proactively respond to a safety concern and then document occurrences.
01.25	Identify and report unsafe conditions.
01.26	Determine the appropriate corrective action after an unsafe condition is identified.
01.27	Demonstrate knowledge of various emergency alarms and procedures.
01.28	Demonstrate knowledge and apply clean-up procedures for spills.
01.29	Identify and apply procedures for handling hazardous material.
01.30	Perform safety and environmental inspections.
01.31	Perform leak checks to determine if toxic or hazardous material is escaping from a piece of equipment.
01.32	Demonstrate knowledge of proper and safe installation techniques as described in manuals, checklists, and regulations.
01.33	Demonstrate and apply proper equipment shutdown procedures.
01.34	Identify, select, and use personal protective equipment (PPE).
01.35	Identify, demonstrate, and apply ergonomic work techniques.
01.36	Train other students to use and apply safety skills outlined in this standard.

CTE Standards and Benchmarks	
02.0	Demonstrate proficiency in performing pre-delivery maintenance services and set-up procedures--The student will be able to:
02.01	Locate, identify, and interpret manufacturer's identification number information.
02.02	Inspect tires; determine necessary action.
02.03	Identify and describe typical gasoline engine lubricants and lubricant properties.
02.04	Check for proper fluid levels; determine necessary action.
02.05	Check radiator coolant level (if applicable); determine necessary action.
02.06	Check filters; determine necessary action.
02.07	Check accessory circuits; determine necessary action.
02.08	Test and inspect battery; determine necessary action.
02.09	Perform battery state-of-charge test; perform slow/fast battery charge.
02.10	Inspect battery cables, connectors, clamps and hold-downs; determine necessary action.
02.11	Inspect and test fuses; replace as needed.
02.12	Detail engine and prepare unit for delivery.
02.13	Install cables, hoses and electrical assemblies.
02.14	Inspect cables, connectors, clamps and hold-downs; adjust as necessary.
02.15	Check drive-chain tension; determine necessary action
03.0	Demonstrate industry-related math skills--The student will be able to:
03.01	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
03.02	Perform metric to SAE (and SAE to metric) conversions.
03.03	Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
03.04	Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
04.0	Demonstrate industry-related science skills--The student will be able to:
04.01	Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
04.02	Draw conclusions or make inferences from data.
04.03	Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.
04.04	Understand pressure measurement in terms of Pounds per Square Inch (PSI).
05.0	Demonstrate industry-related communication skills--The student will be able to:

CTE Standards and Benchmarks	
	05.01 Draw and interpret hydraulic and mechanical schematics.
	05.02 Correctly write reports.
	05.03 Accurately maintain test logs.
	05.04 Create equipment failure reports.
	05.05 Specify and requisition components.
	05.06 Compose technical letters.
	05.07 Write formal reports of laboratory experiences.
06.0	Demonstrate proficiency in parts inventory identification and repair order processing--The student will be able to:
	06.01 Read and interpret information in parts and service manuals and other technical media.
	06.02 Perform basic parts inventory tracking.
	06.03 Identify and locate parts to service equipment.
	06.04 Write logical and understandable statements, or phrases, to accurately fill out forms, invoices, and work orders.
	06.05 Prepare cost estimates for jobs using service- and flat-rate standards.
	06.06 Interpret and verify customer concerns; determine needed repairs.
	06.07 Answer and ask questions coherently, concisely, and professionally.
	06.08 Read and follow written and oral instructions.
07.0	Perform basic fuel and exhaust system service--The student will be able to:
	07.01 Service air filters; determine necessary action.
	07.02 Inspect exhaust system, mufflers, and heat shields; determine necessary action.
	07.03 Service fuel filters; determine necessary action.
	07.04 Inspect fuel tank and fuel cap; inspect fuel lines, fittings, and hoses; determine necessary action.
	07.05 Determine and use correct fuel and fuel mixtures.
	07.06 Check fuel for contaminants and quality; determine necessary action.
08.0	Perform basic engine service and minor repairs--The student will be able to:
	08.01 Identify and demonstrate knowledge of types of engines.
	08.02 Identify and demonstrate knowledge of engine assemblies and systems.
	08.03 Service crankcase breathers.

CTE Standards and Benchmarks	
	08.04 Identify types and ratios of two-cycle mix oils and their application to specific types of equipment.
	08.05 Remove and inspect spark plug(s); determine necessary action.
	08.06 Inspect and test fusible links and fuses; replace as needed.
09.0	Perform basic tune-up service--The student will be able to:
	09.01 Drain and refill oil, if applicable.
	09.02 Remove and replace spark plug(s).
	09.03 Service filters and breathers.
	09.04 Adjust ignition systems timing.
	09.05 Inspect and service power transfer system.
	09.06 Adjust valves.
10.0	Perform power transfer system service and engine controls adjustments--The student will be able to:
	10.01 Inspect and measure drive belts and chains; determine necessary action.
	10.02 Install drive belts and chains.
	10.03 Identify power transfer system components.
	10.04 Replace drive components.
	10.05 Remove, repair, and reinstall clutches.
	10.06 Sharpen and balance blades.
	10.07 Remove and replace or install blades correctly.
11.0	Service and repair lubrication systems--The student will be able to:
	11.01 Service seals and gaskets; determine necessary action.
	11.02 Identify lubrication systems.
	11.03 Service and repair lubrication systems.
12.0	Diagnose, service, repair and adjust electrical systems--The student will be able to:
	12.01 Understand and demonstrate knowledge of basic electricity and electronics.
	12.02 Identify basic electricity and electronic symbols.
	12.03 Read, interpret, and identify circuit components using a schematic.
	12.04 Draw and interpret electrical/electronic schematics.

CTE Standards and Benchmarks	
	12.05 Identify and demonstrate knowledge of a basic series, parallel, and combination circuits.
	12.06 Set up and properly use analog or digital multimeters, voltmeters, ammeters, and ohmmeters.
	12.07 Identify ignition systems and components.
	12.08 Replace electrical system components.
	12.09 Identify and test batteries.
	12.10 Service batteries according to manufacturer's specifications.
	12.11 Service, repair and adjust charging systems.
	12.12 Use proper troubleshooting techniques to measure, identify, and diagnose electrical problems.
	12.13 Use wiring diagrams during diagnosis of electrical circuit problems.
	12.14 Identify damaged wire and electrical harnesses; determine necessary action.
	12.15 Locate opens, shorts, grounds, and resistance problems; determine necessary action.
13.0	Service and repair cooling and exhaust systems--The student will
	13.01 Service air cooling fins and screens.
	13.02 Service two-cycle exhaust systems.
	13.03 Service four-cycle exhaust systems.
14.0	Service and repair starting systems--The student will be able to:
	14.01 Service and repair manual starting systems.
	14.02 Service and repair electrical starting systems.
	14.03 Test and service battery starting systems.
15.0	Diagnose and repair ignition systems--The student will be able to:
	15.01 Identify and diagnose ignition systems and components.
	15.02 Diagnose and repair magneto ignition systems.
	15.03 Diagnose and repair solid-state ignition systems.
	15.04 Diagnose and repair battery ignition systems.
	15.05 Diagnose and repair impulse ignition systems.
	15.06 Diagnose and repair electronically controlled fuel injection systems.
16.0	Service, repair and adjust engine controls--The student will be able to:

CTE Standards and Benchmarks	
16.01	Service, repair and adjust governor speed controls.
16.02	Service, repair and adjust remote speed controls.
16.03	Service, repair and adjust manual start-stop controls.
16.04	Service, repair and adjust electrical start-stop controls.
16.05	Service, repair and adjust zone systems.
16.06	Service, repair and adjust blade clutch controls.
16.07	Service, repair and adjust chain brake systems.
16.08	Comply with the Consumer Protection Act (CPA) for three-second stops.
16.09	Comply with the CPA for interlocks.
16.10	Comply with the CPA for blade tip speed.
16.11	Read and interpret CPA rules and regulations.
17.0	Understand basic two-stroke and four-stroke engines--The student will be able to:
17.01	Explain the basic principles of the operation of two-stroke cycle internal combustion engines.
17.02	Identify types of two-stroke cycle engines.
17.03	Explain the basic principles of the operation of four-stroke cycle internal combustion engines.
17.04	Identify types of four-stroke cycle engines.
17.05	Locate engine serial and model numbers.
17.06	Identify engine assemblies and systems.

Florida Department of Education
Student Performance Standards

Course Number: SER0081
Occupational Completion Point: B
Power Equipment Service Technician 2 – 300 Hours – SOC Code 49-3053

Course Description:
The Power Equipment Service Technician 2 course prepares students for entry into Power Equipment Service Technician 3. Students will learn entry-level skills for entry into the outdoor power equipment and other small engine mechanical industries. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of two-stroke and four-stroke cycle engines; engine interior components; power transfer systems; industry-related power and equipment; employability skills; acceptable employee behavior; and entrepreneurship.

For every task in Power Equipment Service Technician 2, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks	
18.0	Demonstrate proficiency in repairing and maintaining two-stroke cycle engines--The student will be able to:
18.01	Explain the basic principles of the operation of two-stroke cycle internal combustion engines.
18.02	Identify types of two-stroke cycle engines.
18.03	Locate engine serial and model numbers.
18.04	Identify engine assemblies and systems.
18.05	Disassemble engines and inspect parts.
18.06	Remove, clean and inspect heads for cracks, warpage and damaged spark plug threads.
18.07	Diagnose powerhead problems by use of the visual inspection method.
18.08	Diagnose powerhead problems by use of the compression tester method.
18.09	Diagnose powerhead problems by use of the stethoscope method.
18.10	Remove, clean and inspect piston and rod assemblies.
18.11	Measure out-of-round of pistons and cylinders.
18.12	Hone cylinders.

CTE Standards and Benchmarks	
18.13	Check the total bearing surface of connecting rod bearings.
18.14	Measure piston skirts and ring grooves.
18.15	Measure the piston ring gap in cylinder bores.
18.16	Install piston pins according to manufacturer's specifications.
18.17	Check rod and piston assembly alignment.
18.18	Install rings on pistons.
18.19	Install piston rod assemblies.
18.20	Measure and check crankshafts with a micrometer.
18.21	Check needle bearings.
18.22	Inspect crankshafts and install seal.
18.23	Inspect, clean and/or replace reed valves.
18.24	Reassemble engines.
19.0	Demonstrate proficiency in repairing and maintaining basic four-stroke cycle engines--The student will be able to:
19.01	Explain the basic principles of the operation of four-stroke cycle internal combustion engines.
19.02	Identify types of four-stroke cycle engines.
19.03	Locate engine serial and model numbers.
19.04	Identify engine assemblies and systems.
19.05	Diagnose valve and head problems by use of the visual inspection method.
19.06	Diagnose valve and head problems by use of the compression tester and Leak Down tester method.
19.07	Disassemble engines and inspect parts.
19.08	Clean and inspect heads for cracks, warpage and damaged spark plug threads.
19.09	Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.
19.10	Adjust valves.
19.11	Remove and inspect camshafts and lifters.
19.12	Clean and inspect lifters for wear.
19.13	Time valve drive assemblies.
19.14	Remove pistons from rod assemblies.

CTE Standards and Benchmarks	
19.15	Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
19.16	Check piston pins and bosses for wear.
19.17	Measure piston ring lands width, out-of-round and taper.
19.18	Measure the piston ring gap in cylinder bores.
19.19	Install and fit piston pins.
19.20	Check rod and piston assembly alignment.
19.21	Remove and replace rod bearings.
19.22	Hone and clean cylinders.
19.23	Install rings on pistons.
19.24	Measure and check crankshafts with a micrometer.
19.25	Check for end play.
19.26	Check bearing bores with a telescoping gage.
19.27	Reassemble engines.
19.28	Install oil seals.
19.29	Inspect/replace timing belt/chain.
19.30	After rebuild, final Compression Test and Lead Down Test.
20.0	Demonstrate proficiency in repairing engine interior components--The student will be able to:
20.01	Service, repair and adjust valve systems.
20.02	Service, repair and adjust rings, bores and pistons.
20.03	Service, repair and adjust crankshafts and bearings.
20.04	Service, repair and adjust rods.
20.05	Service, repair and adjust lubrication systems.
20.06	Service, repair and adjust internal governor.
20.07	Service, repair and adjust internal components timing.
20.08	Assemble complete engines to manufacturer's specifications.
20.09	Diagnose causes of component failures to determine if they are due to friction, resulting from poor lubrication or contaminated fuel or to normal wear.
21.0	Demonstrate proficiency in diagnosing and repairing power transfer systems--The student will be able to:

CTE Standards and Benchmarks	
	21.01 Diagnose and replace power transfer system components.
	21.02 Diagnose and repair manual transmissions.
	21.03 Diagnose and repair differentials.
	21.04 Diagnose and replace drive components.
	21.05 Remove and replace hydraulic pump systems.
22.0	Demonstrate proficiency in servicing, repairing, and adjusting various types of industry-related power and equipment--The student will be able to:
	22.01 Service, repair and adjust lawn and garden equipment.
	22.02 Service, repair and adjust commercial golf course equipment.
	22.03 Service, repair and adjust commercial industrial equipment.
	22.04 Service, repair and adjust various industry-related power and equipment.
23.0	Demonstrate employability skills--The student will be able to:
	23.01 Conduct a job search using periodicals and the internet.
	23.02 Secure information about a job.
	23.03 Identify documents that may be required when applying for a job interview.
	23.04 Complete a job application form correctly.
	23.05 Demonstrate competence in job interview techniques.
	23.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
	23.07 Identify acceptable work habits.
	23.08 Demonstrate knowledge of how to make appropriate job changes.
	23.09 Demonstrate acceptable employee health habits.
	23.10 Describe "Right-to-Know" Law as recorded in (29 CFR-1910.1200).
24.0	Demonstrate proficiency in acceptable employee behavior--The student will be able to:
	24.01 Explain the effects of chemical/substance abuse.
	24.02 Identify principles of stress management.
	24.03 Identify and define career opportunities in the industry.
	24.04 Explain and identify acceptable work ethics.
	24.05 Explain acceptable dress standards.

CTE Standards and Benchmarks	
	24.06 Identify and demonstrate proper customer relations skills.
	24.07 Identify principles of time management.
	24.08 Identify and define payroll deductions (taxes, insurance, and social security) and employee benefits.
25.0	Demonstrate an understanding of entrepreneurship--The student will be able to:
	25.01 Define entrepreneurship.
	25.02 Describe the importance of entrepreneurship to the American economy.
	25.03 List the advantages and disadvantages of business ownership.
	25.04 Identify and explain the risks involved in ownership of a business.
	25.05 Identify and explain the necessary personal characteristics of a successful entrepreneur.
	25.06 Identify and explain the business skills needed to operate a small business efficiently and effectively.
	25.07 Identify and explain the various types of business structures, e.g. sole proprietor, S-Corporation, etc.

Florida Department of Education
Student Performance Standards

Course Number: SER0082
Occupational Completion Point: C
Power Equipment Service Technician 3 – 300 Hours – SOC Code 49-3053

Course Description:
The Power Equipment Service Technician 3 course prepares students for entry into the outdoor and power equipment technology industry. Students will learn entry-level skills for entry into the outdoor power equipment and other small engine mechanical industries. Hands-on training combined with laboratory and classroom experiences gives the student a full understanding of portable generators; and basic principles of electronic fuel management systems.

For every task in Power Equipment Service Technician 3, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks	
26.0	Diagnose, service, repair and adjust portable generators.
26.01	Identify generator components and system rotor assembly, stator, circuit breakers, transformers, relays, transistors, brush and brush holder, and voltage regulator.
26.02	Diagnose and service generator systems using revolving field excitation methods, direct excitation, brushless excitation method, field boost assembly, power factor, and oil pressure switch on GN engines.
26.03	Identify and diagnose typical automatic idle control system, troubleshooting idle control, and troubleshooting flow chart for direct excited (brush type generators)
26.04	Troubleshoot brush type generators using industry recognized troubleshooting flowcharts.
26.05	Troubleshoot brushless type generators using industry recognized troubleshooting flowcharts.
27.0	Demonstrate and identify basic principles of electronic fuel management (EFI) systems.
27.01	Diagnose and service fuel pump, module and left pump.
27.02	Diagnose and service fuel filter, high pressure lines, and fuel pressure gauge.
27.03	Diagnose and service (injector pop off tool) fuel injector.
27.04	Diagnose and service electronic control unit (ECU).
27.05	Diagnose and service engine oil temperature sensor.

CTE Standards and Benchmarks	
27.06	Diagnose and service throttle control sensor.
27.07	Troubleshoot malfunction indicator light (MIL) air intake temperature sensor.
27.08	Troubleshoot, read and interpret wiring harness EFT diagram 6 terminal connectors.
27.09	Troubleshoot, diagnose, and service using EFI diagnostic flow diagram flowchart.
27.10	Troubleshoot, diagnose, and service using industry recognized EFI system flowchart.
27.11	Diagnose and service oxygen sensor.

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)

SkillsUSA 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.

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

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 8.0, Language 8.0, and Reading 8.0. 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: **Heavy Equipment Service Technician**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T440100
CIP Number	0647030201
Grade Level	30, 31
Standard Length	1800 hours
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists 49-9098 – Helpers—Installations, Maintenance, and Repair 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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to maintaining and repairing diesel engines and electrical systems; reconditioning diesel fuel injection systems; overhauling diesel engines; and performing diesel engine preventive maintenance.

The course content should also include training in communication, leadership, human relations and employability skills; and safe efficient work practices.

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 nine occupational completion points.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	DIM0101	Diesel Engine Mechanic/Technician Helper	150 hours	49-9098
B	DIM0102	Diesel Electrical and Electronics Technician	300 hours	49-3031
C	DIM0103	Diesel Engine Preventative Maintenance Technician	150 hours	49-3031
D	DIM0104	Diesel Engine Technician	300 hours	49-3031
E	DIM0130	Diesel Brakes/Fluid Technician	300 hours	49-3031
F	DIM0106	Diesel Heating and Air Conditioning Technician	150 hours	49-3031
G	DIM0107	Diesel Steering and Suspension Technician	150 hours	49-3031
H	DIM0108	Diesel Drivetrain Technician	150 hours	49-3031
I	DIM0110	Diesel Power Train Technician	150 hours	49-3031

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 Proficiently explain and apply required shop and personal safety tasks.
02.0 Identify the basic diesel components and functions.
03.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment.
04.0 Identify principles, assemblies, and systems of engine operation.
05.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
06.0 Demonstrate workplace employability skills related to personal standards and work habits/ethics.
07.0 Diagnose and repair General electrical systems.
08.0 Diagnose and repair Battery systems.
09.0 Diagnose and repair Starting systems.
10.0 Diagnose and repair Charging systems.
11.0 Diagnose and repair Lighting systems.
12.0 Diagnose and repair Gauges and warning devices.
13.0 Diagnose and repair Related electrical systems.
14.0 Diagnose and repair Engine systems.
15.0 Diagnose and repair Fuel system
16.0 Diagnose and repair Air induction and exhaust system
17.0 Diagnose and repair Cooling system
18.0 Diagnose and repair Lubrication system
19.0 Diagnose and repair Instruments and controls
20.0 Diagnose and repair Safety equipment
21.0 Diagnose and repair Hardware
22.0 Diagnose and repair Heating, ventilation, and air conditioning (HVAC)
23.0 Diagnose and repair Battery and starting systems
24.0 Diagnose and repair Electrical/Electronic charging systems
25.0 Diagnose and repair Lighting systems.
26.0 Diagnose and repair Air brake systems.
27.0 Diagnose and repair Hydraulic brake systems.
28.0 Diagnose and repair Drive Train systems.
29.0 Diagnose and repair Suspension and steering systems.
30.0 Diagnose and repair Tires and wheels.
31.0 Diagnose and repair Frame and fifth wheel.
32.0 General engine diagnosis and repair.
33.0 Cylinder head and valve train diagnosis and repair.
34.0 Engine block diagnosis and repair.
35.0 Lubrication systems diagnosis and repair.
36.0 Cooling system diagnosis and repair.
37.0 Air induction and exhaust systems diagnosis and repair.
38.0 Fuel system diagnosis and repair.

38.01 Fuel supply system.
38.02 Electronic fuel management system.
39.0 Diagnose and repair engine brakes.
40.0 Diagnose and repair air supply and service systems.
41.0 Diagnose and repair mechanical/foundation air brake systems.
42.0 Diagnose and repair parking brakes.
43.0 Diagnose and repair hydraulic systems.
44.0 Diagnose and repair mechanical/foundation hydraulic brake systems.
45.0 Diagnose and repair power assist units.
46.0 Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC).
47.0 Diagnose and repair wheel bearings.
48.0 General hydraulic system diagnosis and repair.
49.0 Diagnose and repair hydraulic pumps.
50.0 Diagnose and repair hydraulic filtration/reservoirs (tanks).
51.0 Diagnose and repair hydraulic hoses, fittings, and connections.
52.0 Diagnose and repair hydraulic control valves.
53.0 Diagnose and repair hydraulic actuators.
54.0 HVAC systems diagnosis, service, and repair.
55.0 A/C system and component diagnosis, service, and repair.
56.0 Diagnose and repair Compressor and clutch.
57.0 Diagnose and repair Evaporator, condenser, and related components.
58.0 Heating and engine cooling systems diagnosis, service, and repair.
59.0 Electrical system diagnosis, service, and repair.
60.0 Air/vacuum/mechanical diagnosis, service, and repair.
61.0 Refrigerant recovery, recycling, and handling.
62.0 Steering column diagnosis, service, and repair.
63.0 Steering units diagnosis, service, and repair.
64.0 Steering linkage diagnosis, service, and repair.
65.0 Suspension systems diagnosis and repair.
66.0 Wheel alignment diagnosis, adjustment, and repair.
67.0 Wheels and tires diagnosis, service, and repair.
68.0 Frame and coupling diagnosis, service, and repair.
69.0 Clutch diagnosis and repair.
70.0 Transmission diagnosis and repair.
71.0 Driveshaft and universal joint diagnosis and repair.
72.0 Drive axle diagnosis and repair.
73.0 Demonstrate shop and occupational safety procedures.
74.0 Identify the requirements for maintaining and repairing track systems.
75.0 Maintain and repair power train systems and components.
76.0 Troubleshoot and repair differentials, final drives and drive lines.
77.0 Demonstrate the qualifications for employment.

Florida Department of Education
Student Performance Standards

Program Title: **Heavy Equipment Service Technician**
PSAV Number: **T440100**

Course Number: DIM0101
Occupational Completion Point: A
Diesel Engine Mechanic/Technician Helper – 150 Hours – SOC Code 49-9098

Course Description:
The Diesel Engine Mechanic/Technician Helper course prepares students for entry into the Heavy Equipment industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop safety, infectious control, basic diesel components, tools and equipment, communication skills, math skills, scientific principles, employability skills, entrepreneurship, engine operation, and employment qualifications.

CTE Standards and Benchmarks	
01.0	Proficiently explain and apply required shop and personal safety tasks--The student will be able to:
01.01	Identify basic shop organization and management regulations.
01.02	Identify and apply general and required shop safety rules and procedures.
01.03	Utilize safe procedures for handling of tools and equipment.
01.04	Identify and use proper placement of floor jacks and jack stands.
01.05	Identify and use proper procedures for safe lift operation.
01.06	Utilize proper ventilation procedures for working within the lab/shop area.
01.07	Identify marked safety areas.
01.08	Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
01.09	Identify the location and use of eye wash stations.
01.10	Identify the location of the posted evacuation routes.
01.11	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
01.12	Identify and wear appropriate clothing for lab/shop activities.
01.13	Secure hair and jewelry for lab/shop activities.
01.14	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.

CTE Standards and Benchmarks	
01.15	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HDD) lamps, ignition systems, injection systems, etc.).
01.16	Locate and demonstrate knowledge of Safety Data Sheets (SDS).
01.17	Assist in activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
01.18	Identify and comply with personal and environmental safety practices associated with the handling, storage, and disposal of chemicals and hazardous materials.
02.0	Identify the basic diesel components and functions--The student will be able to:
02.01	Identify types of bearings and their uses.
02.02	Identify seals, gaskets, and fasteners.
02.03	Identify drive power train components and functions.
02.04	Identify threaded fasteners by size, type, thread series, thread classes, material hardness, and compatibility
03.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment--The student will be able to:
03.01	Identify tools and their usage in automotive applications.
03.02	Identify standard and metric designation.
03.03	Demonstrate safe handling and use of appropriate tools.
03.04	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.
03.05	Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper, etc.).
04.0	Identify principles, assemblies, and systems of engine operation--The student will be able to:
04.01	Explain the basic principles in the operation of the four-stroke-cycle diesel engine
04.02	Identify engine assemblies and systems.
04.03	Explain the operating principles of two-and-four-stroke-cycle engines.
04.04	Identify the equipment of two-and-four-stroke-cycle engines.
04.05	Identify governor types and their operating principles.
05.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services--The student will be able to:
05.01	Identify information needed and the service requested on a repair order.
05.02	Identify purpose and demonstrate proper use of fender covers, mats.
05.03	Demonstrate use of the three C’s (Concern, Cause, and Correction).
05.04	Review vehicle service history.

CTE Standards and Benchmarks	
05.05	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
05.06	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.)
06.0	Demonstrate workplace employability skills related to personal standards and work habits/ethics--The student will be able to:
06.01	Reports to work daily on time; able to take directions and motivated to accomplish the task at hand.
06.02	Dresses appropriately and uses language and manners suitable for the workplace.
06.03	Maintains appropriate personal hygiene.
06.04	Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.
06.05	Demonstrates honesty, integrity and reliability.
06.06	Complies with workplace policies/laws
06.07	Contributes to the success of the team, assists others and requests help when needed.
06.08	Works well with all customers and coworkers.
06.09	Negotiates solutions to interpersonal and workplace conflicts.
06.10	Contributes ideas and initiative.
06.11	Follows directions.
06.12	Communicates (written and verbal) effectively with customers and coworkers.
06.13	Reads and interprets workplace documents; writes clearly and concisely.
06.14	Analyzes and resolves problems that arise in completing assigned tasks.
06.15	Organizes and implements a productive plan of work.
06.16	Uses scientific, technical, engineering and mathematics principles and reasoning to accomplish assigned tasks.
06.17	Identifies and address the needs of all customers, providing helpful, courteous and knowledgeable service and advice as needed.

Florida Department of Education
Student Performance Standards

Course Number: DIM0102
Occupational Completion Point: B
Diesel Electrical and Electronics Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Electrical and Electronics Technician course is designed to build on the skills and knowledge students learned in the Diesel Engine Mechanic/Technician Helper course for entry into the Heavy Equipment industry. Content emphasizes beginning skills and concepts. Students study electrical systems diagnosis, battery systems, starting systems, charging systems, lighting systems, gauges and warning devices, and related electrical systems.

CTE Standards and Benchmarks	
07.0	Diagnose and repair general electrical systems--The student will be able to:
07.01	Read and interpret electrical/electronic circuits using wiring diagrams.
07.02	Check continuity in electrical/electronic circuits using appropriate test equipment.
07.03	Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using appropriate test equipment.
07.04	Check current flow in electrical/electronic circuits and components using appropriate test equipment.
07.05	Check resistance in electrical/electronic circuits and components using appropriate test equipment.
07.06	Locate shorts, grounds, and opens in electrical/electronic circuits.
07.07	Diagnose parasitic (key-off) battery drain problems; perform tests; determine needed action.
07.08	Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed.
07.09	Inspect and test spike suppression devices; replace as needed.
07.10	Check frequency and pulse width signal in electrical/electronic circuits using appropriate test equipment.
08.0	Diagnose and repair battery systems--The student will be able to:
08.01	Identify battery type; perform appropriate battery load test; determine needed action.
08.02	Determine battery state of charge using an open circuit voltage test.
08.03	Inspect, clean, and service battery; replace as needed.
08.04	Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed.
08.05	Charge battery using appropriate method for battery type.
08.06	Inspect, test, and clean battery cables and connectors; repair or replace as needed.

CTE Standards and Benchmarks	
	08.07 Jump start a vehicle using jumper cables and a booster battery or auxiliary power supply using proper safety procedures.
	08.08 Perform battery capacitance test; determine needed action.
	08.09 Identify and test low voltage disconnect (LVD) systems; determine needed repair.
09.0	Diagnose and repair starting systems--The student will be able to:
	09.01 Perform starter circuit cranking voltage and voltage drop tests; determine needed action.
	09.02 Inspect and test components (key switch, push button and/or magnetic switch) and wires and harnesses in the starter control circuit; replace as needed
	09.03 Inspect and test starter relays and solenoids/switches; replace as needed.
	09.04 Remove and replace starter; inspect flywheel ring gear or flex plate.
10.0	Diagnose and repair charging systems--The student will be able to:
	10.01 Test instrument panel mounted volt meters and/or indicator lamps; determine needed action.
	10.02 Identify causes of a no charge, low charge, or overcharge problems; determine needed action.
	10.03 Inspect and replace alternator drive belts, pulleys, fans, tensioners, and mounting brackets; adjust drive belts and check alignment.
	10.04 Perform charging system voltage and amperage output tests; perform AC ripple test; determine needed action.
	10.05 Perform charging circuit voltage drop tests; determine needed action.
	10.06 Remove and replace alternator.
	10.07 Inspect, repair, or replace cables, wires, and connectors in the charging circuit.
11.0	Diagnose and repair lighting systems--The student will be able to:
	11.01 Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
	11.02 Identify causes of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation.
	11.03 Test, aim, and replace headlights.
	11.04 Test headlight and dimmer circuit switches, relays, wires, terminals, connectors, sockets, and control components/modules; repair or replace as needed.
	11.05 Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, and control components/modules of parking, clearance, and taillight circuits; repair or replace as needed.
	11.06 Inspect and test instrument panel light circuit switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires, and printed circuits/control modules; repair or replace as needed.
	11.07 Inspect and test interior cab light circuit switches, bulbs/LEDs, sockets, low voltage disconnect (LVD), connectors, terminals, wires, and control components/modules; repair or replace as needed.
	11.08 Inspect and test tractor-to-trailer multi-wire connector(s); repair or replace as needed.

CTE Standards and Benchmarks	
11.09	Inspect, test, and adjust stoplight circuit switches, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.
11.10	Inspect and test turn signal and hazard circuit flasher(s), switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.
11.11	Inspect and test reverse lights and warning device circuit switches, bulbs/LEDs, sockets, horns, buzzers, connectors, terminals, wires and control components/modules; repair or replace as needed.
12.0	Diagnose and repair gauges and warning devices--The student will be able to:
12.01	Interface with vehicle's on-board computer; perform diagnostic procedure, verify instrument cluster operations using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
12.02	Identify causes of intermittent, high, low, or no gauge readings; determine needed action.
12.03	Identify causes of data bus-driven gauge malfunctions; determine needed action.
12.04	Inspect and test gauge circuit sensor/sending units, gauges, connectors, terminals, and wires; repair or replace as needed.
12.05	Inspect and test warning devices (lights and audible) circuit sensor/sending units, bulbs/LEDs, sockets, connectors, wires, and control components/modules; repair or replace as needed.
12.06	Inspect, test, replace, and calibrate (if applicable) electronic speedometer, odometer, and tachometer systems.
13.0	Diagnose and repair related electrical systems--The student will be able to:
13.01	Interface with vehicle’s on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
13.02	Identify causes of constant, intermittent, or no horn operation; determine needed action.
13.03	Inspect and test horn circuit relays, horns, switches, connectors, wires, clock springs, and control components/modules; repair or replace as needed.
13.04	Identify causes of constant, intermittent, or no wiper operation; diagnose the cause of wiper speed control and/or park problems; determine needed action.
13.05	Inspect and test wiper motor, resistors, park switch, relays, switches, connectors, wires and control components/modules; repair or replace as needed.
13.06	Inspect wiper motor transmission linkage, arms, and blades; adjust or replace as needed.
13.07	Inspect and test windshield washer motor or pump/relay assembly, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.
13.08	Inspect and test side view mirror motors, heater circuit grids, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.
13.09	Inspect and test heater and A/C electrical components including: A/C clutches, motors, resistors, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.
13.10	Inspect and test auxiliary power outlet, integral fuse, connectors, terminals, wires, and control components/modules; repair or replace as needed.
13.11	Identify causes of slow, intermittent, or no power window operation; determine needed action.

CTE Standards and Benchmarks	
13.12	Inspect and test motors, switches, relays, connectors, terminals, wires, and control components/modules of power window circuits; repair or replace as needed.
13.13	Inspect and test block heaters; determine needed repairs.
13.14	Inspect and test cruise control electrical components; repair or replace as needed.
13.15	Inspect and test switches, relays, controllers, actuator/solenoids, connectors, terminals, and wires of electric door lock circuits.
13.16	Check operation of keyless and remote lock/unlock devices; determine needed action.
13.17	Inspect and test engine cooling fan electrical control components/modules, wiring; repair or replace as needed.
13.18	Identify causes of data bus communication problems; determine needed action.

Florida Department of Education
Student Performance Standards

Course Number: DIM0103
Occupational Completion Point: C
Diesel Engine Preventative Maintenance Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Preventative Maintenance Technician course is designed to build on the skills and knowledge students learned in the Diesel Electrical and Electronics Technician course for entry into the Heavy Equipment industry. Content emphasizes beginning skills and concepts. Students study engine systems, cab and hood, electrical/electronics, and frame and chassis.

CTE Standards and Benchmarks	
14.0	Diagnose and repair Engine systems--The student will be able to:
14.01	Check engine starting/operation (including unusual noises, vibrations, exhaust smoke, etc.); record idle and governed rpm.
14.02	Inspect vibration damper.
14.03	Inspect belts, tensioners, and pulleys; check and adjust belt tension; check belt alignment.
14.04	Check engine oil level and condition; check dipstick seal.
14.05	Inspect engine mounts for looseness and deterioration.
14.06	Check engine for oil, coolant, air, fuel and exhaust leaks (Engine Off and Running).
14.07	Check engine compartment wiring harnesses, connectors, and seals for damage and proper routing.
14.08	Check electrical wiring, routing, and hold-down clamps, including Engine Control Module/Powertrain Control Module (ECM/PCM).
15.0	Diagnose and repair Fuel system--The student will be able to:
15.01	Check fuel tanks, mountings, lines, caps, and vents.
15.02	Drain water from fuel system.
15.03	Service water separator/fuel heater; replace fuel filter(s); prime and bleed fuel system.
15.04	Inspect throttle linkages and return springs.
16.0	Diagnose and repair Air induction and exhaust system--The student will be able to:
16.01	Check exhaust system mountings for looseness and damage.
16.02	Check engine exhaust system for leaks, proper routing, and damaged or missing components to include exhaust gas recirculation (EGR) system and after treatment devices, if equipped.
16.03	Check air induction system: piping, charge air cooler, hoses, clamps, and mountings; check for air restrictions and leaks.

CTE Standards and Benchmarks	
16.04	Inspect turbocharger for leaks; check mountings and connections.
16.05	Check operation of engine compression/exhaust brake.
16.06	Service or replace air filter as needed; check and reset air filter restriction indicator.
16.07	Inspect and service crankcase ventilation system.
16.08	Inspect diesel exhaust fluid (DEF) system, to include tanks, lines, gauge pump, and filter.
16.09	Inspect selective catalyst reduction (SCR) system; including diesel exhaust fluid (DEF) for proper levels, leaks, mounting and connections.
17.0	Diagnose and repair Cooling system--The student will be able to:
17.01	Check operation of fan clutch.
17.02	Inspect radiator (including air flow restriction, leaks, and damage) and mountings.
17.03	Inspect fan assembly and shroud.
17.04	Pressure test cooling system and radiator cap.
17.05	Inspect coolant hoses and clamps.
17.06	Inspect coolant recovery system.
17.07	Check coolant for contamination, additive package concentration, aeration, and protection level (freeze point).
17.08	Service coolant filter.
17.09	Inspect water pump.
18.0	Diagnose and repair Lubrication system--The student will be able to:
18.01	Change engine oil and filters; visually check oil for coolant or fuel contamination; inspect and clean magnetic drain plugs.
18.02	Take an engine oil sample for analysis.
19.0	Diagnose and repair Instruments and control systems--The student will be able to:
19.01	Inspect key condition and operation of ignition switch.
19.02	Check warning indicators.
19.03	Check instruments; record oil pressure and system voltage.
19.04	Check operation of electronic power take off (PTO) and engine idle speed controls (if applicable)
19.05	Check HVAC controls.
19.06	Check operation of all accessories.
19.07	Using electronic service tool(s) or on-board diagnostic system; retrieve engine monitoring information; check and record diagnostic codes and trip/operational data (including engine, transmission, ABS, and other systems).

CTE Standards and Benchmarks	
	19.08 Check mechanical, electronic, and emergency shutdown operation.
	19.09 Check mechanical and electronic engine speed controls.
20.0	Diagnose and repair Safety equipment--The student will be able to:
	20.01 Check operation of electric/air horns and back-up warning devices.
	20.02 Check condition of spare fuses, safety triangles, fire extinguisher, and all required decals.
	20.03 Inspect seat belts and sleeper restraints.
	20.04 Inspect wiper blades and arms.
21.0	Diagnose and repair Hardware--The student will be able to:
	21.01 Check operation of wiper and washer.
	21.02 Inspect windshield glass for cracks or discoloration; check sun visor.
	21.03 Check seat condition, operation, and mounting.
	21.04 Check door glass and window operation.
	21.05 Inspect steps and grab handles.
	21.06 Inspect mirrors, mountings, brackets, and glass.
	21.07 Record all observed physical damage.
	21.08 Lubricate all cab and hood grease fittings.
	21.09 Inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables.
	21.10 Inspect cab mountings, hinges, latches, linkages and ride height; service as needed.
	21.11 Inspect tilt cab hydraulic pump, lines, and cylinders for leakage; inspect safety devices; service as needed.
22.0	Diagnose and repair Heating, ventilation, and air conditioning (HVAC)--The student will be able to:
	22.01 Inspect A/C condenser and lines for condition and visible leaks; check mountings.
	22.02 Inspect A/C compressor and lines for condition and visible leaks; check mountings.
	22.03 Check A/C system condition and operation; check A/C monitoring system, if applicable.
	22.04 Check HVAC air inlet filters and ducts; service as needed.
23.0	Diagnose and repair Electrical/Electronic battery and starting systems--The student will be able to:
	23.01 Inspect battery box(es), cover(s), and mountings.
	23.02 Inspect battery hold-downs, connections, cables, and cable routing; service as needed.

CTE Standards and Benchmarks	
	23.03 Check/record battery state-of-charge (open circuit voltage) and condition.
	23.04 Perform battery test (load and/or capacitance).
	23.05 Inspect starter, mounting, and connections.
	23.06 Engage starter; check for unusual noises, starter drag, and starting difficulty.
24.0	Diagnose and repair Electrical/Electronic charging systems--The student will be able to:
	24.01 Inspect alternator, mountings, cable, wiring, and wiring routing; determine needed action.
	24.02 Perform alternator output tests.
25.0	Diagnose and repair Electrical/Electronic lighting systems--The student will be able to:
	25.01 Check operation of interior lights; determine needed action.
	25.02 Check all exterior lights, lenses, reflectors, and conspicuity tape; check headlight alignment; determine needed action.
	25.03 Inspect and test tractor-to-trailer multi-wire connector(s), cable(s), and holder(s); determine needed action.
26.0	Diagnose and repair Air brake systems--The student will be able to:
	26.01 Check operation of parking brake.
	26.02 Record air governor cut-in and cut-out setting (psi).
	26.03 Check operation of air reservoir/tank drain valves.
	26.04 Check air system for leaks (brakes released).
	26.05 Check air system for leaks (brakes applied).
	26.06 Test one-way and double-check valves.
	26.07 Check low air pressure warning devices.
	26.08 Check emergency (spring) brake control/modulator valve, if applicable.
	26.09 Check tractor protection valve.
	26.10 Test air pressure build-up time.
	26.11 Inspect coupling air lines, holders, and gladhands.
	26.12 Check brake chambers and air lines for secure mounting and damage.
	26.13 Check operation of air drier.
	26.14 Inspect and record brake shoe/pad condition, thickness, and contamination.
	26.15 Inspect and record condition of brake drums/rotors.

CTE Standards and Benchmarks	
26.16	Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing
26.17	Check operation and adjustment of brake automatic slack adjusters (ASA); check and record push rod stroke.
26.18	Lubricate all brake component grease fittings.
26.19	Check condition and operation of hand brake (trailer) control valve, if applicable.
26.20	Perform antilock brake system (ABS) operational system self-test.
26.21	Drain air tanks and check for contamination.
26.22	Check condition of pressure relief (safety) valves.
26.23	Check air governor cut-in pressure.
26.24	Check operation of brake manual slack adjusters; adjust as needed.
27.0	Diagnose and repair Hydraulic brake systems--The student will be able to:
27.01	Check master cylinder fluid level and condition.
27.02	Inspect brake lines, fittings, flexible hoses, and valves for leaks and damage.
27.03	Check parking brake operation; inspect parking brake application and holding devices; adjust as needed.
27.04	Check operation of hydraulic system: pedal travel, pedal effort, pedal feel.
27.05	Inspect calipers for leakage, binding and damage.
27.06	Inspect brake assist system (booster), hoses and control valves; check reservoir fluid level and condition.
27.07	Inspect and record brake lining/pad condition, thickness, and contamination.
27.08	Inspect and record condition of brake rotors.
27.09	Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing.
27.10	Adjust drum brakes.
28.0	Diagnose and repair Drive Train systems--The student will be able to:
28.01	Check operation of clutch, clutch brake, and gearshift.
28.02	Check clutch linkage/cable for looseness or binding, if applicable.
28.03	Check hydraulic clutch slave and master cylinders, lines, fittings, and hoses, if applicable.
28.04	Check clutch adjustment; adjust as needed.
28.05	Check transmission case, seals, filter, hoses, lines and cooler for cracks and leaks.
28.06	Inspect transmission breather.

CTE Standards and Benchmarks	
28.07	Inspect transmission mounts.
28.08	Check transmission oil level, type, and condition.
28.09	Inspect U-joints, yokes, driveshafts, boots/seals, center bearings, and mounting hardware for looseness, damage, and proper phasing.
28.10	Inspect axle housing(s) for cracks and leaks.
28.11	Inspect axle breather(s).
28.12	Lubricate all drivetrain grease fittings.
28.13	Check drive axle(s) oil level, type, and condition.
28.14	Change drive axle(s) oil and filter/screen, if applicable; check and clean magnetic plugs.
28.15	Check transmission wiring, connectors, seals, and harnesses for damage and proper routing.
28.16	Change transmission oil and filter, if applicable; check and clean magnetic plugs.
28.17	Check interaxle differential lock operation.
28.18	Check transmission range shift operation.
28.19	Check two-speed axle unit operation and oil level.
29.0	Diagnose and repair Suspension and steering systems--The student will be able to:
29.01	Check steering wheel operation for free play and binding.
29.02	Check power steering pump, mounting, and hoses for leaks, condition, and routing; check fluid level.
29.03	Change power steering fluid and filter.
29.04	Inspect steering gear for leaks and secure mounting.
29.05	Inspect steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, and linkages.
29.06	Check kingpins for wear.
29.07	Check wheel bearings for looseness and noise.
29.08	Check oil level and condition in all non-drive hubs; check for leaks.
29.09	Inspect springs, pins, hangers, shackles, spring U-bolts, and insulators.
29.10	Inspect shock absorbers for leaks and secure mounting.
29.11	Inspect air suspension springs, mounts, hoses, valves, linkage, and fittings for leaks and damage.
29.12	Check and record suspension ride height.
29.13	Lubricate all suspension and steering grease fittings.

CTE Standards and Benchmarks	
	29.14 Check axle locating components (radius, torque, and/or track rods).
	29.15 Check tandem axle alignment and spacing.
	29.16 Remove and inspect wheel bearings; reassemble and adjust.
	29.17 Check toe adjustment.
30.0	Diagnose and repair Tires and wheels--The student will be able to:
	30.01 Inspect tires for wear patterns and proper mounting.
	30.02 Inspect tires for cuts, cracks, bulges, and sidewall damage.
	30.03 Inspect valve caps and stems; determine needed action.
	30.04 Measure and record tread depth; probe for imbedded debris.
	30.05 Check and record air pressure; adjust air pressure in accordance with manufacturers' specifications.
	30.06 Check wheel mounting hardware condition; determine needed action.
	30.07 Inspect wheels for cracks, damage and proper hand hold alignment.
	30.08 Check tire matching (diameter and tread) on single and dual tire applications.
	30.09 Retorque lugs in accordance with manufacturer's specifications.
31.0	Diagnose and repair Frame and fifth wheel--The student will be able to:
	31.01 Inspect fifth wheel mounting, bolts, air lines, and locks.
	31.02 Test operation of fifth wheel locking device; adjust if necessary.
	31.03 Check quarter fenders, mud flaps, and brackets.
	31.04 Check pintle hook assembly and mounting; if applicable.
	31.05 Lubricate all fifth wheel grease fittings and plate; if applicable
	31.06 Inspect frame and frame members for cracks and damage.

Florida Department of Education
Student Performance Standards

Course Number: DIM0104
Occupational Completion Point: D
Diesel Engine Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Technician course is designed to build on the skills and knowledge students learned in the Diesel Engine Preventative Maintenance Technician course for entry into the Heavy Equipment industry. Content emphasizes beginning skills. Students study engine diagnostics, cylinder head, valve train, engine block, lubrication, cooling, air induction, exhaust, fuel system diagnostics, and engine brakes.

CTE Standards and Benchmarks	
32.0	General engine diagnosis and repair--The student will be able to:
32.01	Inspect fuel, oil, Diesel Exhaust Fluid (DEF) and coolant levels, and condition; determine needed action.
32.02	Identify and diagnose the causes of engine fuel, oil, coolant, air, and other leaks; determine needed action.
32.03	Listen and interpret engine noises; determine needed action.
32.04	Observe engine exhaust smoke color and quantity; determine needed action.
32.05	Check and diagnose no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action.
32.06	Identify and diagnose causes of engine surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed action.
32.07	Identify and diagnose engine vibration problems; determine needed action.
32.08	Check, record, and clear electronic diagnostic (fault) codes; monitor electronic data; determine needed action.
32.09	Perform air intake system restriction and leakage tests; determine needed action.
32.10	Perform intake manifold pressure (boost) test; determine needed action.
32.11	Perform exhaust back pressure test; determine needed action.
32.12	Perform cylinder compression test; determine needed action.
33.0	Cylinder head and valve train diagnosis and repair--The student will be able to:
33.01	Inspect cylinder head for cracks/damage; check mating surfaces for warpage; check condition of passages; inspect core/expansion and gallery plugs; determine needed action.
33.02	Disassemble head and inspect valves, guides, seats, springs, retainers, rotators, locks, and seals; determine needed action.
33.03	Measure valve head height relative to deck, valve face-to-seat contact; determine needed action.

CTE Standards and Benchmarks	
33.04	Inspect injector sleeves and seals; measure injector tip or nozzle protrusion; perform needed action.
33.05	Inspect valve train components; determine needed action.
33.06	Reassemble cylinder head.
33.07	Inspect, measure, and replace/reinstall overhead camshaft; measure/adjust end play and backlash.
33.08	Inspect electronic wiring harness and brackets for wear, bending, cracks, and looseness; determine needed action.
33.09	Inspect and adjust valve bridges (crossheads); adjust valve clearances and injector settings.
33.10	Remove, clean, inspect for visible damage, and replace cylinder head(s) assembly.
33.11	Clean and inspect threaded holes, studs, and bolts for serviceability; determine needed action.
33.12	Inspect pushrods, rocker arms, rocker arm shafts, and blocked oil passages; perform needed action.
33.13	Inspect cam followers; perform needed action.
34.0	Engine block diagnosis and repair--The student will be able to:
34.01	Perform crankcase pressure test; determine needed action
34.02	Remove, inspect, service, and install pans, covers, gaskets, seals, wear rings, and crankcase ventilation components.
34.03	Disassemble, clean, and inspect engine block for cracks/damage; measure mating surfaces for warpage; check condition of passages, core/expansion and gallery plugs; inspect threaded holes, studs, dowel pins, and bolts for serviceability; determine needed action.
34.04	Inspect cylinder sleeve counter bore and lower bore; check bore distortion; determine needed action.
34.05	Clean, inspect, and measure cylinder walls or liners for wear and damage; determine needed action.
34.06	Replace/reinstall cylinder liners and seals; check and adjust liner height (protrusion).
34.07	Inspect in-block camshaft bearings for wear and damage; determine needed action.
34.08	Inspect, measure, and replace/reinstall in-block camshaft; measure/adjust end play.
34.09	Clean and inspect crankshaft for surface cracks and journal damage; check condition of oil passages; check passage plugs; measure journal diameter; determine needed action.
34.10	Inspect main bearings for wear patterns and damage; replace as needed; check bearing clearances; check and correct crankshaft end play.
34.11	Inspect, install, and time gear train; measure gear backlash; determine needed action.
34.12	Inspect connecting rod and bearings for wear patterns; measure pistons, pins, retainers, and bushings; perform needed action.
34.13	Determine piston-to-cylinder wall clearance; check ring-to-groove fit and end gap; install rings on pistons.
34.14	Assemble pistons and connecting rods; install in block; install rod bearings and check clearances.
34.15	Check condition of piston cooling jets (nozzles); determine needed action.

CTE Standards and Benchmarks	
34.16	Inspect and measure crankshaft vibration damper; determine needed action.
34.17	Install and align flywheel housing; inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.
34.18	Inspect flywheel/flexplate (including ring gear) and mounting surfaces for cracks and wear; measure runout; determine needed action.
35.0	Lubrication systems diagnosis and repair--The student will be able to:
36.01	Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit, test engine oil temperature and check operation of temperature sensor; determine needed action.
36.02	Check engine oil level, condition, and consumption; determine needed action.
36.03	Inspect and measure oil pump, drives, inlet pipes, and pick-up screens; check drive gear clearances; determine needed action.
36.04	Inspect oil pressure regulator valve(s), by-pass and pressure relief valve(s), oil thermostat, and filters; determine needed action.
36.05	Inspect, clean, and test oil cooler and components; determine needed action.
36.06	Inspect turbocharger lubrication system; determine needed action.
36.07	Determine proper lubricant and perform oil and filter change.
36.0	Cooling system diagnosis and repair--The student will be able to:
36.01	Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action.
36.02	Test coolant temperature and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action.
36.03	Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment.
36.04	Inspect thermostat(s), by-passes, housing(s), and seals; replace as needed.
36.05	Recover coolant, flush, and refill with recommended coolant/additive package; bleed cooling system.
36.06	Inspect coolant conditioner/filter assembly for leaks; inspect valves, lines, and fittings; replace as needed.
36.07	Inspect water pump and hoses; replace as needed.
36.08	Inspect, clean, and pressure test radiator. Pressure test cap, tank(s), and recovery systems; determine needed action.
36.09	Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.
36.10	Inspect turbo charger cooling systems; determine needed action.
37.0	Air induction and exhaust systems diagnosis and repair--The student will be able to:
38.01	Perform air intake system restriction and leakage test; determine needed action.
38.02	Perform intake manifold pressure (boost) test; determine needed action.

CTE Standards and Benchmarks	
38.03	Check exhaust back pressure; determine needed action.
38.04	Inspect turbocharger(s), wastegate, and piping systems; determine needed action.
38.05	Inspect turbocharger(s) (variable ratio/geometry VGT), pneumatic, hydraulic, electronic controls, and actuators.
38.06	Check air induction system: piping, hoses, clamps, and mounting; service or replace air filter as needed.
38.07	Remove and reinstall turbocharger/wastegate assembly.
38.08	Inspect intake manifold, gaskets, and connections; replace as needed.
38.09	Inspect, clean, and test charge air cooler assemblies; replace as needed.
38.10	Inspect exhaust manifold, piping, mufflers, and mounting hardware; repair or replace as needed.
38.11	Inspect exhaust after treatment devices; determine necessary action.
38.12	Inspect and test preheater/inlet air heater, or glow plug system and controls; perform needed action.
38.13	Inspect exhaust gas recirculation (EGR) system including EGR valve, cooler, piping, filter, electronic sensors, controls, and wiring; determine needed action.
38.0	Fuel system diagnosis and repair--The student will be able to:
38.01	Fuel supply system
38.01.1	Check fuel level, and condition; determine needed action.
38.01.2	Perform fuel supply and return system tests; determine needed action.
38.01.3	Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action.
38.01.4	Inspect, clean, and test fuel transfer (lift) pump, pump drives, screens, fuel/water separators/indicators, filters, heaters, coolers, ECM cooling plates, and mounting hardware; determine needed action.
38.01.5	Inspect and test pressure regulator systems (check valves, pressure regulator valves, and restrictive fittings); determine needed action.
38.01.6	Check fuel system for air; determine needed action; prime and bleed fuel system; check primer pump.
38.01.7	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time a distributor (rotary) type injection pump; determine needed action.
38.01.8	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time an in-line type injection pump; determine needed action.
38.01.9	Inspect and adjust throttle control linkage; determine needed action.
38.01.10	Inspect air/fuel ratio control systems; determine needed action.
38.01.11	Inspect, test, and adjust engine fuel shut-down devices and controls; determine needed action.
38.02	Electronic fuel management system

CTE Standards and Benchmarks		
	38.02.1	Inspect and test power and ground circuits and connections; measure and interpret voltage, voltage drop, amperage, and resistance readings using a digital multimeter (DMM); determine needed action.
	38.02.2	Interface with vehicle's on-board computer; perform diagnostic procedures using electronic service tool(s) (to include PC based software and/or data scan tools); determine needed action.
	38.02.3	Check and record electronic diagnostic codes and trip/operational data; monitor electronic data; clear codes; determine further diagnosis.
	38.02.4	Locate and use relevant service information (to include diagnostic procedures, flow charts, and wiring diagrams).
	38.02.5	Inspect and replace electrical connector terminals, seals, and locks.
	38.02.6	Inspect and test switches, sensors, controls, actuator components, and circuits; adjust or replace as needed.
	38.02.7	Using electronic service tool(s) access and interpret customer programmable parameters.
	38.02.8	Perform on-engine inspections, test and adjustments on electronic unit injectors (EUI); determine needed action
	38.02.9	Remove and install electronic unit injectors (EUI) and related components; recalibrate ECM (if applicable).
	38.02.10	Perform cylinder contribution test utilizing electronic service tool(s).
	38.02.11	Perform on-engine inspections and tests on hydraulic electronic unit injectors (HEUI) and system electronic controls; determine needed action.
	38.02.12	Perform on-engine inspections and tests on hydraulic electronic unit injector (HEUI) high pressure oil supply and control systems; determine needed action.
	38.02.13	Perform on-engine inspections and tests on high pressure common rail (HPCR) type injection systems; determine needed action.
	38.02.14	Inspect high pressure injection lines, hold downs, fittings and seals; determine needed action.
	38.02.15	Perform engine timing sensor calibration (if applicable).
	38.02.16	Perform on-engine inspections and tests on distributor-type injection pump electronic controls; determine needed action.
	38.02.17	Perform on-engine inspections and tests on in-line type injection pump electronic controls; determine needed action.
39.0	Diagnose and repair engine brakes--The student will be able to:	
	39.01	Inspect and adjust engine compression/exhaust brakes; determine needed action.
	39.02	Inspect, test, and adjust engine compression/exhaust brake control circuits, switches, and solenoids; determine needed action.
	39.03	Inspect engine compression/exhaust brake housing, valves, seals, lines, and fittings; repair or replace as needed.

Florida Department of Education
Student Performance Standards

Course Number: DIM0130
Occupational Completion Point: E
Diesel Brakes/Fluid Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Brakes/Fluid Technician course is designed to build on the skills and knowledge students learned for entry into the Heavy Equipment industry. Content emphasizes beginning skills and concepts. Students study air and hydraulic brakes/fluid systems.

CTE Standards and Benchmarks	
40.0	Diagnose and repair air supply and service systems--The student will be able to:
40.01	Identify and diagnose poor stopping, air leaks, premature wear, pulling, grabbing, dragging, or balance problems caused by supply and service system malfunctions; determine needed action.
40.02	Check air system build-up time; determine needed action.
40.03	Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action.
40.04	Inspect air compressor drive gear, belts and coupling; adjust or replace as needed.
40.05	Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed.
40.06	Inspect and test air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings; replace as needed.
40.07	Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed.
40.08	Inspect and test air tank relief (safety) valves, one-way (single) check valves, two-way (double) check-valves, manual and automatic drain valves; replace as needed.
40.09	Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; repair or replace as needed.
40.10	Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation; replace as needed.
40.11	Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed.
40.12	Inspect and test hand brake (trailer) control valve, lines, fittings, and mountings; repair or replace as needed.
40.13	Inspect and test brake relay valve; replace as needed.
40.14	Inspect and test quick release valves; replace as needed.
40.15	Inspect and test tractor protection valve; replace as needed.
40.16	Inspect and test emergency (spring) brake control/modulator valve(s); replace as needed.
40.17	Inspect and test low pressure warning devices, wiring, and connectors; repair or replace as needed.

CTE Standards and Benchmarks	
40.18	Inspect and test air pressure gauges, lines, and fittings; replace as needed.
40.19	Inspect and test front and rear axle limiting (proportioning) valves; replace as needed.
41.0	Diagnose and repair mechanical/foundation air brake systems--The student will be able to:
41.01	Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, or dragging problems caused by the foundation brake, slack adjuster, and brake chamber problems; determine needed action.
41.02	Inspect and test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets; repair or replace as needed.
41.03	Identify type, inspect and service slack adjusters; perform needed action.
41.04	Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; replace as needed.
41.05	Inspect, clean, and adjust air disc brake caliper assemblies; determine needed repairs.
41.06	Inspect and measure brake shoes or pads; perform needed action.
41.07	Inspect and measure brake drums or rotors; perform needed action.
42.0	Diagnose and repair parking brakes--The student will be able to**:**
42.01	Inspect and test parking (spring) brake chamber diaphragm and seals; replace parking (spring) brake chamber; dispose of removed chambers in accordance with local regulations.
42.02	Inspect and test parking (spring) brake check valves, lines, hoses, and fittings; replace as needed.
42.03	Inspect and test parking (spring) brake application and release valve; replace as needed.
42.04	Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturers' recommendations.
42.05	Identify and test anti compounding brake function.
43.0	Diagnose and repair hydraulic systems--The student will be able to:
43.01	Identify and diagnose poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system; determine needed action.
43.02	Inspect and test master cylinder for internal/external leaks and damage; replace as needed.
43.03	Inspect hydraulic system brake lines for leaks and damage, flexible hoses, and fittings for leaks and damage; replace as needed.
43.04	Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; replace as needed.
43.05	Inspect and test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors; repair or replace as needed.
43.06	Inspect disc brake caliper assemblies; replace as needed.
43.07	Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type.
43.08	Check and adjust brake pedal pushrod length.

CTE Standards and Benchmarks	
	43.09 Inspect and clean wheel cylinders; replace as needed.
	43.10 Test and adjust brake stop light switch, bulbs, wiring, and connectors; repair or replace as needed.
44.0	Diagnose and repair mechanical/foundation hydraulic brake systems--The student will be able to:
	44.01 Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components; determine needed action.
	44.02 Inspect and measure rotors; perform needed action.
	44.03 Inspect and measure disc brake pads; inspect mounting hardware; perform needed action.
	44.04 Check parking brake operation; inspect parking brake application and holding devices; adjust and replace as needed.
	44.05 Inspect and measure drum brake shoes and linings; inspect mounting hardware, adjuster mechanisms, and backing plates; perform needed action.
45.0	Diagnose and repair power assist units--The student will be able to:
	45.01 Identify and diagnose stopping problems caused by the brake assist (booster) system; determine needed action.
	45.02 Inspect, test, repair, or replace hydraulic brake assist (booster), hoses, and control valves; determine proper fluid type.
	45.03 Check emergency (back-up, reserve) brake assist system.
46.0	Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC)--The student will be able to:
	46.01 Observe antilock brake system (ABS) warning light operation (includes trailer and dash mounted ABS warning light); determine needed action.
	46.02 Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or electronic service tool(s); determine needed action.
	46.03 Identify poor stopping and wheel lock-up caused by failure of the antilock brake system (ABS); determine needed action.
	46.04 Test and check operation of antilock brake system (ABS) air, hydraulic, electrical, and mechanical components; perform needed action.
	46.05 Test antilock brake system (ABS) wheel speed sensors and circuits; adjust or replace as needed.
	46.06 Bleed the ABS hydraulic circuits according to manufacturers' procedures.
	46.07 Observe automatic traction control (ATC) warning light operation; determine needed action.
	46.08 Diagnose automatic traction control (ATC) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer); determine needed action.
	46.09 Verify power line carrier (PLC) operations.
	46.10 Diagnose, service, and adjust antilock brake system (ABS) wheel speed sensors and circuits following manufacturers' recommended procedures (including voltage output, resistance, shorts to voltage/ground, and frequency data).
47.0	Diagnose and repair wheel bearings--The student will be able to:

CTE Standards and Benchmarks	
	47.01 Clean, inspect, lubricate and replace wheel bearings and races/cups; replace seals and wear rings; inspect spindle/tube; inspect and replace retaining hardware; adjust wheel bearings. Verify end play with dial indicator method.
	47.02 Identify, inspect or replace unitized/preset hub bearing assemblies.
48.0	General hydraulic system diagnosis and repair--The student will be able to:
	48.01 Identify system type (closed and open) and verify proper operation.
	48.02 Read and interpret system diagrams and schematics.
	48.03 Perform system temperature, pressure, flow, and cycle time tests; determine needed action.
	48.04 Verify placement of equipment /component safety labels and placards; determine needed action.
49.0	Diagnose and repair hydraulic pumps--The student will be able to:
	49.01 Identify system fluid type.
	49.02 Identify causes of pump failure, unusual pump noises, temperature flow, and leakage problems; determine needed action.
	49.03 Determine pump type, rotation, and drive system.
	49.04 Remove and install pump; prime and/or bleed system.
	49.05 Inspect pump inlet for restrictions and leaks; determine needed action.
	49.06 Inspect pump outlet for restrictions and leaks; determine needed action.
50.0	Diagnose and repair hydraulic filtration/reservoirs (tanks)--The student will be able to:
	50.01 Identify type of filtration system; verify filter application and flow direction.
	50.02 Service filters and breathers.
	50.03 Identify causes of system contamination; determine needed action.
	50.04 Take a hydraulic oil sample for analysis.
	50.05 Check reservoir fluid level and condition; determine needed action.
	50.06 Inspect and repair or replace reservoir, sight glass, vents, caps, mounts, valves, screens, supply and return lines.
51.0	Diagnose and repair hydraulic hoses, fittings, and connections--The student will be able to:
	51.01 Diagnose causes of component leakage, damage, and restriction; determine needed action.
	51.02 Inspect hoses and connections (length, size, routing, bend radii, and protection); repair or replace as needed.
	51.03 Assemble hoses, tubes, connectors, and fittings in accordance with manufacturers' specifications; use proper procedures to avoid contamination.
	51.04 Inspect and replace fitting seals and sealants.
52.0	Diagnose and repair hydraulic control valves--The student will be able to:

CTE Standards and Benchmarks
52.01 Pressure test system safety relief valve; determine needed action.
52.02 Perform control valve operating pressure and flow tests; determine needed action.
52.03 Inspect, test, and adjust valve controls (electrical/electronic, mechanical, and pneumatic).
52.04 Identify causes of control valve leakage problems (internal/external); determine needed action.
52.05 Inspect pilot control valve linkages, cables, and PTO controls; adjust, repair, or replace as needed.
53.0 Diagnose and repair hydraulic actuators--The student will be able to:
Comply with manufacturers' and industry accepted safety practices associated with equipment lock out/tag out; pressure line release; implement/support (blocked or resting on ground); and articulated cylinder devices/machinery safety locks.
53.01 Identify actuator type (single/double acting, multi-stage/telescopic, and motors).
53.02 Identify the cause of seal failure; determine needed repairs.
53.03 Identify the cause of incorrect actuator movement and leakage (internal and external); determine needed repairs.
53.04 Inspect actuator mounting, frame components, and hardware for looseness, cracks, and damage; determine needed action.
53.05 Remove, repair, and/or replace actuators in accordance with manufacturers' recommended procedures.
53.06 Inspect actuators for dents, cracks, damage, and leakage; determine needed action.
53.07 Purge and/or bleed system in accordance with manufacturers' recommended procedures.

Florida Department of Education
Student Performance Standards

Course Number: DIM0106
Occupational Completion Point: F
Diesel Heating and Air Conditioning Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Heating and Air Conditioning Technician course is designed to build on the skills and knowledge students learned in the Diesel Brakes Technician course for entry into the Heavy Equipment industry. Content emphasizes beginning skills. Students study HVAC systems, A/C systems, heating, cooling, related controls, and recycling and recovering.

CTE Standards and Benchmarks	
54.0	HVAC systems diagnosis, service, and repair--The student will be able to:
54.01	Verify the need for service or repair of HVAC systems based on unusual operating noises; determine needed action.
54.02	Verify the need for service or repair of HVAC systems based on unusual visual, smell, and touch conditions; determine needed action.
54.03	Identify system type and components (cycling clutch orifice tube - CCOT, expansion valve) and conduct performance test(s) on HVAC systems; determine needed action.
54.04	Retrieve diagnostic codes; determine needed action.
55.0	A/C system and component diagnosis, service, and repair--The student will be able to:
55.01	Identify causes of temperature control problems in the A/C system; determine needed action.
55.02	Identify refrigerant and lubricant types; check for contamination; determine needed action.
55.03	Identify A/C system problems indicated by pressure gauge and temperature readings; determine needed action.
55.04	Identify A/C system problems indicated by visual, audible, smell, and touch procedures; determine needed action.
55.05	Perform A/C system leak test; determine needed action.
55.06	Recover, evacuate, and recharge A/C system using appropriate equipment.
55.07	Identify contamination in the A/C system components; determine needed action.
55.08	Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
55.09	Charge A/C system with refrigerant.
55.10	Identify lubricant type needed for system application.
56.0	Diagnose and repair Compressor and clutch--The student will be able to:

CTE Standards and Benchmarks	
56.01	Identify and diagnose A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action.
56.02	Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices.
56.03	Inspect, and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension and check alignment.
56.04	Inspect, test, adjust, service, or replace A/C compressor clutch components or assembly.
56.05	Inspect and correct A/C compressor lubricant level (if applicable).
56.06	Inspect, test, or replace A/C compressor.
56.07	Inspect, repair, or replace A/C compressor mountings and hardware.
57.0	Diagnose and repair Evaporator, condenser, and related components--The student will be able to:
57.01	Correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses.
57.02	Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action.
57.03	Inspect and test A/C system condenser. Check for proper airflow and mountings; determine needed action.
57.04	Inspect and replace receiver/drier or accumulator/drier.
57.05	Inspect and test cab/sleeper refrigerant solenoid, expansion valve(s); check placement of thermal bulb (capillary tube); determine needed action.
57.06	Remove and replace orifice tube.
57.07	Inspect and test cab/sleeper evaporator core; determine needed action.
57.08	Inspect, clean, and repair evaporator housing and water drain; inspect and service/replace evaporator air filter.
57.09	Identify and inspect A/C system service ports (gauge connections); determine needed action.
57.10	Identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device; determine needed action.
57.11	Inspect and test A/C system condenser and mountings; determine needed action.
58.0	Heating and engine cooling systems diagnosis, service, and repair--The student will be able to:
58.01	Identify causes of outlet air temperature control problems in the HVAC system; determine needed action.
58.02	Diagnose window fogging problems; determine needed action.
58.03	Perform engine cooling system tests for leaks, protection level, contamination, coolant level, coolant type, temperature, and conditioner concentration; determine needed action.
58.04	Inspect engine cooling and heating system hoses, lines, and clamps; determine needed action.
58.05	Inspect and test radiator, pressure cap, and coolant recovery system (surge tank); determine needed action.
58.06	Inspect water pump; determine needed action.

CTE Standards and Benchmarks	
	58.07 Inspect and test thermostats, by-passes, housings, and seals; determine needed repairs.
	58.08 Recover, flush and refill with recommended coolant/additive package; bleed cooling system.
	58.09 Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.
	58.10 Inspect and test heating system coolant control valve(s) and manual shut-off valves; determine needed action.
	58.11 Inspect and flush heater core; determine needed action.
59.0	Electrical system diagnosis, service, and repair--The student will be able to:
	59.01 Identify causes of HVAC electrical control system problems; determine needed action.
	59.02 Inspect and test A/C heater blower motors, resistors, switches, relays, modules, wiring, and protection devices; determine needed action.
	59.03 Inspect and test A/C compressor clutch relays, modules, wiring, sensors, switches, diodes, and protection devices; determine needed action.
	59.04 Inspect and test A/C related electronic engine control systems; determine needed action.
	59.05 Inspect and test engine cooling/condenser fan motors, relays, modules, switches, sensors, wiring, and protection devices; determine needed action.
	59.06 Inspect and test electric actuator motors, relays/modules, switches, sensors, wiring, and protection devices; determine needed action.
	59.07 Inspect and test HVAC system electrical/electronic control panel assemblies; determine needed action.
	59.08 Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
60.0	Air/vacuum/mechanical diagnostics, service, and repair--The student will be able to:
	60.01 Identify causes of HVAC air and mechanical control problems; determine needed action.
	60.02 Inspect and test HVAC system air and mechanical control panel assemblies; determine needed action.
	60.03 Inspect, test, and adjust HVAC system air and mechanical control cables and linkages; determine needed action.
	60.04 Inspect and test HVAC system actuators and hoses; determine needed action.
	60.05 Inspect, test, and adjust HVAC system ducts, doors, and outlets; determine needed action.
	60.06 Inspect and test HVAC system vacuum reservoir(s), check valve(s), and restrictors; determine needed action.
61.0	Refrigerant recovery, recycling, and handling--The student will be able to:
	61.01 Maintain and verify correct operation of certified equipment.
	61.02 Identify and recover A/C system refrigerant.
	61.03 Recycle or properly dispose of refrigerant.

CTE Standards and Benchmarks
61.04 Handle, label, and store refrigerant.
61.05 Test recycled refrigerant for non-condensable gases.

Florida Department of Education
Student Performance Standards

Course Number: DIM0107
Occupational Completion Point: G
Diesel Steering and Suspension Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Steering and Suspension Technician course is designed to build on the skills and knowledge students learned in the Diesel Heating and Air Conditioning Technician course for entry into the Heavy Equipment industry. Content emphasizes beginning skills. Students study steering systems, suspension systems, wheel alignment, wheels and tires, and frames.

CTE Standards and Benchmarks	
62.0	Steering column diagnosis, service, and repair--The student will be able to:
62.01	Identify and diagnose fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action.
62.02	Inspect and service steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft.
62.03	Check cab mounting and adjust ride height.
62.04	Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components); install and center the steering wheel. Inspect, test, replace and calibrate steering angle sensor.
62.05	Disable and enable supplemental restraint system (SRS) in accordance with manufacturers' procedures.
63.0	Steering units diagnosis, service, and repair--The student will be able to:
63.01	Identify and diagnose power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action.
63.02	Determine recommended type of power steering fluid; check level and condition; determine needed action.
63.03	Flush and refill power steering system; purge air from system.
63.04	Perform power steering system pressure, temperature, and flow tests; determine needed action.
63.05	Inspect, service, or replace power steering reservoir including filter, seals, and gaskets.
63.06	Inspect power steering pump drive gear and coupling; replace as needed.
63.07	Inspect, adjust, or replace power steering pump, mountings, and brackets.
63.08	Inspect and replace power steering system cooler, lines, hoses, clamps/mountings, hose routings, and fittings.
63.09	Inspect, adjust, repair, or replace integral type power steering gear(s) (single and/or dual) and mountings.
63.10	Inspect, and reinstall/replace pulleys, tensioners, and drive belts; adjust drive belts and check alignment.

CTE Standards and Benchmarks	
	63.11 Inspect, adjust, or replace linkage-assist type power steering cylinder or gear (dual system).
	63.12 Adjust manual and automatic steering gear poppet/relief valves.
64.0	Steering linkage diagnosis, service, and repair--The student will be able to:
	64.01 Inspect and align pitman arm; replace as needed.
	64.02 Check and adjust steering (wheel) stops; verify relief pressures.
	64.03 Inspect and lubricate steering components.
	64.04 Inspect drag link (relay rod) and tie rod ends; adjust or replace as needed.
	64.05 Inspect steering arm and levers, and linkage pivot joints; replace as needed.
	64.06 Inspect clamps and retainers on cross tube/relay rod/centerline/tie rod; position or replace as needed.
65.0	Suspension systems diagnosis, service, and repair--The student will be able to:
	65.01 Inspect front axles and attaching hardware; determine needed action.
	65.02 Inspect and service kingpins, steering knuckle bushings, locks, bearings, seals, and covers; determine needed action.
	65.03 Inspect shock absorbers, bushings, brackets, and mounts; replace as needed.
	65.04 Inspect leaf springs, center bolts, clips, pins and bushings, shackles, U-bolts, insulators, brackets, and mounts; determine needed action.
	65.05 Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, torque arms, related bushings, mounts, shims, and cams; determine needed action.
	65.06 Inspect tandem suspension equalizer components; determine needed action.
	65.07 Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; adjust, repair or replace as needed.
	65.08 Inspect air springs, mounting plates, springs, suspension arms, and bushings; replace as needed.
	65.09 Measure and adjust vehicle ride height; determine needed action.
	65.10 Identify rough ride problems; determine needed action.
	65.11 Inspect walking beams, center (cross) tube, bushings, mounts, load pads, and saddles/caps; replace as needed.
66.0	Wheel alignment diagnosis, adjustment, and repair--The student will be able to:
	66.01 Identify and diagnose vehicle wandering, pulling, shimmy, hard steering and off-center steering wheel problems; adjust or repair as needed.
	66.02 Check camber; determine needed action.
	66.03 Check caster; adjust as needed.
	66.04 Check and adjust toe settings.

CTE Standards and Benchmarks	
	66.05 Check rear axle(s) alignment (thrust line/centerline) and tracking; adjust or repair as needed.
	66.06 Diagnose turning/Ackerman angle (toe-out-on-turns) problems; determine needed action.
	66.07 Check front axle alignment (centerline); adjust or repair as needed.
67.0	Wheels and tires diagnosis, service, and repair --The student will be able to:
	67.01 Identify and diagnose tire wear patterns; check tread depth and pressure; determine needed action.
	67.02 Identify and diagnose wheel/tire vibration, shimmy, pounding, hop (tramp) problems; determine needed action.
	67.03 Remove and install steering and drive axle wheel/tier assemblies; torque mounting hardware to specifications with a torque wrench.
	67.04 Inspect tire for proper application, (size, load range, position, and tread design); determine needed action.
	67.05 Inspect wheel/rims for proper application, hand hold alignment, load range, and design; determine needed action.
	67.06 Check operation of tire pressure monitoring system (TPMS); determine needed action if applicable.
68.0	Frame and coupling diagnosis, service, and repair --The student will be able to:
	68.01 Inspect, service, and/or adjust fifth wheel, pivot pins, bushings, locking mechanisms, and mounting hardware.
	68.02 Inspect and service sliding fifth wheel, tracks, stops, locking systems, air cylinders, springs, lines, hoses, and controls.
	68.03 Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage; determine needed repairs.
	68.04 Inspect, install, or repair frame hangers, brackets, and cross members in accordance with manufacturers' recommended procedures.
	68.05 Inspect, repair or replace pintle hooks and draw bars, if applicable.

Florida Department of Education
Student Performance Standards

Course Number: DIM0108
Occupational Completion Point: H
Diesel Drivetrain Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Drivetrain Technician course is designed to build on the skills and knowledge students learned in the Diesel Steering and Suspension Technician course for entry into the Heavy Equipment industry. Content emphasizes beginning skills. Students study clutch, transmission, drive shaft, universal joint, and drive axle.

CTE Standards and Benchmarks	
69.0	Clutch diagnosis and repair--The student will be able to:
69.01	Identify causes of clutch noise, binding, slippage, pulsation, vibration, grabbing, dragging, and chatter problems; determine needed action.
69.02	Inspect and adjust clutch linkage, cables, levers, brackets, bushings, pivots, springs, and clutch safety switch (includes push and pull-type assemblies); check pedal height and travel; perform needed action.
69.03	Inspect, adjust, repair, and replace hydraulic clutch slave and master cylinders, lines, and hoses; bleed system.
69.04	Inspect, adjust, lubricate or replace release (throw-out) bearing, sleeve, bushings, springs, housing, levers, release fork, fork pads, rollers, shafts, and seals.
69.05	Inspect, adjust, and replace single-disc clutch pressure plate and clutch disc.
69.06	Inspect, adjust, and replace two-plate clutch pressure plate, clutch discs, intermediate plate, and drive pins/lugs.
69.07	Inspect and/or replace clutch brake assembly; inspect input shaft and bearing retainer; perform needed action.
69.08	Inspect, adjust, and replace self-adjusting/continuous-adjusting clutch mechanisms.
69.09	Inspect and replace pilot bearing.
69.10	Remove and reinstall flywheel, inspect mounting area on crankshaft, rear main oil seal, and measure crankshaft end play; determine needed action.
69.11	Inspect flywheel, starter ring gear and measure flywheel face and pilot bore runout; determine needed action.
69.12	Inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.
70.0	Transmission diagnosis and repair--The student will be able to:
70.01	Identify causes of transmission noise, shifting concerns, lockup, jumping-out-of-gear, overheating, and vibration problems; determine needed action.
70.02	Inspect, test, repair, or replace air shift controls, lines, hoses, valves, regulators, filters, and cylinder assemblies.

CTE Standards and Benchmarks	
70.03	Inspect and replace transmission mounts, insulators, and mounting bolts.
70.04	Inspect for leakage and replace transmission cover plates, gaskets, seals, and cap bolts; inspect seal surfaces and vents; repair as needed.
70.05	Check transmission fluid level and condition; determine needed service; add proper type of lubricant.
70.06	Inspect, adjust, and replace transmission shift lever, cover, rails, forks, levers, bushings, sleeves, detents, interlocks, springs, and lock bolts/safety wires.
70.07	Remove and reinstall transmission.
70.08	Inspect input shaft, gear, spacers, bearings, retainers, and slingers; determine needed action.
70.09	Inspect transmission oil filters and coolers and related components; replace as needed.
70.10	Inspect speedometer components; determine needed action.
70.11	Inspect and adjust power take-off (P.T.O.) assemblies, controls, and shafts; determine needed action.
70.12	Inspect and test function of reverse light, neutral start, and warning device circuits; determine needed action.
70.13	Inspect and test transmission temperature gauge, wiring harnesses and sensor/sending unit; determine needed action.
70.14	Inspect and test operation of automated mechanical transmission and manual electronic shift controls, shift, range and splitter solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU) neutral/in gear and reverse switches, and wiring harnesses; determine needed action.
70.15	Inspect and test operation of automated mechanical transmission electronic shift selectors, air and electrical switches, displays and indicators, wiring harnesses, and air lines; determine needed action.
70.16	Use appropriate electronic service tool(s) and procedures to diagnose automated mechanical transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed action.
70.17	Inspect and test operation of automatic transmission electronic shift controls, shift solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU), neutral/in gear and reverse switches, and wiring harnesses.
70.18	Inspect and test operation of automatic transmission electronic shift selectors, switches, displays and indicators, wiring harnesses.
70.19	Use appropriate electronic service tool(s) and procedures to diagnose automatic transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed repairs.
70.20	Diagnose transmission component failure cause, both before and during disassembly procedures; determine needed action.
70.21	Inspect, adjust, service, repair, or replace transmission remote shift linkages, brackets, bushings, pivots, and levers.
70.22	Inspect and adjust main shaft, gears, sliding clutches, washers, spacers, bushings, bearings, auxiliary drive assemblies, retainers, and keys; replace as needed.
70.23	Inspect countershafts, gears, bearings, retainers, and keys; adjust bearing preload and time multiple countershaft gears; replace as needed.
70.24	Inspect output shafts, gears, washers, spacers, bearings, retainers, and keys; replace as needed.
70.25	Inspect and/or replace reverse idler shafts, gears, bushings, bearings, thrust washers, and retainers; check reverse idler gear end play (where applicable).

CTE Standards and Benchmarks	
70.26	Inspect synchronizer hub, sleeve, keys (inserts), springs, blocking rings, synchronizer plates, blocker pins, and sliding clutches; replace as needed.
70.27	Inspect transmission cases including surfaces, bores, bushings, pins, studs, and magnets; replace as needed.
70.28	Inspect transmission lubrication system pumps, troughs, collectors, and slingers; service or replace as needed.
71.0	Driveshaft and universal joint diagnosis and repair--The student will be able to:
71.01	Identify causes of driveshaft and universal joint noise and vibration problems; determine needed action.
71.02	Inspect, service, or replace driveshaft, slip joints, yokes, drive flanges, and universal joints; driveshaft boots and seals, and retaining hardware; check phasing of all shafts.
71.03	Inspect driveshaft center support bearings and mounts; determine needed action.
71.04	Measure drive line angles; determine needed action.
72.0	Drive axle diagnosis and repair--The student will be able to:
72.01	Identify causes of drive axle(s) drive unit noise and overheating problems; determine needed action.
72.02	Check and repair fluid leaks; inspect and replace drive axle housing cover plates, gaskets, sealants, vents, magnetic plugs, and seals.
72.03	Check drive axle fluid level and condition; determine needed service; add proper type of lubricant.
72.04	Remove and replace differential carrier assembly.
72.05	Inspect and replace differential case assembly including spider gears, cross shaft, side gears, thrust washers, case halves, and bearings.
72.06	Inspect and replace components of locking differential case assembly.
72.07	Inspect differential carrier housing and caps, side bearing bores, and pilot (spigot, pocket) bearing bore; determine needed action.
72.08	Measure ring gear runout; determine needed action.
72.09	Inspect and replace ring and drive pinion gears, spacers, sleeves, bearing cages, and bearings.
72.10	Measure and adjust drive pinion bearing preload.
72.11	Measure and adjust drive pinion depth.
72.12	Measure and adjust side bearing preload and ring gear backlash.
72.13	Check and interpret ring gear and pinion tooth contact pattern; determine needed action.
72.14	Inspect, adjust, or replace ring gear thrust block/bolt.
72.15	Inspect power divider (inter-axle differential) assembly; determine needed action.
72.16	Inspect, adjust, repair, or replace air operated power divider (inter-axle differential) lockout assembly including diaphragms, seals, springs, yokes, pins, lines, hoses, fittings, and controls.

CTE Standards and Benchmarks	
72.17	Inspect, repair, or replace drive axle lubrication system: pump, troughs, collectors, slingers, tubes, and filters.
72.18	Inspect and replace drive axle shafts.
72.19	Remove and replace wheel assembly; check rear wheel seal and axle flange gasket for leaks; perform needed action.
72.20	Identify causes of drive axle wheel bearing noise and check for damage; perform needed action.
72.21	Inspect and test drive axle temperature gauge, wiring harnesses, and sending unit/sensor; determine needed action.
72.22	Clean, inspect, lubricate and replace wheel bearings; replace seals and wear rings; inspect and replace retaining hardware; adjust drive axle wheel bearings. Verify end play with dial indicator method
72.23	Inspect, adjust, repair, or replace planetary gear-type 2-speed axle assembly including: case, idler pinion, pins, thrust washers, sliding clutch gear, shift fork, pivot, seals, cover, and springs.
72.24	Inspect, repair, or replace 2-speed axle shift control system, speedometer adapters, motors, axle shift units, wires, air lines, and connectors.

Florida Department of Education
Student Performance Standards

Course Number: DIM0110
Occupational Completion Point: I
Diesel Power Train Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Power Train Technician course is designed to build on the skills and knowledge students learned in the Diesel Drivetrain Technician course for entry into the Heavy Equipment industry. Content emphasizes beginning skills. Students study shop safety procedures, track systems, power trains, components, and qualifications for employment.

CTE Standards and Benchmarks	
73.0	Demonstrate shop and occupational safety procedures--The student will be able to:
73.01	For all track system and power train technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
73.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
74.0	Identify the requirements for maintenance and repairing track systems--The student will be able to:
74.01	Identify types of track system components.
74.02	Describe common problems with track systems and components.
74.03	Explain methods for removing, installing, and aligning track assemblies.
74.04	Demonstrate methods for maintaining and repairing track systems.
74.05	Demonstrate methods for maintaining track assemblies, sprockets, bottom rollers, top rollers, and idler.
75.0	Maintain and repair power train systems and components--The student will be able to:
75.01	Troubleshoot and repair components and assemblies of winches, clutches, and transmissions.
75.02	Describe common problems of operation of winches, clutches, and transmissions.
75.03	Remove, replace or rebuild, and adjust transmissions.
75.04	Remove, replace, and adjust push- and pull-type clutches.
75.05	Inspect flywheel surface for wear or cracks.
75.06	Replace pilot and clutch release bearing.
75.07	Rebuild and adjust manual transmission and linkage.
76.0	Maintain and repair differentials, final drives, and drivetrains--The student will be able to:

CTE Standards and Benchmarks	
76.01	Describe procedures to troubleshoot and repair final drive assemblies.
76.02	Inspect drive shaft for correct timing.
76.03	Replace universal joints.
76.04	Rebuild differential assembly.
76.05	Overhaul differential.
77.0	Demonstrate the qualifications for employment--The student will be able to:
77.01	Demonstrate shop organization, management, and safety requirements for a diesel power train technician.
77.02	Demonstrate the use of tools and equipment required for an electrical and electronics technician.
77.03	Demonstrate workplace communication skills required by a diesel power train technician.
77.04	Demonstrate the application of math and science principles required for a diesel power train technician’s job tasks.
77.05	Demonstrate employability skills as a diesel power train technician.

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)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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 Automotive Service Technology 1**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T600100
CIP Number	0647060413
Grade Level	30, 31
Standard Length	800 hours
Teacher Certification	AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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.

NOTE: It is recommended that students complete **OCP-A (Automotive Maintenance Technician)** and/or demonstrate mastery of the outcomes in **OCP-A (Automotive Maintenance Technician)** prior to enrolling in additional Advanced Automotive Service Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automotive Maintenance Technician), is at the discretion of the instructor.**

For institutions using this framework, the National Automotive Technicians Education Foundation (NATEF) highly recommends the Master Automotive Service Technology (MAST) program Certification/Accreditation. Florida Statute (F.S.) 1004.925 – Automotive service technology education programs; certification. – requires all automotive service technology education programs shall be industry certified in accordance with rules adopted by the State Board of Education.

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

When offered at the postsecondary adult career and technical level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0011	Automotive Maintenance Technician	400 hours	49-3023
B	AER0319	Advanced Automotive Electrical/Electronic System Technician	400 hours	49-3023

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Advanced Automotive Service Technology program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry.
02.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry.
03.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
04.0 Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems.

Florida Department of Education
Student Performance Standards

Program Title: **Advanced Automotive Technology**
PSAV Number: **I470604**

Course Number: AER0011
Occupational Completion Point: A
Automotive Maintenance Technician – 400 Hours – SOC Code 49-3023

Course Description:
The Automotive Maintenance Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop and personal safety skills, tools and equipment, pre/post maintenance, and customer service.

Abbreviations:
ASE = Required Supplemental Tasks

For every task in Automotive Maintenance Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

CTE Standards and Benchmarks		Priority Number
01.0	Proficiently explain and apply required shop and personal safety tasks relating to the automotive industry --The student will be able to:	
01.01	Identify and apply general shop safety rules and procedures, EPA and OSHA standards	ASE
01.02	Identify and use appropriate emergency first aid procedures.	
01.03	Identify and use proper placement of floor jacks and jack stands.	ASE
01.04	Identify and use proper procedures for safe lift operation.	ASE
01.05	Utilize proper ventilation procedures for working within the lab/shop area.	ASE
01.06	Identify and use proper procedures for safe pit usage.	
01.07	Identify marked safety areas.	ASE
01.08	Identify the location and the types of fire extinguishers and other fire safety equipment.	ASE
01.09	Demonstrate knowledge of the procedures for using fire extinguishers and other safety equipment.	ASE

CTE Standards and Benchmarks		Priority Number
01.10	Identify the location and use of eye wash stations.	ASE
01.11	Identify the location of the posted evacuation routes.	ASE
01.12	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE
01.13	Secure hair and jewelry for lab/shop activities.	ASE
01.14	Use proper handling procedures for automotive fluids.	
01.15	Identify and describe the proper procedure to apply and remove automotive fasteners, including thread inserts.	
01.16	Identify and wear appropriate clothing for lab/shop activities.	ASE
01.17	Identify and describe typical automotive lubricants and lubricant properties.	
01.18	Research, identify, and interpret the Federal 'Workers Right To Know Law'.	
01.19	Identify and describe typical automotive seals and gaskets.	
01.20	Explain the effects of chemical/substance abuse.	
01.21	Identify principles of stress management.	
01.22	Identify and define career opportunities in the automotive service industry.	
01.23	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)	ASE
01.24	Locate and demonstrate knowledge of Safety Data Sheets (SDS).	ASE
01.25	Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.	
01.26	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE
01.27	Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.	
02.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive industry --The student will be able to:	
02.01	Utilize and demonstrate safe procedures for handling of tools and equipment.	ASE
02.02	Identify and use standard and metric measurement skills and designation.	ASE
02.03	Identify tools and equipment and their appropriate usage in automotive applications.	ASE
02.04	Demonstrate proper use of precision-measuring tools (i.e. micrometer, digital/dial-indicator, digital/dial-caliper) and torque methods.	ASE
02.05	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE
02.06	Identify and use the proper procedures required for cutting tubing and double and ISO flaring.	

CTE Standards and Benchmarks		Priority Number
03.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services --The student will be able to:	
03.01	Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.	
03.02	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).	
03.03	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE
03.04	Review vehicle service history.	ASE
03.05	Identify information needed and the service requested on a repair order.	ASE
03.06	Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment.	ASE
03.07	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE
03.08	Use computer and operate keyboard to perform tasks typically required at a dealership.	
03.09	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).	ASE
03.10	Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order.	
03.11	Document observed damage, unusual conditions, and concerns.	
03.12	Demonstrate retrieving stored diagnostic trouble codes.	
03.13	Reset product specific service indicator.	
03.14	Identify acceptable customer relations.	
03.15	Identify and demonstrate proper customer relations skills.	
03.16	Identify and define payroll deductions (taxes, insurance, social security) employee benefits and pay systems.	
03.17	Identify principles of time management.	
03.18	Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information.	
03.19	Locate and use technical service bulletins (TSBs).	
03.20	Use proper chemicals for cleaning and lubrication.	
03.21	Determine the presence of a Tire Pressure Monitoring System (TPMS).	
03.22	Identify service considerations when equipped with a Tire Pressure Monitoring System (TPMS).	
03.23	Determine the presence of wheel locks.	
03.24	Determine the presence of an air suspension system.	

CTE Standards and Benchmarks	Priority Number
03.25 Check operation and status of instrument panel warning lights and gauges.	
03.26 Inspect underhood area for leaks, damage, and unusual conditions.	
03.27 Inspect undercar area for leaks, damage, and unusual conditions.	
03.28 Inspect engine assembly for fuel, oil, coolant, and other leaks.	
03.29 Determine fluid type requirements and identify fluid.	
03.30 Check engine oil level and condition; service as required.	
03.31 Change engine oil and filter.	
03.32 Check engine coolant level and condition; service as required.	
03.33 Inspect cooling system pipes and hoses for wear, damage, and proper routing.	
03.34 Inspect manual and power steering fluid levels and condition; service as required.	
03.35 Lubricate driveline, suspension and steering systems.	
03.36 Inspect and replace power steering hoses and fittings.	
03.37 Inspect struts, springs, and related components; service as required.	
03.38 Inspect stabilizer bar, bushings, brackets, and links; service as required.	
03.39 Inspect springs, torsion bars, and related components; service as required.	
03.40 Inspect, remove, and replace shock absorbers.	
03.41 Check windshield washer fluid level and condition; service as required.	
03.42 Check automatic transmission fluid level and condition; service as required.	
03.43 Check differential/transfer case fluid level; note unusual conditions; service as required.	
03.44 Check manual transmission fluid level; note unusual conditions; service as required.	
03.45 Service transmission; perform visual inspection; replace fluids and filters.	
03.46 Check hydraulic clutch fluid and condition; service as required.	
03.47 Check rear axle drive assembly seals and vents; check lube level.	
03.48 Inspect constant velocity (CV) axle shaft boots; service as required.	
03.49 Remove, inspect, and service front and rear wheel bearings on non-drive axles.	
03.50 Check wheel bearings for play and other signs of wear.	
03.51 Inspect, replace and adjust drive belts; inspect tensioners and pulleys.	

CTE Standards and Benchmarks		Priority Number
03.52	Inspect and replace air filter.	
03.53	Inspect and replace cabin air filter.	
03.54	Inspect tires, diagnose tire wear patterns, inspect spare and mounting system; check and adjust tire pressure.	
03.55	Rotate tires according to manufacturer's recommendations; install wheels, torque lug nuts.	
03.56	Balance wheel and tire assembly (static and dynamic).	
03.57	Dismount, inspect, repair, and remount tire on wheel.	
03.58	Repair tire according to industry standards.	
03.59	Identify nitrogen-filled tires.	
03.60	Reinstall wheel; torque wheel fasteners to specification.	
03.61	Perform a visual inspection of a brake drum system.	
03.62	Perform a visual inspection of a disc brake system.	
03.63	Check parking brake operation; check parking brake components for unusual conditions.	
03.64	Check master cylinder for internal and external leaks and proper operation.	
03.65	Fill master cylinder with recommended fluid and seat pads.	
03.66	Select, handle, store, and install brake fluids to proper level.	
03.67	Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports.	
03.68	Inspect flexible brake hoses for leaks, kinks, cracks, bulging or wear; tighten loose fittings and supports.	
03.69	Inspect fuel tank, fuel cap and seal; inspect and replace fuel lines, fittings, and hoses.	
03.70	Inspect and replace fuel filters as applicable.	
03.71	Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.	
03.72	Inspect, test head lamps, tail lamps and stop lamps. Aim headlights.	
03.73	Inspect and replace exterior and courtesy lamps.	
03.74	Check wiper blades, inserts, and arms; replace wiper blades or inserts.	
03.75	Lubricate door latches and hinges.	
03.76	Perform slow/fast battery charge.	
03.77	Inspect, clean, fill, and replace battery.	

CTE Standards and Benchmarks		Priority Number
03.78	Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.	
03.79	Perform battery, starting, and charging system tests using appropriate tester.	
03.80	Perform battery capacity (load, high-rate discharge) test; determine needed service.	
03.81	Start a vehicle using jumper cables using a battery auxiliary power supply.	
03.82	Measure and diagnose the cause(s) of abnormal key-off battery drain.	
03.83	Perform starter current draw and circuit voltage drop test; determine necessary action.	
03.84	Remove and replace/reinstall starter.	
03.85	Remove, inspect, and replace/reinstall alternator.	
03.86	Observe dash warning lamps during bulb check.	
03.87	Practice recommended precautions when handling static sensitive devices.	
03.88	Check 12 volt non-computer electrical circuits with a test light; determine necessary action.	
03.89	Check voltage and voltage drop in electrical circuits using a digital multimeter (DMM).	
03.90	Obtain and interpret digital multimeter (DMM) readings.	
03.91	Check current flow in electrical/electronic circuits and components using an ammeter.	
03.92	Check electrical circuits using jumper wires.	
03.93	Inspect and test fusible links, circuit breakers, and fuses; confirm proper circuit operation; replace as needed.	
03.94	Maintain or restore electronic memory functions if required.	
03.95	Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.	
03.96	Adjust valves on engines with mechanical lifters.	
03.97	Remove and replace valve cover gaskets.	
03.98	Return cores for rebuilt and exchange items.	
03.99	Inspect driver and passenger restraint system, repair if needed.	
03.100	Demonstrate knowledge of manufacturer policies and procedures.	
03.101	Perform product specific service procedures.	
03.102	Identify and maintain product specific engine systems.	
03.103	Identify and maintain product specific automatic transmission systems.	
03.104	Identify and maintain product specific manual transmission systems.	

CTE Standards and Benchmarks	Priority Number
03.105 Identify and maintain product specific electrical and electronic systems.	
03.106 Identify and maintain product specific heating and A/C systems.	
03.107 Identify and maintain product specific steering and suspension systems.	
03.108 Identify and maintain product specific brake systems.	
03.109 Identify and maintain product specific audio systems.	
03.110 Identify and maintain product specific safety systems.	
03.111 Identify and maintain product specific accessories.	

Florida Department of Education
Student Performance Standards

Course Number: AER0319
Occupational Completion Point: B
Advanced Automotive Electrical/Electronic System Technician – 400 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Electrical/Electronic System Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems diagnostics, service, and repair.

Abbreviations:
EE = Electrical/Electronic Systems

For every task in Advanced Automotive Electrical/Electronic System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EE Task List:	
P-1 =	**36**
P-2 =	**14**
P-3 =	**8**
Total	**58**

CTE Standards and Benchmarks		**Priority Number**
04.0	Explain and apply proficiently the diagnosis, service and repair of electrical/electronic system components, battery, starting, charging, lighting, gauges, warning devices, driver information, horn, wiper/washer and accessory systems--The student will be able to:	
04.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
04.02	Identify and interpret electrical/electronic system concern; determine necessary action.	
04.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
04.04	Locate and interpret vehicle and major component identification numbers.	
04.05	Diagnose and demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).	P-1
04.06	Use wiring diagrams during diagnosis (troubleshooting) of electrical/electronic circuit problems.	P-1
04.07	Demonstrate the proper use of a digital multimeter (DMM) when measuring source, voltage drop (including grounds), current flow, and resistance.	P-1
04.08	Check operation of electrical circuits with a test light.	P-1

CTE Standards and Benchmarks		Priority Number
04.09	Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.	P-2
04.10	Check operation of electrical circuits using fused jumper wires.	P-1
04.11	Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.	P-1
04.12	Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.	P-1
04.13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	P-1
04.14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.	P-1
04.15	Replace electrical connectors and terminal ends.	P-1
04.16	Repair wiring harness.	P-1
04.17	Perform solder repair of electrical wiring.	P-1
04.18	Repair CAN/BUS wiring harness.	P-1
04.19	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	
04.20	Perform battery state-of-charge test; determine necessary action.	P-1
04.21	Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.	P-1
04.22	Maintain or restore electronic memory functions.	P-1
04.23	Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.	P-1
04.24	Perform slow/fast battery charge according to manufacturer’s recommendations.	P-1
04.25	Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.	P-1
04.26	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	P-3
04.27	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	P-1
04.28	Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	P-3
04.29	Perform battery conductance test; determine necessary action.	
04.30	Perform starter current draw tests; determine necessary action.	P-1
04.31	Perform starter circuit voltage drop tests; determine necessary action.	P-1
04.32	Inspect and test starter relays and solenoids; determine necessary action.	P-2
04.33	Remove and install starter in a vehicle.	P-1

CTE Standards and Benchmarks		Priority Number
04.34	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	P-2
04.35	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	P-2
04.36	Perform charging system output test; determine necessary action.	P-1
04.37	Diagnose (troubleshoot) charging system for the cause of undercharge, no-charge, and overcharge conditions.	P-1
04.38	Inspect, adjust, or replace generator (alternator) drive belts, check pulleys, and tensioners for wear; check pulley and belt alignment.	P-1
04.39	Remove, inspect, and re-install generator (alternator).	P-1
04.40	Perform charging circuit voltage drop test; determine necessary action.	P-1
04.41	Diagnose (troubleshoot) the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.	P-1
04.42	Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving light); replace as needed.	P-1
04.43	Aim headlights.	P-2
04.44	Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.	
04.45	Identify system voltage and safety precautions associated with high intensity discharge headlights.	P-2
04.46	Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.	P-2
04.47	Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action.	
04.48	Diagnose (troubleshoot) the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.	P-2
04.49	Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action.	
04.50	Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.	P-1
04.51	Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	P-2
04.52	Diagnose (troubleshoot) windshield washer problems; perform necessary action.	P-2
04.53	Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.	P-2
04.54	Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action.	
04.55	Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.	P-2
04.56	Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action	P-3
04.57	Diagnose (troubleshoot) supplemental restraint system (SRS) concerns; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
04.58	Disable and enable an airbag system for vehicle service; verify indicator lamp operation.	P-1
04.59	Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.	P-3
04.60	Remove and reinstall door panel.	P-1
04.61	Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.	P-3
04.62	Check for module communication (including CAN/BUS systems) using a scan tool.	P-2
04.63	Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.	P-3
04.64	Describe the operation of keyless entry/remote-start systems.	P-3
04.65	Verify operation of instrument panel gauges and warning /indicator lights; reset maintenance indicator.	P-1
04.66	Verify windshield wiper and washer operation, replace wiper blades.	P-1
04.67	Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.	P-3
04.68	Service and repair product specific electrical/electronic systems.	
04.69	Perform product specific diagnostic procedures.	

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 identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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 Automotive Service Technology 2**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T600200
CIP Number	0647060414
Grade Level	30, 31
Standard Length	1600 hours
Teacher Certification	AUTO IND @7 %7 %G AUTO MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3023 – Automotive Service Technicians and Mechanics
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product 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 seven occupational completion points.

NOTE: It is recommended that students complete **OCP-A (Automotive Maintenance Technician) of Advanced Automotive Service Technology 1** and/or demonstrate mastery of the outcomes in **OCP-A (Automotive Maintenance Technician) of Advanced Automotive Service Technology 1** prior to enrolling in additional Advanced Automotive Service Technology courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automotive Maintenance Technician) of Advanced Automotive Service Technology 1, is at the discretion of the instructor.**

For institutions using this framework, the National Automotive Technicians Education Foundation (NATEF) highly recommends the Master Automotive Service Technology (MAST) program Certification/Accreditation. Florida Statute (F.S.) 1004.925 – Automotive service technology education programs; certification. – requires all automotive service technology education programs shall be industry certified in accordance with rules adopted by the State Board of Education.

Benchmarks identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

When offered at the postsecondary adult career and technical level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AER0118	Advanced Engine Repair Technician	200 hours	49-3023
B	AER0258	Advanced Automatic Transmission and Transaxle Technician	200 hours	49-3023
C	AER0275	Advanced Manual Drivetrain and Axle Technician	200 hours	49-3023
D	AER0459	Advanced Automotive Suspension and Steering Technician	200 hours	49-3023
E	AER0419	Advanced Automotive Brake System Technician	200 hours	49-3023
F	AER0173	Advanced Automotive Heating and Air Conditioning Technician	200 hours	49-3023
G	AER0506	Advanced Automotive Engine Performance Technician	400 hours	49-3023

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Advanced Automotive Service Technology program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Explain and apply proficiently engine theory, diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems
02.0 Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles.
03.0 Explain and apply proficiently the operation, assembly, diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive.
04.0 Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires.
05.0 Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems.
06.0 Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling.
07.0 Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems.

Florida Department of Education
Student Performance Standards

Program Title: **Advanced Automotive Technology 2**
PSAV Number: **I470604**

Course Number: AER0018
Occupational Completion Point: A
Advanced Engine Repair Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Engine Repair Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine theory and repair, cylinder heads, valve trains, engine blocks, lubrication, and cooling systems.

Abbreviations:
ER = Engine Repair

For every task in Advanced Engine Repair Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

ER Task List:	
P-1	**23**
P-2	**17**
P-3	**11**
Total	**51**

CTE Standards and Benchmarks		**Priority Number**
01.0	Explain and apply proficiently engine theory, diagnosis, service and repair of engines, cylinder heads, valve train, engine block, lubrication and cooling systems --The student will be able to:	
01.01	Service product specific engine systems.	
01.02	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	P-1
01.03	Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.	P-1
01.04	Verify operation of the instrument panel engine warning indicator.	P-1
01.05	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	P-1
01.06	Remove and replace timing belt; verify correct camshaft timing.	P-1
01.07	Remove and reinstall engine in an OBDII or newer vehicle; reconnect all attaching components and restore the vehicle to running condition.	P-3

CTE Standards and Benchmarks		Priority Number
01.08	Install engine covers using gaskets, seals and sealers as required.	P-1
01.09	Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.	P-1
01.10	Inspect, remove and replace engine mounts.	P-2
01.11	Identify hybrid vehicle internal combustion engine service precautions.	P-3
01.12	Diagnose engine noises and vibrations; determine necessary action.	
01.13	Diagnose the cause of excessive oil consumption, coolant consumption, unusual engine exhaust color and odor; determine necessary action.	
01.14	Perform engine vacuum tests; determine necessary action.	
01.15	Locate and interpret vehicle and major component identification numbers.	
01.16	Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.	P-1
01.17	Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.	P-1
01.18	Inspect valve springs for squareness and free height comparison; determine necessary action.	P-3
01.19	Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action.	P-3
01.20	Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action.	P-3
01.21	Inspect valves and valve seats; determine necessary action.	P-3
01.22	Check valve spring assembled height and valve stem height; determine necessary action.	P-3
01.23	Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action.	P-2
01.24	Inspect valve lifters; determine necessary action.	P-2
01.25	Adjust valves (mechanical or hydraulic lifters).	P-1
01.26	Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing.	P-1
01.27	Inspect and/or measure camshaft for run out, journal wear and lobe wear.	P-2
01.28	Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
01.29	Establish camshaft position sensor indexing.	P-1
01.30	Service product specific cam drive systems.	
01.31	Perform product specific valve adjustments.	

CTE Standards and Benchmarks		Priority Number
01.32	Perform cylinder power balance tests; determine necessary action.	
01.33	Perform cylinder cranking and running compression tests; determine necessary action.	
01.34	Perform cylinder leakage tests; determine necessary action.	
01.35	Remove, inspect, or replace crankshaft vibration damper (harmonic balancer).	P-2
01.36	Disassemble engine block; clean and prepare components for inspection and reassembly.	P-1
01.37	Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action.	P-2
01.38	Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action.	P-2
01.39	Deglaze and clean cylinder walls.	P-2
01.40	Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.	P-3
01.41	Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action.	P-1
01.42	Inspect main and connecting rod bearings for damage and wear; determine necessary action.	P-2
01.43	Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action.	P-3
01.44	Inspect and measure piston skirts and ring lands; determine necessary action.	P-2
01.45	Determine piston-to-bore clearance.	P-2
01.46	Inspect, measure, and install piston rings.	P-2
01.47	Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.	P-2
01.48	Assemble engine block.	P-1
01.49	Remove and replace piston pin.	
01.50	Perform oil pressure tests; determine necessary action.	P-1
01.51	Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.	P-2
01.52	Perform cooling system pressure and dye test to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and gallery plugs; determine necessary action.	P-1
01.53	Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	P-1
01.54	Remove, inspect, and replace thermostat and gasket/seal.	P-1

CTE Standards and Benchmarks		Priority Number
01.55	Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	P-1
01.56	Inspect, remove and replace water pump.	P-2
01.57	Remove and replace radiator.	P-2
01.58	Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.	P-1
01.59	Inspect auxiliary coolers; determine necessary action.	P-3
01.60	Inspect, test, and replace oil temperature and pressure switches and sensors.	P-2
01.61	Perform engine oil and filter change.	P-1
01.62	Identify causes of engine overheating.	P-1
01.63	Inspect and replace engine cooling and heater system hoses.	
01.64	Service product specific water pumps.	
01.65	Service product specific belt drive and tensioner systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0258
Occupational Completion Point: B
Advanced Automatic Transmission and Transaxle Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automatic Transmission and Transaxle Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study automatic transmission/transaxle diagnosis, service, and repair.

Abbreviations:
AT = Automatic Transmission/Transaxle

For every task in Advanced Automatic Transmission and Transaxle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

AT Task List:	
P-1 =	**15**
P-2 =	**20**
P-3 =	**4**
Total	**39**

CTE Standards and Benchmarks		**Priority Number**
02.0	Explain and apply proficiently the diagnosis, service, repair and overhaul of automatic transmissions/transaxles -- The student will be able to:	
02.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
02.02	Identify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action.	P-1
02.03	Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.	P-1
02.04	Locate and interpret vehicle and major component identification numbers.	
02.05	Diagnose fluid loss and condition concerns; determine necessary action.	P-1
02.06	Check fluid level in a transmission or a transaxle equipped with a dipstick.	P-1
02.07	Check fluid level in a transmission or a transaxle not equipped with a dipstick.	P-1
02.08	Perform pressure tests (including transmissions/transaxles equipped with electronic pressure control); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
02.09	Perform stall test; determine necessary action.	P-3
02.10	Perform lock-up converter system tests; determine necessary action.	P-3
02.11	Diagnose noise and vibration concerns; determine necessary action.	P-2
02.12	Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.	P-1
02.13	Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law).	P-2
02.14	Diagnose electronic transmission/transaxle control systems using appropriate test equipment and service information.	P-1
02.15	Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.	P-2
02.16	Inspect for leakage; replace external seals, gaskets, and bushings.	P-2
02.17	Inspect, test, adjust, repair, or replace electrical/electronic components and circuits, including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses.	P-1
02.18	Inspect, replace, and align powertrain mounts.	P-2
02.19	Drain and replace fluids and filter(s).	P-1
02.20	Diagnose electronic transmission control systems using a scan tool; determine necessary action.	
02.21	Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces.	P-1
02.22	Disassemble, clean, and inspect transmission/transaxle.	P-2
02.23	Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, sleeves, retainers, brackets, check valves/balls, screens, spacers, and gaskets).	P-2
02.24	Inspect servo and accumulator bores, pistons, seals, pins, springs, and retainers; determine necessary action.	P-2
02.25	Assemble transmission/transaxle.	P-2
02.26	Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings.	P-1
02.27	Inspect converter flex (drive) plate, converter attaching bolts, converter pilot, converter pump drive surfaces, converter end play, and crankshaft pilot bore.	P-2
02.28	Inspect, measure, and reseal oil pump assembly and components.	P-2
02.29	Measure transmission/transaxle end play or preload; determine necessary action.	P-1
02.30	Inspect, measure, and replace thrust washers and bearings.	P-2
02.31	Inspect oil delivery circuits, including seal rings, ring grooves, and sealing surface areas, feed pipes, orifices, and check valves/balls.	P-2
02.32	Inspect bushings; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
02.33	Inspect and measure planetary gear assembly components; determine necessary action.	P-2
02.34	Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action.	P-2
02.35	Diagnose and inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action.	P-2
02.36	Inspect, measure, repair, adjust or replace transaxle final drive components.	P-2
02.37	Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates; determine necessary action.	P-2
02.38	Measure clutch pack clearance; determine necessary action.	P-1
02.39	Air test operation of clutch and servo assemblies.	P-1
02.40	Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, and retainers; determine necessary action.	P-2
02.41	Describe the operational characteristics of a continuously variable transmission (CVT).	P-3
02.42	Describe the operational characteristics of a hybrid vehicle drive train.	P-3
02.43	Install and seat torque converter to engage drive/splines.	
02.44	Inspect bands and drums; determine necessary action.	

Florida Department of Education
Student Performance Standards

Course Number: AER0275
Occupational Completion Point: C
Advanced Manual Drivetrain and Axle Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Manual Drivetrain and Axle Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study manual drivetrain, clutch, transmission/transaxle, drive and half-shaft universals, constant velocity joints, rear axle differential, limited slip, four-wheel drive, all-wheel drive operation, assembly, diagnosis, service and repair.

Abbreviations:
MD = Manual Drivetrain and Axles

For every task in Advanced Manual Drivetrain and Axle Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

MD Task List:	
P-1	**17**
P-2	**12**
P-3	**20**
Total	**49**

CTE Standards and Benchmarks		Priority Number
03.0	Explain and apply proficiently the operation, assembly, diagnosis, service and repair of manual drivetrains, clutches, transmissions/transaxles, drive and half-shaft universals, constant velocity joints, rear axle differential assembly, limited slip, four-wheel drive and all-wheel drive--The student will be able to:	
03.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
03.02	Identify and interpret drive train concern; determine necessary action.	P-1
03.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
03.04	Check fluid condition; check for leaks; determine necessary action.	P-1
03.05	Locate and interpret vehicle and major component identification numbers.	
03.06	Diagnose fluid loss, level, and condition concerns; determine necessary action.	
03.07	Drain and refill manual transmission/transaxle and final drive unit.	P-1
03.08	Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
03.09	Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action.	P-1
03.10	Inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action.	
03.11	Check and adjust clutch master cylinder fluid level; check for leaks.	P-1
03.12	Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable).	P-1
03.13	Bleed clutch hydraulic system.	P-1
03.14	Inspect flywheel and ring gear for wear and cracks; determine necessary action.	P-1
03.15	Inspect engine block, core plugs, rear main engine oil seal, clutch (bell) housing, transmission/transaxle case mating surfaces, and alignment dowels; determine necessary action.	
03.16	Measure flywheel run out and crankshaft end play; determine necessary action.	P-2
03.17	Remove and reinstall transmission/transaxle.	
03.18	Disassemble, inspect, clean, and reassemble internal transmission/transaxle components.	P-3
03.19	Inspect transmission/transaxle case, extension housing, case mating surfaces, bores, bushings, and vents; perform necessary action.	
03.20	Diagnose noise concerns through the application of transmission/transaxle powerflow principles.	P-2
03.21	Diagnose hard shifting and jumping out of gear concerns; determine necessary action.	P-2
03.22	Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers.	P-2
03.23	Inspect, replace, and align powertrain mounts.	
03.24	Inspect and replace gaskets, seals, and sealants; inspect sealing surfaces.	
03.25	Remove and replace transaxle final drive.	
03.26	Inspect, adjust, and reinstall shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.	
03.27	Measure end play or preload (shim or spacer selection procedure) on transmission/transaxle shafts; perform necessary action.	
03.28	Inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings.	
03.29	Diagnose transaxle final drive assembly noise and vibration concerns; determine necessary action.	P-3
03.30	Remove, inspect, measure, adjust, and reinstall transaxle final drive pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.	
03.31	Inspect lubrication devices (oil pump or slingers); perform necessary action.	
03.32	Inspect, test, and replace transmission/transaxle sensors and switches.	
03.33	Describe the operational characteristics of an electronically controlled manual transmission/transaxle.	P-3

CTE Standards and Benchmarks		Priority Number
03.34	Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action.	P-1
03.35	Diagnose universal joint noise and vibration concerns; perform necessary action.	P-2
03.36	Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.	P-1
03.37	Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.	P-1
03.38	Inspect, service, and replace shaft center support bearings.	
03.39	Check shaft balance and phasing; measure shaft run out; measure and adjust driveline angles.	P-2
03.40	Diagnose noise and vibration concerns; determine necessary action.	
03.41	Inspect and replace companion flange and pinion seal; measure companion flange run out.	P-2
03.42	Inspect ring gear and measure run out; determine necessary action.	P-3
03.43	Remove, inspect, and reinstall drive pinion and ring gear, spacers, sleeves, and bearings.	P-3
03.44	Measure and adjust drive pinion depth.	P-3
03.45	Measure and adjust drive pinion bearing preload.	P-3
03.46	Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup or shim types).	P-3
03.47	Check ring and pinion tooth contact patterns; perform necessary action.	P-3
03.48	Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.	P-3
03.49	Reassemble and reinstall differential case assembly; measure run out; determine necessary action.	P-3
03.50	Diagnose noise, slippage, and chatter concerns; determine necessary action.	P-3
03.51	Clean and inspect differential housing; check for leaks; inspect housing vent.	P-2
03.52	Check and adjust differential housing fluid level.	P-1
03.53	Drain and refill differential housing.	P-1
03.54	Inspect and reinstall limited slip differential components.	
03.55	Measure rotating torque; determine necessary action.	P-3
03.56	Diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leakage concerns; determine necessary action.	P-2
03.57	Inspect and replace drive axle wheel studs.	P-1
03.58	Remove and replace drive axle shafts.	P-1
03.59	Inspect and replace drive axle shaft seals, bearings, and retainers.	P-2

CTE Standards and Benchmarks		Priority Number
03.60	Measure drive axle flange run out and shaft end play; determine necessary action.	P-2
03.61	Diagnose noise and vibration concerns; determine necessary action.	P-2
03.62	Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.	P-3
03.63	Remove and reinstall transfer case.	
03.64	Disassemble, service, and reassemble transfer case and components.	P-3
03.65	Inspect front-wheel bearings and locking hubs; perform necessary action(s).	P-3
03.66	Check for leaks at drive assembly seals; check vents; check lube level.	P-3
03.67	Diagnose, test, adjust, and replace electrical/electronic components of four-wheel drive systems.	P-3
03.68	Diagnose noise, vibration, and unusual steering concerns; determine necessary action.	P-3
03.69	Identify concerns related to variations in tire circumference and/or final drive ratios.	P-3

Florida Department of Education
Student Performance Standards

Course Number: AER0459
Occupational Completion Point: D
Advanced Automotive Suspension and Steering Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Suspension and Steering Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study front and rear suspension systems, wheel alignment, wheels and tire, diagnosis, service, and repair.

Abbreviations:
SS = Suspension and Steering

For every task in Advanced Automotive Suspension and Steering Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

SS Task List:	
	P-1 = 23
	P-2 = 22
	P-3 = 12
Total	**57**

CTE Standards and Benchmarks		**Priority Number**
04.0	Explain and apply proficiently the diagnosis, service and repair of front and rear suspensions systems, wheel alignment, and wheels and tires --The student will be able to:	
04.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
04.02	Identify and interpret suspension and steering system concerns; determine necessary action.	P-1
04.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
04.04	Locate and interpret vehicle and major component identification numbers.	
04.05	Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
04.06	Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	P-1
04.07	Inspect, remove, and install upper and lower control arms, bushings, shafts, and rebound and jounce bumpers.	P-3
04.08	Inspect, remove and install strut rods and bushings.	P-3

CTE Standards and Benchmarks		Priority Number
04.09	Inspect, remove and install upper and/or lower ball joints (with or without wear indicators).	P-2
04.10	Inspect, remove and install steering knuckle assemblies.	P-3
04.11	Inspect, remove and install short and long arm suspension system coil springs and spring insulators.	P-3
04.12	Inspect, remove and install torsion bars and mounts.	P-3
04.13	Inspect, remove and install front stabilizer bar (sway bar) bushings, brackets, and links.	P-3
04.14	Inspect, remove and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	P-3
04.15	Inspect, remove and install track bar, strut rods/radius arms and related mounts and bushings.	P-3
04.16	Inspect rear suspension system leaf spring(s), bushings, center pins/bolts and mounts.	P-1
04.17	Inspect, remove, and replace shock absorbers; inspect mounts and bushings.	P-1
04.18	Remove, inspect, and service or replace front and rear wheel bearings.	P-1
04.19	Describe the function of the power steering pressure switch.	P-3
04.20	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concern; determine necessary action.	P-1
04.21	Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	P-1
04.22	Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber and toe as required; center steering wheel.	P-1
04.23	Check toe-out-on-turns (turning radius); determine necessary action.	P-2
04.24	Check SAI (steering axis inclination) and included angle; determine necessary action.	P-2
04.25	Check rear wheel thrust angle; determine necessary action.	P-1
04.26	Check for front wheel setback; determine necessary action.	P-2
04.27	Check front and/or rear cradle (sub-frame) alignment; determine necessary action.	P-3
04.28	Reset steering angle sensor.	P-2
04.29	Disable and enable supplemental restraint system (SRS).	P-1
04.30	Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).	P-1
04.31	Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action.	P-2
04.32	Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine necessary action.	P-2
04.33	Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; perform necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
04.34	Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.	P-2
04.35	Adjust non-rack and pinion worm bearing preload and sector lash.	
04.36	Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets.	P-2
04.37	Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed.	P-2
04.38	Determine proper power steering fluid type; inspect fluid level and condition.	P-1
04.39	Flush, fill, and bleed power steering system.	P-2
04.40	Inspect for power steering fluid leakage; determine necessary action.	P-1
04.41	Remove, inspect, replace, and adjust power steering pump drive belt.	P-1
04.42	Remove and reinstall power steering pump.	P-2
04.43	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	P-2
04.44	Inspect and replace power steering hoses and fittings.	P-2
04.45	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	P-2
04.46	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	P-1
04.47	Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action.	P-3
04.48	Inspect electric power-assisted steering.	P-3
04.49	Identify hybrid vehicle power steering system electrical circuits and safety precautions.	P-2
04.50	Inspect tire condition; identify tire wear patterns; check of correct tire size and application (load and speed rating) and adjust air pressure; determine necessary action.	P-1
04.51	Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	P-2
04.52	Rotate tires according to manufacturer’s recommendations.	P-1
04.53	Measure wheel, tire, axle flange, and hub run out; determine necessary action.	P-2
04.54	Diagnose tire pull problems; determine necessary action.	P-2
04.55	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).	P-1
04.56	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	P-2
04.57	Reinstall wheel; torque lug nuts.	
04.58	Inspect tire and wheel assembly for air loss; perform necessary action.	P-1
04.59	Repair tire using internal patch.	P-1

CTE Standards and Benchmarks		Priority Number
04.60	Identify and test pressure monitor system (indirect and direct) for operation; calibrate system; verify operation of instrument panel lambs.	P-2
04.61	Demonstrate knowledge of steps required to remove and replace sensor in a tire pressure monitoring system.	P-1
04.62	Service product specific suspension systems.	
04.63	Service product specific ride height control systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0419
Occupational Completion Point: E
Advanced Automotive Brake System Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Brake System Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study drum/disc brakes, hydraulics, power assist units, electronic brakes, traction control, stability control, and miscellaneous diagnostics, service, and repair.

Abbreviations:
BR = Brakes

For every task in Advanced Automotive Brake System Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

BR Task List:
P-1 = 34
P-2 = 12
P-3 = 11
Total 57

CTE Standards and Benchmarks		Priority Number
05.0	Explain and apply proficiently the diagnosis, service and repair of drum\disc brake, hydraulics, power assist units, electronic brakes, traction control, stability control systems and miscellaneous (wheel bearings, parking brake, electrical, etc.) systems--The student will be able to:	
05.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
05.02	Identify and interpret brake system concern; determine necessary action.	P-1
05.03	Describe procedures for performing a road test to check brake system operation; including an antilock brake system (ABS).	P-1
05.04	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
05.05	Install wheel and torque lug nuts.	P-1
05.06	Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).	
05.07	Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).	P-1
05.08	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
05.09	Check master cylinder for internal/external leaks and proper operation; determine necessary action.	P-1
05.10	Remove, bench bleed, and reinstall master cylinder.	P-1
05.11	Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.	P-3
05.12	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; check for loose fittings and supports; determine necessary action.	P-1
05.13	Replace brake lines, hoses, fittings, and supports.	P-2
05.14	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	P-2
05.15	Select, handle, store, and fill brake fluids to proper level.	P-1
05.16	Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.	
05.17	Inspect, test, and/or replace components of brake warning light system.	P-3
05.18	Identify components of brake warning light system.	P-2
05.19	Bleed and/or flush brake system.	P-1
05.20	Test brake fluid for contamination.	P-1
05.21	Diagnose poor drum brake stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	P-1
05.22	Remove, clean, inspect, and measure brake drums; determine necessary action.	P-1
05.23	Refinish brake drum and measure final drum diameter; compare with specifications.	P-1
05.24	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	P-1
05.25	Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.	P-2
05.26	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments.	P-2
05.27	Install wheel, torque lug nuts, and make final checks and adjustments associated with drum brakes.	
05.28	Diagnose poor disk brake stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.	P-1
05.29	Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.	P-1
05.30	Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.	P-1
05.31	Remove, inspect, and replace pads and retaining hardware; determine necessary action.	P-1
05.32	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.	

CTE Standards and Benchmarks		Priority Number
05.33	Lubricate and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	P-1
05.34	Clean and inspect rotor; measure rotor thickness, thickness variation, and lateral run out; determine necessary action.	P-1
05.35	Remove and reinstall rotor.	P-1
05.36	Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.	P-1
05.37	Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.	P-1
05.38	Retract and re-adjust caliper piston on an integrated parking brake system.	P-3
05.39	Install wheel, torque lug nuts, and make final checks and adjustments associated with disc brakes.	
05.40	Check brake pad wear indicator; determine necessary action.	P-2
05.41	Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations.	P-1
05.42	Check brake pedal travel with, and without engine running to verify proper power booster operation.	P-2
05.43	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.	P-1
05.44	Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action.	P-1
05.45	Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action.	P-3
05.46	Measure and adjust master cylinder pushrod length.	P-3
05.47	Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.	P-3
05.48	Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings.	P-1
05.49	Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	P-2
05.50	Check parking brake operation and parking brake indicator light system; determine necessary action.	P-1
05.51	Check operation of brake stop light system.	P-1
05.52	Replace wheel bearing and race.	P-2
05.53	Inspect and replace wheel studs.	P-1
05.54	Remove and reinstall sealed wheel bearing assembly.	P-2
05.55	Identify and inspect electronic brake control system components; determine necessary action.	P-1
05.56	Identify traction control/vehicle stability control system components.	P-3
05.57	Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system ; determine necessary action.	P-2
05.58	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
05.59	Depressurize high-pressure components of the electronic brake control system.	P-3
05.60	Bleed the electronic brake control system hydraulic circuits.	P-1
05.61	Remove and install electronic brake control system electrical/electronic and hydraulic components.	
05.62	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).	P-3
05.63	Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).	P-3
05.64	Describe the operation of a regenerative braking system.	P-3
05.65	Service product specific anti-lock brake systems	
05.66	Service product specific traction control systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0173
Occupational Completion Point: F
Advanced Automotive Heating and Air Conditioning Technician – 200 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Heating and Air Conditioning Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, recycling and handling, diagnostics, service, and repair.

Abbreviations:
HA = Heating and Air Conditioning

For every task in Advanced Automotive Heating and Air Conditioning Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

HA Task List:	
P-1 =	**17**
P-2 =	**17**
P-3 =	**4**
Total	**38**

CTE Standards and Benchmarks		**Priority Number**
06.0	Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems, refrigerant recovery, and recycling and handling--The student will be able to:	
06.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
06.02	Identify and interpret heating and air conditioning problems; determine necessary action.	P-1
06.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
06.04	Locate and interpret vehicle and major component identification numbers.	
06.05	Performance test A/C system; identify problems.	P-1
06.06	Identify abnormal operating noises in the A/C system; determine necessary action.	P-2
06.07	Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.	P-1
06.08	Leak test A/C system; determine necessary action.	P-1

CTE Standards and Benchmarks		Priority Number
06.09	Inspect the condition of refrigerant oil removed from A/C system; determine necessary action.	P-2
06.10	Determine recommended oil and oil capacity for system application.	P-1
06.11	Using a scan tool, observe and record related HVAC data and trouble codes.	P-3
06.12	Diagnose A/C system conditions that cause the protection devices (pressure, thermal, and PCM) to interrupt system operation; determine necessary action.	P-2
06.13	Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.	P-1
06.14	Inspect, test, service or replace A/C compressor clutch components and/or assembly; check compressor clutch air gap; adjust as needed.	P-2
06.15	Remove, inspect, and reinstall A/C compressor and mountings; determine recommended oil quantity.	P-2
06.16	Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.	P-2
06.17	Determine the need for an additional A/C system filter; perform necessary action.	P-3
06.18	Remove and inspect A/C system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action.	P-2
06.19	Inspect A/C condenser for airflow restrictions; perform necessary action.	P-1
06.20	Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine required oil quantity.	P-2
06.21	Remove, inspect, and install expansion valve or orifice (expansion) tube.	P-1
06.22	Inspect evaporator housing water drain; perform necessary action.	P-1
06.23	Determine procedure to remove and reinstall evaporator; determine required oil quantity.	P-2
06.24	Remove, inspect, and reinstall condenser; determine required oil quantity.	P-2
06.25	Diagnose temperature control problems in the heater/ventilation system; (determine PCM) to interpret system operation; determine necessary action.	P-2
06.26	Perform cooling system pressure tests; check coolant condition, inspect and test radiator, cap (pressure/vacuum), coolant recovery tank, and hoses; perform necessary action.	
06.27	Inspect engine cooling and heater system hoses; perform necessary action.	P-1
06.28	Determine procedure to remove, inspect, and reinstall heater core.	P-2
06.29	Inspect, test, and replace thermostat and gasket/seal.	
06.30	Determine coolant condition and coolant type for vehicle application; drain and recover coolant.	
06.31	Flush system; refill system with recommended coolant; bleed system.	
06.32	Inspect and test cooling fan, fan clutch, fan shroud, and air dams; perform necessary action.	
06.33	Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.	

CTE Standards and Benchmarks		Priority Number
06.34	Inspect and test heater control valve(s); perform necessary action.	P-2
06.35	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; perform necessary action.	P-1
06.36	Diagnose A/C compressor clutch control systems; determine necessary action.	P-2
06.37	Diagnose malfunctions in the vacuum, mechanical, and electrical components and controls of the heating, ventilation, and A/C (HVAC) system; determine necessary action.	P-2
06.38	Inspect and test A/C-heater control panel assembly; determine necessary action.	P-3
06.39	Inspect and test A/C-heater control cables, motors, and linkages; perform necessary action.	P-3
06.40	Inspect A/C-heater ducts, doors, hoses, cabin filters and outlets; perform necessary action.	P-1
06.41	Identify the source of A/C system odors.	P-2
06.42	Check operation of automatic or semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine necessary action.	P-2
06.43	Perform correct use and maintenance of refrigerant handling equipment according to equipment manufacturer’s standards.	P-1
06.44	Identify and recover A/C system refrigerant.	P-1
06.45	Recycle, label, and store refrigerant.	P-1
06.46	Evacuate and charge A/C system; add refrigerant oil as required.	P-1
06.47	Service product specific climate control systems.	

Florida Department of Education
Student Performance Standards

Course Number: AER0506
Occupational Completion Point: G
Advanced Automotive Engine Performance Technician – 400 Hours – SOC Code 49-3023

Course Description:
The Advanced Automotive Engine Performance Technician course prepares students for entry into the Automotive Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engines, ignition, fuel, air induction, exhaust, computer, engine and emission control systems diagnostics, service, and repair.

Abbreviations:
EP = Engine Performance

For every task in Advanced Automotive Engine Performance Technician course, the following safety requirement MUST be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

EP Task List:
P-1 = 21
P-2 = 17
P-3 = 9
Total 47

CTE Standards and Benchmarks			Priority Number
07.0		Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer engine and emission control systems --The student will be able to:	
	07.01	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
	07.02	Identify and interpret engine performance concern; determine necessary action.	P-1
	07.03	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	P-1
	07.04	Locate and interpret vehicle and major component identification numbers.	
	07.05	Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.	
	07.06	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	P-3
	07.07	Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action.	P-2
	07.08	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	P-1
	07.09	Perform cylinder power balance test; determine necessary action.	P-2

CTE Standards and Benchmarks		Priority Number
07.10	Perform cylinder cranking and running compression tests; determine necessary action.	P-1
07.11	Perform cylinder leakage test; determine necessary action.	P-1
07.12	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	P-2
07.13	Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.	
07.14	Verify engine operating temperature; determine necessary action.	P-1
07.15	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	
07.16	Verify correct camshaft timing.	P-1
07.17	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	P-1
07.18	Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	P-1
07.19	Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action.	P-1
07.20	Check for module communication (including CAN/BUS systems) errors using a scan tool.	
07.21	Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.	P-2
07.22	Access and use service information to perform step-by-step (troubleshooting) diagnosis.	P-1
07.23	Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, or similar systems); determine necessary action.	P-3
07.24	Perform active tests of actuators using a scan tool; determine necessary action.	P-2
07.25	Describe the importance of running all OBDII monitors for repair verification.	P-1
07.26	Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action.	P-2
07.27	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	
07.28	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	P-1
07.29	Remove and replace spark plugs; inspect secondary ignition components for wear and damage.	P-1
07.30	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	P-3

CTE Standards and Benchmarks		Priority Number
07.31	Diagnose (troubleshoot) hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	P-2
07.32	Check fuel for contaminants; determine necessary action.	P-2
07.33	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	P-1
07.34	Replace fuel filters.	P-1
07.35	Inspect, service or replace air filters, filter housing and intake duct work.	P-1
07.36	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	P-2
07.37	Inspect and test fuel injectors.	P-2
07.38	Verify idle control operation.	P-1
07.39	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; perform necessary action.	P-1
07.40	Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed.	P-1
07.41	Perform exhaust system back-pressure test; determine necessary action.	P-2
07.42	Check and refill diesel exhaust fluid (DEF).	P-3
07.43	Test the operation of turbocharger/supercharger systems; determine necessary action.	P-3
07.44	Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action.	P-3
07.45	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	P-2
07.46	Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action.	P-3
07.47	Diagnose emissions and driveability concerns caused by the secondary injection and catalytic converter systems; determine necessary action.	P-2
07.48	Inspect, test, service and replace components of the EGR system, including tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	P-2
07.49	Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action.	P-2
07.50	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	
07.51	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	P-3
07.52	Inspect and test catalytic converter efficiency.	P-2

CTE Standards and Benchmarks		Priority Number
07.53	Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action.	P-2
07.54	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	P-1
07.55	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	P-3
07.56	Adjust valves on engines with mechanical or hydraulic lifters.	
07.57	Remove and replace timing belt; verify correct camshaft timing.	
07.58	Remove and replace thermostat and gasket/seal.	
07.59	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	
07.60	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	
07.61	Perform engine oil and filter change.	
07.62	Identify hybrid vehicle internal combustion engine service precautions.	
07.63	Demonstrate proficiency in use of computer-based information systems.	
07.64	Perform product specific OBD II drive cycle diagnostic tests.	
07.65	Service product specific ignition systems.	
07.66	Inspect and test distributor; service as needed.	
07.67	Perform exhaust system back-pressure test; determine needed action.	
07.68	Service product specific fuel injection systems.	

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 identified with a designation of P-1, P-2, or P-3 are NATEF tasks. NATEF requires that a minimum of 95% of P-1 tasks, 80% of P-2 tasks, and 50% of P-3 tasks are to be accomplished.

The standard length of this program is 2400 hours. **Advanced Automotive Service Technology 1** is a core program. It is recommended students complete **Advanced Automotive Service Technology 1,** or demonstrate mastery of the outcomes in that program, prior to enrollment in **Advanced Automotive Service Technology 2.**

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Avionics 1**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Avionics Systems Technician (T400310).

PSAV – Career Preparatory	
Program Number	T640100
CIP Number	0647060900
Grade Level	30, 31
Standard Length	1400 hours
Teacher Certification	AVIONICS @7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2091 – Avionics Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to, troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

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 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 **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	EEV0010	Electronics Assembler	250 hours	49-2091
B	EEV0100	Electronics Tester	400 hours	49-2091
C	EEV0616	Electronics Technician	375 hours	49-2091
D	EEV0500	Electronics Equipment Repairer	375 hours	49-2091

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Avionics program can be found using the following links:

www.faa.gov/
www.eta-i.org/

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate proficiency in soldering and basic laboratory practices.
02.0 Demonstrate proficiency in basic DC circuits.
03.0 Demonstrate proficiency in advanced DC circuits.
04.0 Demonstrate proficiency in AC circuits.
05.0 Demonstrate proficiency in solid state devices.
06.0 Demonstrate skills in technical recording utilizing industry recognized computer application software.
07.0 Demonstrate proficiency in analog circuits.
08.0 Demonstrate proficiency in digital circuits.
09.0 Demonstrate proficiency in fundamental micro-processors.

Florida Department of Education
Student Performance Standards

Program Title: **Avionics 1**
PSAV Number: **T640100**

Course Number: EEV0010
Occupational Completion Point: A
Electronics Assembler – 250 Hours – SOC Code 49-2091

Course Description:
The Electronics Assembler course prepares students for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study basic laboratory practices, and direct current (DC) circuitry.

CTE Standards and Benchmarks	
01.0	Demonstrate proficiency in soldering basic laboratory practices--The student will be able to:
01.01	Apply proper Occupational Safety Health Administration (OSHA) safety standards.
01.02	Make electrical connections.
01.03	Identify and use hand tools properly.
01.04	Identify and use power tools properly.
01.05	Apply recognized industry accepted standard soldering techniques.
01.06	Apply recognized industry accepted standard desoldering techniques.
01.07	Apply recognized industry accepted standard electrostatic discharge (ESD) safety procedures.
01.08	Design and/or construct printed circuit boards (PCB's) to industry accepted standards.
01.09	Explain the theoretical concepts of industry accepted soldering techniques.
01.10	Apply recognized industry accepted standard techniques for rework and repair.
02.0	Demonstrate proficiency in basic DC circuits--The student will be able to:
02.01	Demonstrate proficiency in basic DC circuits.
02.02	Solve problems in electronic units utilizing metric prefixes.
02.03	Identify sources of electricity.
02.04	Define voltage, current, resistance, power and energy.
02.05	Apply Ohm's law and power formulas.

CTE Standards and Benchmarks	
02.06	Read and interpret color codes and symbols to identify electrical components and values.
02.07	Measure properties of a circuit using a digital multi-meter (DMM).
02.08	Compute conductance and compute and measure resistance of conductors and insulators.
02.09	Apply Ohm's law to series circuits.
02.10	Construct and verify operation of series circuits.
02.11	Analyze and troubleshoot series circuits.
02.12	Apply Ohm's law to parallel circuits.
02.13	Construct and verify the operation of parallel circuits.
02.14	Analyze and troubleshoot parallel circuits.

Florida Department of Education
Student Performance Standards

Course Number: EEV0100
Occupational Completion Point: B
Electronics Tester – 400 Hours – SOC Code 49-2091

Course Description:
The Electronics Tester course is designed to build on the skills and knowledge students learned in the Electronics Assembler course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study advanced direct current (DC) circuitry, alternating current (AC) circuitry, and solid state circuitry.

CTE Standards and Benchmarks	
03.0	Demonstrate proficiency in advanced DC circuits--The student will be able to:
03.01	Solve algebraic problems to include exponentials to DC.
03.02	Describe the relationship of DC electricity to the nature of matter.
03.03	Apply Ohm's law to series-parallel and parallel-series circuits.
03.04	Construct and verify the operation of series-parallel and parallel-series and bridge circuits.
03.05	Troubleshoot series-parallel and parallel-series and bridge circuits.
03.06	Identify and define voltage divider circuits (loaded and unloaded).
03.07	Construct and verify the operation of voltage divider circuits (loaded and unloaded).
03.08	Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
03.09	Apply maximum power transfer theorem.
03.10	Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
03.11	Describe magnetic properties of circuits and devices.
03.12	Determine the physical and electrical characteristics of capacitors and inductors.
03.13	Define resistor-capacitor (R-C) and resistor-inductor (R-L) time constants and classify the output of differentiators and integrators.
03.14	Set up and operate power supplies for DC circuits.
03.15	Explain the theory of DC motor operation.
03.16	Identify the practical applications for the use of a DC motor.
04.0	Demonstrate proficiency in AC circuits--The student will be able to:

CTE Standards and Benchmarks	
04.01	Solve basic trigonometric problem as applicable to electronics.
04.02	Define the characteristics of AC capacitive circuits.
04.03	Construct and verify the operation of AC capacitive circuits.
04.04	Analyze and troubleshoot AC capacitive circuits.
04.05	Define the characteristics of AC inductive circuits.
04.06	Construct and verify the operation of AC inductive circuits.
04.07	Analyze and troubleshoot AC inductive circuits.
04.08	Define and apply the principles of transformers to AC circuits.
04.09	Construct and verify the operation of AC circuits utilizing transformers.
04.10	Analyze and troubleshoot AC circuits utilizing transformers.
04.11	Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
04.12	Analyze and troubleshoot differentiator and integrator circuits.
04.13	Define the characteristics of Resistive, Inductive, and Capacitive (RLC) circuits (series, parallel and complex).
04.14	Construct and verify the operation of series and parallel resonant circuits.
04.15	Define the characteristics of series and parallel resonant circuits.
04.16	Construct and verify the operation of series and parallel resonant circuits.
04.17	Analyze and troubleshoot R-C, R-L, and RLC circuits.
04.18	Define the characteristics of frequency selective filter circuits.
04.19	Construct and verify the operation of frequency selective filter circuits.
04.20	Analyze and troubleshoot frequency selective filter circuits.
04.21	Define the characteristics of polyphase circuits.
04.22	Define basic motor theory and operation.
04.23	Define basic generator theory and operation.
04.24	Set up and operate power supplies for AC circuits.
04.25	Set up and operate oscilloscopes for AC circuits.
04.26	Set up and operate function generators for AC circuits.
04.27	Analyze and measure power in AC circuits.

CTE Standards and Benchmarks	
	04.28 Set up and operate capacitor and inductor analyzers for AC circuits.
	04.29 Explain the theory of AC motor operation.
	04.30 Identify the practical applications for the use of an AC motor.
05.0	Demonstrate proficiency in solid state devices--The student will be able to:
	05.01 Identify and define properties of semiconductor materials.
	05.02 Identify and define operating characteristics and applications of junction diodes.
	05.03 Identify and define operating characteristics and applications of special diodes, ex. Zener diodes.
	05.04 Construct diode circuits.
	05.05 Analyze and troubleshoot diode circuits.
	05.06 Identify and define operating characteristics and applications of bipolar transistors,
	05.07 Identify and define operating characteristics and applications of field effect transistors.
	05.08 Identify and define operating characteristics and applications of single-stage amplifiers.
	05.09 Construct single-stage amplifiers.
	05.10 Analyze and troubleshoot single-stage amplifiers.
	05.11 Construct thyristor circuitry.
	05.12 Analyze and troubleshoot thyristor circuitry.
	05.13 Set up and operate power supplies for solid-state devices.
	05.14 Set up and operate oscilloscopes for solid-state devices.
	05.15 Set up and operate function generators for solid-state devices.
	05.16 Set up and operate capacitor and inductor analyzers for solid-state devices.
	05.17 Set up and operate curve tracers.
	05.18 Set up and operate transistor testers.

Florida Department of Education
Student Performance Standards

Course Number: EEV0616
Occupational Completion Point: C
Electronics Technician – 375 Hours – SOC Code 49-2091

Course Description:
The Electronics Technician course is designed to build on the skills and knowledge students learned in the Electronics Tester course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study analog circuitry, and technical writing.

CTE Standards and Benchmarks	
06.0	Demonstrate skills in technical recording utilizing industry recognized computer application software--The student will be able to:
06.01	Draw and interpret electronic schematics.
06.02	Record data and design curves and graphs.
06.03	Write reports and make oral presentations.
06.04	Maintain test logs.
06.05	Make equipment failure reports.
06.06	Specify and requisition simple electronic components.
06.07	Compose technical letters and memoranda.
06.08	Write formal reports of laboratory experiences.
06.09	Draft preventive maintenance and calibration procedures.
07.0	Demonstrate proficiency in analog circuits--The student will be able to:
07.01	Identify and define operational characteristics and applications of multistage amplifiers.
07.02	Construct multistage amplifiers.
07.03	Analyze and troubleshoot multistage amplifiers.
07.04	Identify and define operating characteristics and applications of linear integrated circuits.
07.05	Identify and define operating characteristics and applications of basic power supplies and filters.
07.06	Construct basic power supplies and filters.
07.07	Identify and define operating characteristics and applications of differential and operational amplifiers.

CTE Standards and Benchmarks	
07.08	Construct differential and operational amplifier circuits.
07.09	Analyze and troubleshoot differential and operational amplifier circuits.
07.10	Identify and define operating characteristics of audio power amplifiers.
07.11	Construct audio power amplifiers.
07.12	Analyze and troubleshoot audio power amplifiers.
07.13	Identify and define operating characteristics and applications of power supply regulator circuits.
07.14	Construct power supply regulator circuits.
07.15	Analyze and troubleshoot power supply regulator circuits.
07.16	Identify and define operating characteristics and applications of active filters.
07.17	Construct active filter circuits.
07.18	Analyze and troubleshoot active filter circuits.
07.19	Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
07.20	Construct oscillator circuits.
07.21	Analyze and troubleshoot oscillator circuits.
07.22	Identify and define operating characteristics and applications of Liquid Crystal Display (LCD), Light Emitting Diode (LED), and Three Dimensional (3D) technologies.
07.23	Identify and define operating characteristics and applications of optoelectronic devices.
07.24	Set up and operate measuring instruments for analog circuits.

Florida Department of Education
Student Performance Standards

Course Number: EEV0500
Occupational Completion Point: D
Electronics Equipment Repairer – 375 Hours – SOC Code 49-2091

Course Description:
The Electronics Equipment Repairer course is designed to build on the skills and knowledge students learned in the Electronics Technician course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study digital circuitry, and micro-processors.

CTE Standards and Benchmarks	
08.0	Demonstrate proficiency in digital circuits--The student will be able to:
08.01	Define and apply numbering systems to codes and arithmetic operations.
08.02	Analyze and minimize logic circuits using Boolean operations.
08.03	Set up and operate logic probes for digital circuits.
08.04	Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
08.05	Set up and operate pulsers for digital circuits.
08.06	Set up and operate oscilloscopes for digital circuits.
08.07	Set up and operate logic analyzers for digital circuits.
08.08	Set up and operate pulse generators for digital circuits.
08.09	Identify types of logic gates and their truth tables.
08.10	Construct combinational logic circuits using integrated circuits.
08.11	Troubleshoot logic circuits.
08.12	Analyze types of flip-flops and their truth tables.
08.13	Construct flip-flops using integrated circuits.
08.14	Troubleshoot flip-flops.
08.15	Identify, define and measure characteristics of integrated circuit (IC) logic families.
08.16	Identify types of registers and counters.
08.17	Construct registers and counters using flip-flops and logic gates.

CTE Standards and Benchmarks	
08.18	Troubleshoot registers and counters.
08.19	Analyze clock and timing circuits.
08.20	Construct clock and timing circuits.
08.21	Troubleshoot clock and timing circuits.
08.22	Identify types of arithmetic-logic circuits.
08.23	Construct arithmetic-logic circuits.
08.24	Troubleshoot arithmetic-logic circuits.
08.25	Identify types of encoding and decoding devices.
08.26	Construct encoders and decoders.
08.27	Troubleshoot encoders and decoders.
08.28	Identify types of multiplexer and demultiplexer circuits.
08.29	Construct multiplexer and demultiplexer circuits using integrated circuits.
08.30	Troubleshoot multiplexer and demultiplexer circuits.
08.31	Identify types of memory circuits.
08.32	Relate the uses of digital-to-analog and analog-to-digital conversions.
08.33	Construct digital-to-analog and analog-to-digital circuits.
08.34	Troubleshoot digital-to-analog and analog-to-digital circuits.
08.35	Identify types of digital displays.
08.36	Construct digital display circuits.
08.37	Troubleshoot digital display circuits.
09.0	Demonstrate proficiency in fundamental micro-processors--The student will be able to:
09.01	Identify central processing unit (CPU) building blocks and their uses (architecture).
09.02	Safely install and remove a CPU without damaging.
09.03	Analyze bus concepts.
09.04	Analyze various memory schemes.
09.05	Use memory devices in circuits.
09.06	Troubleshoot memory device circuits.

CTE Standards and Benchmarks	
09.07	Set up and operate oscilloscopes for microprocessor systems.
09.08	Set up and operate logic-data analyzers to troubleshoot microprocessor systems.
09.09	Identify types of input and output devices and peripherals.
09.10	Interface input and output ports to peripherals.
09.11	Analyze and troubleshoot input and output ports.
09.12	Compare and contrast macro processor programming language types.
09.13	Diagram the macro processor programming sequence using a flow chart.

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

The purpose of this program is to prepare students for employment as radio mechanics and as avionics technicians.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Electronic Technology and/or Electronic Engineering Technology and/or Equipment Training and/or Work Experience are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Avionics 2**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

NOTE: This program has been **daggered for deletion** with 2017-2018 being the last cohort of students permitted to enroll in the program. **After 2017-2018, 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. The alternative enrollment option for students is the Avionics Systems Technician (T400310).

PSAV – Career Preparatory	
Program Number	T640200
CIP Number	0647060901
Grade Level	30, 31
Standard Length	720 hours
Teacher Certification	AVIONICS @7 7G ELECTRONIC @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-2091 – Avionics Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 10 Reading: 10

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

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 occupational completion points.

The standard length of this program is 720 hours. **Avionics 1** is a core program. It is recommended students complete **Avionics 1,** or demonstrate mastery of the outcomes in that program, prior to enrollment in **Avionics 2.**

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3) (b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AVS0090	Avionics Technical Publications Technician	180 hours	49-2091
B	AVS0091	Avionics Installer	180 hours	49-2091
C	AVS0092	Avionics Communications System Technician	180 hours	49-2091
D	AVS0093	Avionics Technician	180 hours	49-2091

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Avionics program can be found using the following links:

www.faa.gov/
www.eta-i.org/

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate proficiency in avionics radio repair station regulations and procedures.
02.0 Demonstrate proficiency in aircraft electrical systems and ground safety
03.0 Demonstrate proficiency in line and bench maintenance of airborne communication systems.
04.0 Demonstrate proficiency in installing avionics systems.
05.0 Demonstrate proficiency in the usage and adjustment of test equipment
06.0 Demonstrate proficiency in AM and FM transmitters.
07.0 Demonstrate proficiency in AM and FM receivers.
08.0 Demonstrate proficiency in AM and FM transceivers.
09.0 Demonstrate proficiency in electromagnetic wave emissions.
10.0 Demonstrate proficiency in line and bench maintenance of airborne radio navigation systems and equipment.
11.0 Demonstrate proficiency in line and bench maintenance of airborne radar systems.
12.0 Demonstrate proficiency in the principles of operation of area navigation (R-NAV) systems.
13.0 Demonstrate proficiency in the principles of Global Positioning Systems.

Florida Department of Education
Student Performance Standards

Program Title: **Avionics 2**
PSAV Number: **T640200**

Course Number: AVS0090
Occupational Completion Point: A
Avionics Technical Publications Technician – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Technical Publications Technician course is designed to build on the skills and knowledge students learned in the Electronics Equipment Repairer course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study avionics radio station regulations and procedures.

CTE Standards and Benchmarks	
01.0	Demonstrate proficiency in avionics radio station regulations and procedures--The student will be able to:
01.01	Define repair station related regulatory and standardization agencies and their purposes.
01.02	Define repair station certification requirements.
01.03	Define requirements for certification of radio repairmen.
01.04	Practice proper station operation procedures.
01.05	Prepare repair station reports and documentation.

Florida Department of Education
Student Performance Standards

Course Number: AVS0091
Occupational Completion Point: B
Avionics Installer – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Installer course is designed to build on the skills and knowledge students learned in the Avionics Technical Publications Technician course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study aircraft electrical systems, airborne communication systems, avionics installation, and test equipment.

CTE Standards and Benchmarks	
02.0	Demonstrate proficiency in aircraft electrical systems and ground safety--The student will be able to:
02.01	Define standard aircraft bus voltage.
02.02	Analyze aircraft electrical power generation and charging systems.
02.03	Analyze aircraft electrical power control and distribution systems.
02.04	Analyze aircraft electrical warning systems.
02.05	Analyze aircraft ground handling safety.
02.06	Describe and practice aircraft ground handling safety procedures pertaining to avionics maintenance.
03.0	Demonstrate proficiency in line and bench maintenance of airborne communication systems--The student will be able to:
03.01	Describe theory of operation of air to ground communication systems.
03.02	Determine serviceability through performance checks of avionics communication systems.
03.03	Troubleshoot to the component/module level malfunctioning communication systems/equipment.
03.04	Repair and return to service air to ground communication systems/equipment.
03.05	Analyze and troubleshoot communication transmitter switching and audio distribution circuits and equipment.
03.06	Describe the theory of operation of emergency locator transmitters (ELTs).
03.07	Perform preventative and regulatory maintenance and performance tests of ELTs.
03.08	Troubleshoot defective ELTs, repair and return to service.
04.0	Demonstrate proficiency in installing avionics systems--The student will be able to:
04.01	Draw an interconnecting diagram and interconnect an IFR Avionics system for a single engine or light twin aircraft using acceptable methods, techniques and practices.

CTE Standards and Benchmarks	
	04.02 Determine proper placement of the various antennas required for an IFR Avionics package on a light twin or single engine aircraft.
	04.03 Describe the effects of precipitation static on aircraft radios and standard methods of reduction.
	04.04 Compute the dimensions of an ADF Sense antenna for a typical installation.
	04.05 Apply the formula for weight and balance computation.
05.0	Demonstrate proficiency in the usage and adjustment of test equipment--The student will be able to:
	05.01 Describe the regulatory requirements for repair station test equipment calibration.
	05.02 Use and adjust frequency counters/meters.
	05.03 Use and adjust general-purpose multimeters.
	05.04 Use and adjust RF voltmeters.
	05.05 Use and adjust RF power meters, wattmeters, loads and attenuators.
	05.06 Use and adjust audio signal generators and power meters.
	05.07 Use and adjust oscilloscopes.
	05.08 Use and adjust power supplies.
	05.09 Use and adjust RF signal generators.
	05.10 Use and adjust special purpose test sets normally used in an Avionics Repair Station.

Florida Department of Education
Student Performance Standards

Course Number: AVS0092
Occupational Completion Point: C
Avionics Communication System Technician – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Communication System Technician course is designed to build on the skills and knowledge students learned in the Avionics Installer course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study AM and FM transmitters, receivers, transceivers, and electromagnetic wave emissions.

CTE Standards and Benchmarks	
06.0	Demonstrate proficiency in AM and FM transmitters--The student will be able to:
06.01	Define DSB, SSB and FM modulation.
06.02	Draw, analyze and troubleshoot AM and FM RF oscillator circuits.
06.03	Draw, analyze and troubleshoot buffer and multiplier circuits.
06.04	Draw, analyze and troubleshoot RF power amplifier circuits.
06.05	Draw, analyze and troubleshoot AM and FM modulation circuits.
06.06	Draw, analyze and troubleshoot microphone circuits.
06.07	Draw, analyze and troubleshoot balanced modulators and SSB filter circuits.
06.08	Draw, analyze and troubleshoot AM and FM power supply circuits.
06.09	Make power, frequency and modulation measurements of AM and FM transmitters.
06.10	Align and troubleshoot AM and FM transmitters.
06.11	Describe FCC rules pertaining to AM and FM transmitter maintenance and operation.
07.0	Demonstrate proficiency in AM and FM receivers--The student will be able to:
07.01	Draw, analyze and troubleshoot receiver audio voltage and power amplifiers and speaker/headphone circuits.
07.02	Draw, analyze and troubleshoot AM and FM detector circuits.
07.03	Draw, analyze and troubleshoot AM IF amplifier circuits.
07.04	Draw, analyze and troubleshoot FM IF amplifier and limited circuits.
07.05	Draw, analyze and troubleshoot receiver oscillator and AFC circuits.

CTE Standards and Benchmarks	
07.06	Draw, analyze and troubleshoot RF mixer/hetrodyne circuits.
07.07	Draw, analyze and troubleshoot receiver RF amplifier circuits.
07.08	Draw, analyze and troubleshoot AVC/AGC circuits.
07.09	Draw, analyze and troubleshoot receiver power supplies.
07.10	Make receiver sensitivity, selectivity, bandwidth, image rejection and adjacent channel rejection measurements.
07.11	Align and troubleshoot AM and FM receivers.
08.0	Demonstrate proficiency in AM and FM transceivers--The student will be able to:
08.01	Analyze and troubleshoot transceiver control, metering and switching circuits.
08.02	Analyze and troubleshoot transceiver frequency synthesizers and phase locked loop circuits.
08.03	Analyze and troubleshoot squelch circuits.
08.04	Align and troubleshoot transceivers.
09.0	Demonstrate proficiency in electromagnetic wave emissions--The student will be able to:
09.01	Define the radio frequency spectrum.
09.02	Define types and classification of RF emissions.
09.03	Define the characteristics of radio waves.
09.04	Define radio wave propagation method.
09.05	Define the basic types of antennas.
09.06	Draw the voltage and current relationships and radiation patterns for the basic types of antennas.
09.07	Solve signal strength problems and measure signal strength.
09.08	Solve problems pertaining to antenna length, propagation velocity and frequency.
09.09	Define methods for antenna tuning, gain and directivity.
09.10	Define transmission lines in terms of electrical and physical properties.
09.11	Define standing waves, cause and effect, and measure standing wave ratios.
09.12	Define tuned transmission lines and describe applications.
09.13	Draw voltage, current and impedance relationships for tuned transmission lines.
09.14	Compute transmission line losses.
09.15	Construct transmission lines.

CTE Standards and Benchmarks
09.16 Define waveguides, resonant cavities and their applications.

Florida Department of Education
Student Performance Standards

Course Number: AVS0093
Occupational Completion Point: D
Avionics Technician – 180 Hours – SOC Code 49-2091

Course Description:
The Avionics Technician course is designed to build on the skills and knowledge students learned in the Avionics Communication System Technician course for entry into the Avionics industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study airborne radio navigation systems, radar systems, R-NAV systems, and Global Positioning Systems.

CTE Standards and Benchmarks	
10.0	Demonstrate proficiency in line and bench maintenance of airborne radio navigation systems and equipment--The student will be able to:
10.01	Describe the principles and theory of operation of VHF omnirange receivers, converters and indicators.
10.02	Determine through performance checks, the serviceability of VHF omnirange systems.
10.03	Troubleshoot to the component/module level malfunctioning omnirange systems.
10.04	Repair and return to service omnirange systems equipment.
10.05	Describe the principles and theory of operation of instrument landing systems (ILS).
10.06	Determine through performance checks the serviceability of localizer, glideslope and marker beacon receivers, converters and indicators.
10.07	Troubleshoot to the component/module level malfunctioning ILS systems and equipment.
10.08	Repair and return to service ILS systems and equipment.
10.09	Describe the principles of operation of microwave landing systems.
10.10	Describe the principles and theory of operation of Automatic Direction Finders (ADF).
10.11	Determine through performance checks the serviceability of ADF systems.
10.12	Troubleshoot to the component/module level malfunctioning ADF systems.
10.13	Repair and return to service ADF systems.
10.14	Describe radio navigation systems/equipment interface with other aircraft instruments and systems.
11.0	Demonstrate proficiency in line and bench maintenance of airborne radar systems--The student will be able to:
11.01	Describe the principles and theory of operation of Air Traffic Control (ATC) transporters and altitude encoders.
11.02	Determine through performance checks the serviceability of ATC transponders and altitude encoders.

CTE Standards and Benchmarks	
	11.03 Troubleshoot to the component/module level ATC transponders.
	11.04 Repair and return to service ATC transponders.
	11.05 Describe the principles and theory of operation and Distance Measurements Equipment (DME).
	11.06 Determine through performance checks the serviceability of DME systems.
	11.07 Troubleshoot to the component/module level malfunctioning DME systems.
	11.08 Repair and return to service DME transponders.
	11.09 Describe the principles and basic theory of operation of weather radar systems.
	11.10 Describe the basic principles of operation of the 3M/RYAN Stormscope.
12.0	Demonstrate proficiency in the principles of operation of area navigation (R-NAV) systems--The student will be able to:
	12.01 Describe the principles of operation of VHF R-NAV systems (VOR-DME).
	12.02 Describe the principles of operation of Hyperbolic R-NAV systems (Loran C), (Omega/VAF) and Global Positioning Systems.
13.0	Demonstrate proficiency in the principles of Global Positioning Systems--The student will be able to:
	13.01 Describe the principles and basic theory of operation of Global Positioning Systems

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

The purpose of this program is to prepare students for employment as radio mechanics and as avionics technicians.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Electronic Technology and/or Electronic Engineering Technology and/or Equipment Training and/or Work Experience are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

The standard length of this program is 720 hours. **Avionics 1** is a core program. It is recommended students complete **Avionics 1,** or demonstrate mastery of the outcomes in that program, prior to enrollment in **Avionics 2.**

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 10.0, and Reading 10.0. 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: **Aviation Airframe Mechanics**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T640300
CIP Number	0647060703
Grade Level	30, 31
Standard Length	1,350 hours
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 9 Reading: 10

Purpose

The purpose of this program is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. This program prepares students for employment as an Aviation Maintenance General Technician, and an Aviation Airframe Maintenance Technician.

This program focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

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. The Aviation Maintenance General Technician (AMT0705) course is the core course.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3) (b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AMT0705	Aviation Maintenance General Technician	450 hours	49-3011
B	AMT0765 AMT0766	Aviation Maintenance Airframe Technician 1 Aviation Maintenance Airframe Technician 2	450 hours 450 hours	49-3011 49-3011

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Aircraft Airframe Mechanics program can be found using the following link:

http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part147-appC.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 Perform basic aircraft drawing skills.
02.0 Demonstrate aircraft weight and balance skills.
03.0 Perform ground operations and servicing duties.
04.0 Demonstrate mathematical skills.
05.0 Maintain forms and records.
06.0 Apply principles of basic physics.
07.0 Demonstrate the use of maintenance publications.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate employability skills as an Aviation Maintenance General Technician.
10.0 Maintain aircraft fluid lines and fittings.
11.0 Perform aircraft materials and processes skills.
12.0 Perform cleaning and corrosion-control operations.
13.0 Perform basic electricity skills.
14.0 Interpret mechanic privileges and limitations.
15.0 Maintain wood structures.
16.0 Perform aircraft covering.
17.0 Apply aircraft finishes.
18.0 Repair sheet-metal and non-metallic structures.
19.0 Perform and identify proper welding.
20.0 Perform assembly and rigging.
21.0 Perform airframe inspection.
22.0 Maintain aircraft landing-gear systems.
23.0 Maintain hydraulic and pneumatic power systems.
24.0 Maintain cabin atmosphere control systems.
25.0 Maintain aircraft instrument systems.
26.0 Maintain communication and navigation systems.
27.0 Inspect and repair aircraft fuel systems.
28.0 Inspect and repair aircraft electrical systems.
29.0 Inspect and repair position and warning systems.
30.0 Maintain ice and rain control systems.
31.0 Inspect and repair aircraft fire-protection systems.
32.0 Demonstrate knowledge of Federal Aviation Administration Airframe licensing requirements.
33.0 Demonstrate employability skills for an Aviation Maintenance Airframe Technician (AMT) with an FAA Airframe rating.
34.0 Demonstrate an understanding of entrepreneurship related to opportunities in Aviation Airframe Maintenance occupations.

Florida Department of Education
Student Performance Standards

Program Title: **Aviation Airframe Mechanics**
PSAV Number: **T640300**

Course Number: AMT0705
Occupational Completion Point: A
Aviation Maintenance General Technician – 450 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance General Technician course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study basic electricity, aircraft drawing, weight, balance, fluid lines, fittings, materials, processes, operations, services, cleaning, corrosion-control, math, forms, records, basic physics, maintenance publications, communication, and employability skills.

CTE Standards and Benchmarks		FAA FAR Part 147
01.0	Perform basic aircraft drawing skills--The student will be able to:	
01.01	Use aircraft drawings, symbols, and system schematics.	App. B, B, 7. Level 2
01.02	Draw sketches of repairs and alterations.	App. B, B, 8. Level 3
01.03	Use blueprint information.	App. B, B, 9. Level 3
01.04	Use graphs and charts.	App. B, B, 10. Level 3
02.0	Demonstrate aircraft weight and balance skills--The student will be able to:	
02.01	Weigh aircraft.	App. B, C, 11. Level 2
02.02	Perform complete weight-and-balance check and record data.	App. B, C, 12. Level 3
02.03	Properly configure aircraft for weighing and capable of setting up and using weighing equipment.	
03.0	Perform ground operations and servicing duties--The student will be able to:	
03.01	Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards.	App. B, G, 20. Level 2
03.02	Identify and select fuels.	App. B, G, 21. Level 2
03.03	Comply with prescribed shop and personal safety procedures.	
04.0	Demonstrate mathematical skills--The student will be able to:	
04.01	Extract roots and raise numbers to a given power.	App. B, H, 24. Level 3

CTE Standards and Benchmarks		FAA FAR Part 147
	04.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.	App. B, H, 25. Level 3
	04.03 Solve ratio, proportion, and percentage problems.	App. B, H, 26. Level 3
	04.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	App. B, H, 27. Level 3
05.0	Maintain forms and records--The student will be able to:	
	05.01 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.	App. B, I, 28. Level 3
	05.02 Complete required maintenance forms, records, and inspection reports.	App. B, I, 29. Level 3
06.0	Apply principles of basic physics--The student will be able to:	
	06.01 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.	App. B, J, 30. Level 2
	06.02 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.	
	06.03 Draw conclusions or make inferences from data.	
	06.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.	
	06.05 Understand pressure measurement in terms of PSI, inches of mercury, and KPA.	
07.0	Demonstrate the use of maintenance publications--The student will be able to:	
	07.01 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.	App. B, K, 31. Level 3
	07.02 Read technical data.	App. B, K, 32. Level 3
08.0	Demonstrate appropriate communication skills--The student will be able to:	
	08.01 Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.	
	08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.	
	08.03 Read and follow written and oral instructions.	
	08.04 Answer and ask questions coherently and concisely.	
	08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.	
	08.06 Demonstrate appropriate telephone/communication skills.	
09.0	Demonstrate employability skills as an Aviation Maintenance General Technician--The student will be able to:	

CTE Standards and Benchmarks		FAA FAR Part 147
	09.01 Conduct a job search.	
	09.02 Secure information about a job.	
	09.03 Identify documents that may be required when applying for a job position.	
	09.04 Complete a job-application form correctly.	
	09.05 Demonstrate job-interview skills.	
	09.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.	
	09.07 Identify work habits for getting and keeping a job.	
	09.08 Explain how to make job changes.	
	09.09 Explain the purpose of the Right-to-Know" law.	
10.0	Maintain aircraft fluid lines and fittings--The student will be able to:	
	10.01 Fabricate and install rigid and flexible fluid lines and fittings.	App. B, D, 13. Level 3
	10.02 Utilize proper personal safety procedures for fluid lines and fittings.	
11.0	Perform aircraft materials and processes skills--The student will be able to:	
	11.01 Identify and select appropriate nondestructive testing methods.	App. B, E, 14. Level 1
	11.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.	App. B, E, 15. Level 2
	11.03 Perform basic heat-testing processes.	App. B, E, 16. Level 1
	11.04 Identify and select aircraft hardware and materials.	App. B, E, 17. Level 3
	11.05 Inspect and check welds.	App. B, E, 18. Level 3
	11.06 Perform precision measurements.	App. B, E, 19. Level 3
	11.07 Perform safety-wiring techniques.	
12.0	Perform cleaning and corrosion-control operations--The student will be able to:	
	12.01 Identify and select cleaning materials.	App. B, G, 22. Level 3
	12.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. Understand metal strength limitations when removing corrosion.	App. B, G, 23. Level 3
13.0	Perform basic electricity skills--The student will be able to:	
	13.01 Calculate and measure capacitance and inductance.	App. B, A, 1. Level 2
	13.02 Calculate and measure electrical power.	App. B, A, 2. Level 2
	13.03 Measure voltage, current, resistance, and continuity.	App. B, A, 3. Level 3

CTE Standards and Benchmarks		FAA FAR Part 147
13.04	Determine the relationship of voltage, current, and resistance in electrical circuits.	App. B, A, 4. Level 3
13.05	Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.	App. B, A, 5. Level 3
13.06	Inspect and service batteries.	App. B, A, 6. Level 3
13.07	Utilize proper electrical safety procedures.	
14.0	Interpret mechanic privileges and limitations--The student will be able to:	
14.01	Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.	App. B, L, 33. Level 3
14.02	Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.	
14.03	Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.	

Florida Department of Education
Student Performance Standards

Course Number: AMT0765
Occupational Completion Point: B (1 of 2)
Aviation Maintenance Airframe Technician 1 – 450 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Airframe Technician 1 course is designed to build on the skills and knowledge students learned in the Aviation Maintenance General Technician course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study wood structures, aircraft covering, finishes, metallic and non-metallic surfaces, basic welding, assembly, rigging, airframe inspection, landing gear, hydraulic and pneumatic systems, atmosphere control, aircraft instruments, communication, and navigation systems.

CTE Standards and Benchmarks		FAA FAR Part 147
15.0	Maintain wood structures--The student will be able to:	
15.01	Service and repair wood structures.	App. C, I, A, 1. Level 1
15.02	Identify wood defects.	App. C, I, A, 2. Level 1
15.03	Inspect wood structures.	App. C, I, A, 3. Level 1
16.0	Perform aircraft covering--The student will be able to:	
16.01	Select and apply fabric and fiberglass covering materials.	App. C, I, B, 4. Level 1
16.02	Inspect, test, and repair fabric and fiberglass.	App. C, I, B, 5. Level 1
17.0	Apply aircraft finishes--The student will be able to:	
17.01	Apply trim, letters, and touch-up paint.	App. C, I, C, 6. Level 1
17.02	Identify and select aircraft finishing materials.	App. C, I, C, 7. Level 2
17.03	Apply finishing materials.	App. C, I, C, 8. Level 2
17.04	Inspect finishes and identify defects.	App. C, I, C, 9. Level 2
17.05	Demonstrate an understanding of common safety practices dealing with paints and solvents.	
18.0	Repair sheet-metal and non-metallic structures--The student will be able to:	
18.01	Select, install, and remove special fasteners for metallic, bonded, and composite structures.	App. C, I, D, 10. Level 2
18.02	Inspect bonded structures.	App. C, I, D, 11. Level 2
18.03	Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.	App. C, I, D, 12. Level 2

CTE Standards and Benchmarks		FAA FAR Part 147
	18.04 Inspect, check, service, and repair windows, doors, and interior furnishings.	App. C, I, D, 13. Level 2
	18.05 Inspect and repair sheet-metal structures.	App. C, I, D, 14. Level 3
	18.06 Install conventional rivets.	App. C, I, D, 15. Level 3
	18.07 Form, lay out, and bend sheet metal.	App. C, I, D, 16. Level 3
19.0	Perform and identify proper welding--The student will be able to:	
	19.01 Weld magnesium and titanium.	App. C, I, E, 17. Level 1
	19.02 Solder stainless steel.	App. C, I, E, 18. Level 1
	19.03 Fabricate tubular structures.	App. C, I, E, 19. Level 1
	19.04 Solder, braze, gas-weld, and arc-weld steel.	App. C, I, E, 20. Level 2
	19.05 Weld aluminum and stainless steel.	App. C, I, E, 21. Level 1
20.0	Perform assembly and rigging--The student will be able to:	
	20.01 Rig rotary-wing aircraft.	App. C, I, F, 22. Level 1
	20.02 Rig fixed-wing aircraft.	App. C, I, F, 23. Level 2
	20.03 Check alignment of structures.	App. C, I, F, 24. Level 2
	20.04 Assemble aircraft components, including flight control surfaces.	App. C, I, F, 25. Level 3
	20.05 Balance, rig, and inspect movable primary and secondary flight control structures.	App. C, I, F, 26. Level 3
	20.06 Jack aircraft.	App. C, I, F, 27. Level 3
21.0	Perform airframe inspection--The student will be able to:	
	21.01 Perform aircraft conformity and airworthiness inspections.	App. C, I, G, 28. Level 3
22.0	Maintain aircraft landing gear systems--The student will be able to:	
	22.01 Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.	App. C, II, A, 29. Level 3
	22.02 Utilize proper safety procedures and equipment when working on aircraft with electrical or hydraulic power on.	
	22.03 Utilize proper safety procedures when working on landing gear struts or wheel and tire assemblies.	
23.0	Maintain hydraulic and pneumatic power systems--The student will be able to:	
	23.01 Repair hydraulic and pneumatic power system components.	App. C, II, B, 30. Level 2
	23.02 Identify and select hydraulic fluids.	App. C, II, B, 31. Level 3
	23.03 Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.	App. C, II, B, 32. Level 3

CTE Standards and Benchmarks		FAA FAR Part 147
24.0	Maintain cabin atmosphere control systems--The student will be able to:	
24.01	Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, pressurization systems, and air-cycle machines.	App. C, II, C, 33. Level 1
24.02	Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, and pressurization systems.	App. C, II, C, 34. Level 1
24.03	Inspect, check, troubleshoot, service and repair oxygen systems.	App. C, II, C, 35. Level 2
25.0	Maintain aircraft instrument systems--The student will be able to:	
25.01	Inspect, check, service, troubleshoot, and repair electronic flight-instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position-indicating systems to include the use of built-in test equipment.	App. C, II, D, 36. Level 1
25.02	Install instruments and perform a static pressure-system leak test.	App. C, II, D, 37. Level 2
26.0	Maintain communication and navigation systems--The student will be able to:	
26.01	Inspect, check, and troubleshoot autopilot, servos, and approach coupling systems.	App. C, II, E, 38. Level 1
26.02	Inspect, check, and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static-discharge devices, aircraft VOR, ILS, LORAN, radar beacon transponders, flight-management computers, and GPWS.	App. C, II, E, 39. Level 1
26.03	Inspect and repair antenna and electronic equipment installations.	App. C, II, E, 40. Level 2

Course Number: AMT0766
Occupational Completion Point: B (2 of 2)
Aviation Maintenance Airframe Technician 2 – 450 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Airframe Technician 2 course is designed to build on the skills and knowledge students learned in the Aviation Maintenance Airframe Technician 1 course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study aircraft fuel, electrical, position, warning, ice and rain control, fire-protection, FAA Airframe licensing requirements, employability skills, and entrepreneurship.

CTE Standards and Benchmarks		FAA FAR Part 147
27.0	Inspect and repair aircraft fuel systems--The student will be able to:	
27.01	Check and service fuel-dump systems	App. C, II, F, 41. Level 1
27.02	Perform fuel-management transfer, re-fueling, and de-fueling	App. C, II, F, 42. Level 1
27.03	Inspect, check, and repair pressure fuel systems	App. C, II, F, 43. Level 1

CTE Standards and Benchmarks		FAA FAR Part 147
	27.04 Repair aircraft fuel-system components.	App. C, II, F, 44. Level 2
	27.05 Inspect and repair fluid quantity-indicating systems.	App. C, II, F, 45. Level 2
	27.06 Troubleshoot, service, and repair fluid pressure and temperature warning systems.	App. C, II, F, 46. Level 2
	27.07 Inspect, check, service, troubleshoot, and repair aircraft fuel systems.	App. C, II, F, 47. Level 3
28.0	Inspect and repair aircraft electrical systems--The student will be able to:	
	28.01 Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors.	App. C, II, G, 48. Level 2
	28.02 Install, check, and service airframe electric wiring, controls, switches, indicators, and protective devices.	App. C, II, G, 49. Level 3
	28.03 Inspect, check, troubleshoot, service, and repair alternating and direct current electrical systems.	App. C, II, G, 50a. Level 3
	28.04 Inspect, check, and troubleshoot constant and integrated speed- drive generators.	App. C, II, G, 50b. Level 1
29.0	Inspect and repair position and warning systems--The student will be able to:	
	29.01 Inspect, check, and service speed and configuration warning systems, electrical brake controls, and antiskid systems.	App. C, II, H, 51. Level 2
	29.02 Inspect, check, troubleshoot, and service landing gear position- indicating and warning systems.	App. C, II, H, 52. Level 3
30.0	Maintain ice and rain control systems--The student will be able to:	
	30.01 Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.	App. C, II, I, 53. Level 2
31.0	Inspect and repair aircraft fire-protection systems--The student will be able to:	
	31.01 Inspect, check, and service smoke and carbon monoxide detection systems.	App. C, II, J, 54. Level 1
	31.02 Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.	App. C, II, J, 55. Level 3
32.0	Demonstrate knowledge of Federal Aviation Administration Airframe licensing requirements--The student will be able to:	
	32.01 Explain the requirements for obtaining FAA authorization to take the FAA Airframe examinations.	
33.0	Demonstrate employability skills for an Aviation Maintenance Airframe Technician (AMT) with an FAA Airframe rating --The student will be able to:	
	33.01 Conduct a job search for an AMT with FAA Airframe rating position.	
	33.02 Secure information about the requirements for an AMT with FAA Airframe rating in a particular firm.	
	33.03 Identify documents that may be required when applying for an AMT with FAA Airframe rating position.	
	33.04 Complete a job-application form correctly.	
	33.05 Demonstrate competency in job-interview techniques.	

CTE Standards and Benchmarks		FAA FAR Part 147
	33.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.	
	33.07 Identify or adopt acceptable work habits.	
	33.08 Demonstrate knowledge of how to make job changes appropriately.	
	33.09 Demonstrate acceptable employee health habits.	
	33.10 Demonstrate knowledge of the **"**Right-to-Know" law.	
34.0	Demonstrate an understanding of entrepreneurship related opportunities in Aviation Airframe Maintenance occupations--The student will be able to:	
	34.01 Define entrepreneurship.	
	34.02 Describe the importance of entrepreneurship to Aviation Airframe Maintenance occupations.	
	34.03 List the advantages and disadvantages of Aviation Airframe Maintenance business ownership.	
	34.04 Identify the risks involved in ownership of an Aviation Airframe Maintenance business.	
	34.05 Identify the necessary personal characteristics of a successful Aviation Airframe Maintenance business owner.	
	34.06 Identify the business skills needed to operate an Aviation Airframe Maintenance business efficiently and effectively.	

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.

Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

Special Notes

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral, and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

Common hand tools, portable tools, precision tools, machine tools, torqueing tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician School shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 10.0. 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: **Aviation Powerplant Mechanics**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T640400
CIP Number	0647060801
Grade Level	30, 31
Standard Length	1,350 hours
Teacher Certification	AIR MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3011 – Aircraft Mechanics and Service Technicians
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 10 Language: 9 Reading: 10

Purpose

The purpose of this program is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. This program prepares students for employment as an Aviation Maintenance General Technician, and an Aviation Powerplant Maintenance Technician.

This program focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

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. The Aviation Maintenance General Technician (AMT0705) course is the core course.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3) (b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	AMT0705	Aviation Maintenance General Technician	450 hours	49-3011
B	AMT0775 AMT0776	Aviation Maintenance Powerplant Technician 1 Aviation Maintenance Powerplant Technician 2	450 hours 450 hours	49-3011 49-3011

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Aviation Powerplant Mechanics program can be found using the following link:

http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part147-appC.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 Perform basic aircraft drawing skills.
02.0 Demonstrate aircraft weight and balance skills.
03.0 Perform ground operations and servicing duties.
04.0 Demonstrate mathematical skills.
05.0 Maintain forms and records.
06.0 Apply principles of basic physics.
07.0 Demonstrate the use of maintenance publications.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate employability skills as an Aviation Maintenance General Technician.
10.0 Maintain aircraft fluid lines and fittings.
11.0 Perform aircraft materials and processes skills.
12.0 Perform cleaning and corrosion-control operations.
13.0 Perform basic electricity skills.
14.0 Interpret mechanic privileges and limitations.
15.0 Perform basic reciprocating engine skills.
16.0 Perform basic turbine engine skills.
17.0 Perform engine inspection.
18.0 Maintain engine instrument systems.
19.0 Maintain engine fire-protection systems.
20.0 Maintain engine electrical systems.
21.0 Maintain lubrication systems.
22.0 Maintain ignition and starting systems.
23.0 Maintain fuel-metering systems.
24.0 Maintain engine fuel systems.
25.0 Maintain induction and engine airflow systems.
26.0 Maintain engine cooling systems.
27.0 Maintain engine exhaust and reverser systems.
28.0 Maintain aircraft propellers.
29.0 Maintain unducted fans.
30.0 Maintain auxiliary power units
31.0 Demonstrate knowledge of FAA Powerplant licensing requirements.
32.0 Demonstrate employability skills for an Aviation Maintenance Powerplant Technician (AMT) with an FAA Powerplant rating
33.0 Demonstrate an understanding of entrepreneurship opportunities in Aviation Powerplant Maintenance occupations.

Florida Department of Education
Student Performance Standards

Program Title: **Aviation Powerplant Mechanics**
PSAV Number: **T640400**

Course Number: AMT0705
Occupational Completion Point: A
Aviation Maintenance General Technician – 450 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance General Technician course prepares students for entry into the aviation industry. Students explore career opportunities and requirements of a professional aviation mechanic. Students study basic electricity, aircraft drawing, weight, balance, fluid lines, fittings, materials, processes, operations, services, cleaning, corrosion-control, math, forms, records, basic physics, maintenance publications, communication, and employability skills.

CTE Standards and Benchmarks		FAA FAR Part 147
01.0	Perform basic aircraft drawing skills--The student will be able to:	
01.01	Use aircraft drawings, symbols, and system schematics.	App. B, B, 7. Level 2
01.02	Draw sketches of repairs and alterations.	App. B, B, 8. Level 3
01.03	Use blueprint information.	App. B, B, 9. Level 3
01.04	Use graphs and charts.	App. B, B, 10. Level 3
02.0	Demonstrate aircraft weight and balance skills--The student will be able to:	
02.01	Weigh aircraft.	App. B, C, 11. Level 2
02.02	Perform complete weight-and-balance check and record data.	App. B, C, 12. Level 3
02.03	Properly configure aircraft for weighing and capable of setting up and using weighing equipment.	
03.0	Perform ground operations and servicing duties--The student will be able to:	
03.01	Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards.	App. B, G, 20. Level 2
03.02	Identify and select fuels.	App. B, G, 21. Level 2
03.03	Comply with prescribed shop and personal safety procedures.	
04.0	Demonstrate mathematical skills--The student will be able to:	
04.01	Extract roots and raise numbers to a given power.	App. B, H, 24. Level 3

CTE Standards and Benchmarks		FAA FAR Part 147
	04.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.	App. B, H, 25. Level 3
	04.03 Solve ratio, proportion, and percentage problems.	App. B, H, 26. Level 3
	04.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	App. B, H, 27. Level 3
05.0	Maintain forms and records--The student will be able to:	
	05.01 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.	App. B, I, 28. Level 3
	05.02 Complete required maintenance forms, records, and inspection reports.	App. B, I, 29. Level 3
06.0	Apply principles of basic physics--The student will be able to:	
	06.01 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.	App. B, J, 30. Level 2
	06.02 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.	
	06.03 Draw conclusions or make inferences from data.	
	06.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.	
	06.05 Understand pressure measurement in terms of PSI, inches of mercury, and KPA.	
07.0	Demonstrate the use of maintenance publications--The student will be able to:	
	07.01 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.	App. B, K, 31. Level 3
	07.02 Read technical data.	App. B, K, 32. Level 3
08.0	Demonstrate appropriate communication skills--The student will be able to:	
	08.01 Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.	
	08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.	
	08.03 Read and follow written and oral instructions.	
	08.04 Answer and ask questions coherently and concisely.	
	08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.	
	08.06 Demonstrate appropriate telephone/communication skills.	
09.0	Demonstrate employability skills as an Aviation Maintenance General Technician--The student will be able to:	

CTE Standards and Benchmarks		FAA FAR Part 147
	09.01 Conduct a job search.	
	09.02 Secure information about a job.	
	09.03 Identify documents that may be required when applying for a job position.	
	09.04 Complete a job-application form correctly.	
	09.05 Demonstrate job-interview skills.	
	09.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.	
	09.07 Identify work habits for getting and keeping a job.	
	09.08 Explain how to make job changes.	
	09.09 Explain the purpose of the Right-to-Know" law.	
10.0	Maintain aircraft fluid lines and fittings--The student will be able to:	
	10.01 Fabricate and install rigid and flexible fluid lines and fittings.	App. B, D, 13. Level 3
	10.02 Utilize proper personal safety procedures for fluid lines and fittings.	
11.0	Perform aircraft materials and processes skills--The student will be able to:	
	11.01 Identify and select appropriate nondestructive testing methods.	App. B, E, 14. Level 1
	11.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.	App. B, E, 15. Level 2
	11.03 Perform basic heat-testing processes.	App. B, E, 16. Level 1
	11.04 Identify and select aircraft hardware and materials.	App. B, E, 17. Level 3
	11.05 Inspect and check welds.	App. B, E, 18. Level 3
	11.06 Perform precision measurements.	App. B, E, 19. Level 3
	11.07 Perform safety-wiring techniques.	
12.0	Perform cleaning and corrosion-control operations--The student will be able to:	
	12.01 Identify and select cleaning materials.	App. B, G, 22. Level 3
	12.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. Understand metal strength limitations when removing corrosion.	App. B, G, 23. Level 3
13.0	Perform basic electricity skills--The student will be able to:	
	13.01 Calculate and measure capacitance and inductance.	App. B, A, 1. Level 2
	13.02 Calculate and measure electrical power.	App. B, A, 2. Level 2
	13.03 Measure voltage, current, resistance, and continuity.	App. B, A, 3. Level 3

CTE Standards and Benchmarks		FAA FAR Part 147
13.04	Determine the relationship of voltage, current, and resistance in electrical circuits.	App. B, A, 4. Level 3
13.05	Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.	App. B, A, 5. Level 3
13.06	Inspect and service batteries.	App. B, A, 6. Level 3
13.07	Utilize proper electrical safety procedures.	
14.0	Interpret mechanic privileges and limitations--The student will be able to:	
14.01	Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.	App. B, L, 33. Level 3
14.02	Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.	
14.03	Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.	

Florida Department of Education
Student Performance Standards

Course Number: AMT0775
Occupational Completion Point: B (1 of 2)
Aviation Maintenance Powerplant Technician 1 – 450 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Powerplant Technician 1 course is designed to build on the skills and knowledge students learned in the Aviation Maintenance General Technician course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study reciprocating engines, turbine engines, inspection, instruments, fire-protection, electrical, lubrication, ignition, and starting systems.

CTE Standards and Benchmarks		FAA FAR Part 147
15.0	Perform basic reciprocating engine skills--The student will be able to:	
15.01	Inspect and repair a radial engine.	App. D, I, A, 1. Level 1
15.02	Overhaul a reciprocating engine.	App. D, I, A, 2. Level 2
15.03	Inspect, check, service, and repair reciprocating engines and engine installations.	App. D, I, A, 3. Level 3
15.04	Install, troubleshoot, and remove reciprocating engines.	App. D, I, A, 4. Level 3
16.0	Perform basic turbine engine skills--The student will be able to:	
16.01	Overhaul a turbine engine.	App. D, I, B, 5. Level 2
16.02	Inspect, check, service, and repair turbine engines and turbine engine installations.	App. D, I, B, 6. Level 3
16.03	Install, troubleshoot, and remove turbine engines.	App. D, I, B, 7. Level 3
17.0	Perform engine inspection--The student will be able to:	
17.01	Perform Powerplant conformity and airworthiness inspections.	App. D, I, C, 8. Level 3
18.0	Maintain engine instrument systems--The student will be able to:	
18.01	Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.	App. D, II, A, 9. Level 2
18.02	Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and r.p.m. indicating systems.	App. D, II, A, 10. Level 2
19.0	Maintain engine fire-protection systems--The student will be able to:	
19.01	Inspect, check, service, troubleshoot, and repair engine fire-detection and extinguishing systems.	App. D, II, B, 11. Level 3
20.0	Maintain engine electrical systems--The student will be able to:	
20.01	Repair engine electrical system components.	App. D, II, C, 12. Level 2

CTE Standards and Benchmarks		FAA FAR Part 147
	20.02 Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.	App. D, II, C, 13. Level 3
21.0	Maintain lubrication systems--The student will be able to:	
	21.01 Identify and select lubricants.	App. D, II, D, 14. Level 2
	21.02 Repair engine lubrication system components.	App. D, II, D, 15. Level 2
	21.03 Inspect, check, service, troubleshoot, and repair engine lubrication systems.	App. D, II, D, 16. Level 3
22.0	Maintain ignition and starting systems--The student will be able to:	
	22.01 Overhaul magneto and ignition harness.	App. D, II, E, 17. Level 2
	22.02 Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.	App. D, II, E, 18. Level 2
	22.03 Inspect, service, troubleshoot, and repair turbine engine electrical starting systems.	App. D, II, E, 19a. Level 3
	22.04 Inspect, service, and troubleshoot turbine engine pneumatic starting systems.	App. D, II, E, 19b. Level 1

Course Number: AMT0776
Occupational Completion Point: B (2 of 2)
Aviation Maintenance Powerplant Technician 2 – 450 Hours – SOC Code 49-3011

Course Description:
The Aviation Maintenance Powerplant Technician 2 course is designed to build on the skills and knowledge students learned in the Aviation Maintenance Powerplant Technician 1 course. Students explore career opportunities and requirements of a professional aviation mechanic. Students study fuel, metering, induction, airflow, cooling, exhaust, reverser, propellers, inductors, auxiliary power units, FAA Powerplant Rating licensing, employability skills, and entrepreneurship.

CTE Standards and Benchmarks		FAA FAR Part 147
23.0	Maintain fuel metering systems--The student will be able to:	
	23.01 Troubleshoot and adjust turbine engine fuel-metering systems and electronic-engine fuel controls.	App. D, II, F, 20. Level 1
	23.02 Overhaul carburetor.	App. D, II, F, 21. Level 1
	23.03 Repair engine fuel metering system components.	App. D, II, F, 22. Level 2
	23.04 Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel-metering systems.	App. D, II, F, 23. Level 3
24.0	Maintain engine fuel systems--The student will be able to:	
	24.01 Repair engine fuel system components.	App. D, II, G, 24. Level 2

CTE Standards and Benchmarks		FAA FAR Part 147
	24.02 Inspect, check, service, troubleshoot, and repair engine fuel systems.	App. D, II, G, 25. Level 3
25.0	Maintain induction and engine airflow systems --The student will be able to:	
	25.01 Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.	App. D, II, H, 26. Level 2
	25.02 Inspect, check, service, troubleshoot, and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.	App. D, II, H, 27. Level 1
	25.03 Inspect, check, service, and repair carburetor air intake and induction manifolds.	App. D, II, H, 28. Level 3
26.0	Maintain engine cooling systems--The student will be able to:	
	26.01 Repair engine cooling system components.	App. D, II, I, 29. Level 2
	26.02 Inspect, check, troubleshoot, service, and repair engine cooling systems.	App. D, II, I, 30. Level 3
27.0	Maintain engine exhaust and reverser systems--The student will be able to:	
	27.01 Repair engine exhaust system components.	App. D, II, J, 31. Level 2
	27.02 Inspect, check, troubleshoot, service, and repair engine exhaust systems.	App. D, II, J, 32a. Level 3
	27.03 Troubleshoot and repair engine thrust reverser systems and related components.	App. D, II, J, 32b. Level 1
28.0	Maintain aircraft propellers--The student will be able to:	
	28.01 Inspect, check, service, and repair propeller synchronizing and ice control systems.	App. D, II, K, 33. Level 1
	28.02 Identify and select propeller lubricants.	App. D, II, K, 34. Level 2
	28.03 Balance propellers.	App. D, II, K, 35. Level 1
	28.04 Repair propeller control system components.	App. D, II, K, 36. Level 2
	28.05 Inspect, check, service, and repair fixed-pitch, constant-speed, feathering propellers, and propeller-governing systems.	App. D, II, K, 37. Level 3
	28.06 Install, troubleshoot, and remove propellers.	App. D, II, K, 38. Level 3
	28.07 Repair aluminum alloy propeller blades.	App. D, II, K, 39. Level 3
29.0	Maintain unducted fans-The student will be able to:	
	29.01 Inspect and troubleshoot unducted fan systems and components.	App. D, II, L, 40. Level 1
30.0	Maintain auxiliary power units-The student will be able to:	
	30.01 Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.	
31.0	Demonstrate knowledge of Federal Aviation Administration Powerplant licensing requirements--The student will be able to:	
	31.01 Explain the requirements for obtaining FAA authorization to take the FAA Powerplant examinations.	

CTE Standards and Benchmarks		FAA FAR Part 147
32.0	Demonstrate employability skills for an Aviation Maintenance Powerplant Technician (AMT) with an FAA Powerplant rating--The student will be able to:	
32.01	Conduct a job search for an AMT position.	
32.02	Secure information about the requirements for an AMT in a particular firm.	
32.03	Identify documents that may be required when applying for an AMT position.	
32.04	Complete a job-application form correctly.	
32.05	Demonstrate competency in job-interview techniques.	
32.06	Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.	
32.07	Identify or adopt acceptable AMT work habits.	
32.08	Demonstrate knowledge of how to make job changes appropriately.	
32.09	Demonstrate acceptable employee health habits.	
32.10	Demonstrate knowledge of the "Right-to-Know" law.	
33.0	Demonstrate an understanding of entrepreneurship related to opportunities in Aviation Powerplant Maintenance occupations--The student will be able to:	
33.01	Define entrepreneurship.	
33.02	Describe the importance of entrepreneurship to the Aviation Maintenance industry.	
33.03	List the advantages and disadvantages of Aviation Maintenance business ownership.	
33.04	Identify the risks involved in ownership of an Aviation Maintenance business.	
33.05	Identify the necessary personal characteristics of a successful Aviation Maintenance business owner.	
33.06	Identify the business skills needed to operate an Aviation Maintenance business efficiently and effectively.	

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.

Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

Special Notes

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral, and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certified aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certified and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels according to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet “return to service” standards must be in satisfactory working condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

Common hand tools, portable tools, precision tools, machine tools, torqueing tools, shop equipment and machinery, specialized tools and equipment, airframe structures, aircraft, airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certified Aviation Maintenance Technician School shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

In PSAV programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 10.0, Language 9.0, and Reading 10.0. 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: **Medium and Heavy Duty Truck and Bus Technician 1**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T650100
CIP Number	0647061305
Grade Level	30, 31
Standard Length	1050 hours
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to maintaining and repairing diesel engines and electrical systems; reconditioning diesel fuel injection systems; overhauling diesel engines; and performing diesel engine preventive maintenance.

The course content should also include training in communication, leadership, human relations and employability skills; and safe efficient work practices.

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 occupational completion points.

The courses after the core (OCP-A) may be taken in any sequence.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	DIM0101	Diesel Engine Mechanic/Technician Helper	150 hours	49-3031
B	DIM0102	Diesel Electrical and Electronics Technician	300 hours	49-3031
C	DIM0104	Diesel Engine Technician	300 hours	49-3031
D	DIM0105	Diesel Brakes Technician	300 hours	49-3031

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Medium and Heavy Duty Bus and Truck program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Proficiently explain and apply required shop and personal safety tasks.
02.0 Identify the basic diesel components and functions.
03.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment.
04.0 Identify principles, assemblies, and systems of engine operation.
05.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
06.0 Demonstrate workplace employability skills related to personal standards and work habits/ethics.
07.0 Diagnose and repair General electrical systems.
08.0 Diagnose and repair Battery systems.
09.0 Diagnose and repair Starting systems.
10.0 Diagnose and repair Charging systems.
11.0 Diagnose and repair Lighting systems.
12.0 Diagnose and repair Gauges and warning devices.
13.0 Diagnose and repair Related electrical systems.
14.0 General engine diagnosis and repair.
15.0 Cylinder head and valve train diagnosis and repair.
16.0 Engine block diagnosis and repair.
17.0 Lubrication systems diagnosis and repair.
18.0 Cooling system diagnosis and repair.
19.0 Air induction and exhaust systems diagnosis and repair.
20.0 Fuel system diagnosis and repair.
  20.01 Fuel supply system.
  20.02 Electronic fuel management system.
21.0 Diagnose and repair engine brakes.
22.0 Diagnose and repair air supply and service systems.
23.0 Diagnose and repair mechanical/foundation air brake systems.
24.0 Diagnose and repair parking brakes.
25.0 Diagnose and repair hydraulic systems.
26.0 Diagnose and repair mechanical/foundation hydraulic brake systems.
27.0 Diagnose and repair power assist units.
28.0 Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC).
29.0 Diagnose and repair wheel bearings**.**

Florida Department of Education
Student Performance Standards

Program Title: **Medium and Heavy Duty Truck and Bus Technician 1**
PSAV Number: **T650100**

Course Number: DIM0101
Occupational Completion Point: A
Diesel Engine Mechanic/Technician Helper – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Mechanic/Technician Helper course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop and personal safety skills, basic diesel components, tools and equipment, occupational safety, engine operation, and workplace employment skills.

ASE = Required Supplemental Tasks

CTE Standards and Benchmarks		Priority Number
01.0	Proficiently explain and apply required shop and personal safety tasks--The student will be able to:	
01.01	Identify basic shop organization and management regulations.	
01.02	Identify and apply general and required shop safety rules and procedures.	ASE
01.03	Utilize safe procedures for handling of tools and equipment.	ASE
01.04	Identify and use proper placement of floor jacks and jack stands.	ASE
01.05	Identify and use proper procedures for safe lift operation.	ASE
01.06	Utilize proper ventilation procedures for working within the lab/shop area.	ASE
01.07	Identify marked safety areas.	ASE
01.08	Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.	ASE
01.09	Identify the location and use of eye wash stations.	ASE
01.10	Identify the location of the posted evacuation routes.	ASE
01.11	Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	ASE
01.12	Identify and wear appropriate clothing for lab/shop activities.	ASE
01.13	Secure hair and jewelry for lab/shop activities.	ASE

CTE Standards and Benchmarks		Priority Number
01.14	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	ASE
01.15	Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HDD) lamps, ignition systems, injection systems, etc.).	ASE
01.16	Locate and demonstrate knowledge of Safety Data Sheets (SDS).	ASE
01.17	Assist in activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.	
01.18	Identify and comply with personal and environmental safety practices associated with the handling, storage, and disposal of chemicals and hazardous materials.	
02.0	Identify the basic diesel components and functions--The student will be able to:	
02.01	Identify types of bearings and their uses.	
02.02	Identify seals, gaskets, and fasteners.	
02.03	Identify drive power train components and functions.	
02.04	Identify threaded fasteners by size, type, thread series, thread classes, material hardness, and compatibility	
03.0	Explain and apply required tasks associated with the proper use and handling of tools and equipment--The student will be able to:	
03.01	Identify tools and their usage in automotive applications.	ASE
03.02	Identify standard and metric designation.	ASE
03.03	Demonstrate safe handling and use of appropriate tools.	ASE
03.04	Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	ASE
03.05	Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper, etc.).	ASE
04.0	Identify principles, assemblies, and systems of engine operation--The student will be able to:	
04.01	Explain the basic principles in the operation of the four-stroke-cycle diesel engine	
04.02	Identify engine assemblies and systems.	
04.03	Explain the operating principles of two-and-four-stroke-cycle engines.	
04.04	Identify the equipment of two-and-four-stroke-cycle engines.	
04.05	Identify governor types and their operating principles.	
05.0	Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services--The student will be able to:	
05.01	Identify information needed and the service requested on a repair order.	ASE
05.02	Identify purpose and demonstrate proper use of fender covers, mats.	ASE

CTE Standards and Benchmarks		Priority Number
05.03	Demonstrate use of the three C's (Concern, Cause, and Correction).	ASE
05.04	Review vehicle service history.	ASE
05.05	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	ASE
05.06	Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.)	ASE
06.0	Demonstrate workplace employability skills related to personal standards and work habits/ethics--The student will be able to:	
06.01	Reports to work daily on time; able to take directions and motivated to accomplish the task at hand.	ASE
06.02	Dresses appropriately and uses language and manners suitable for the workplace.	ASE
06.03	Maintains appropriate personal hygiene.	ASE
06.04	Meets and maintains employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc.	ASE
06.05	Demonstrates honesty, integrity and reliability.	ASE
06.06	Complies with workplace policies/laws	ASE
06.07	Contributes to the success of the team, assists others and requests help when needed.	ASE
06.08	Works well with all customers and coworkers.	ASE
06.09	Negotiates solutions to interpersonal and workplace conflicts.	ASE
06.10	Contributes ideas and initiative.	ASE
06.11	Follows directions.	ASE
06.12	Communicates (written and verbal) effectively with customers and coworkers.	ASE
06.13	Reads and interprets workplace documents; writes clearly and concisely.	ASE
06.14	Analyzes and resolves problems that arise in completing assigned tasks.	ASE
06.15	Organizes and implements a productive plan of work.	ASE
06.16	Uses scientific, technical, engineering and mathematics principles and reasoning to accomplish assigned tasks.	ASE
06.17	Identifies and address the needs of all customers, providing helpful, courteous and knowledgeable service and advice as needed.	ASE

Florida Department of Education
Student Performance Standards

Course Number: DIM0102
Occupational Completion Point: B
Diesel Electrical and Electronics Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Electrical and Electronics Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study general electrical systems, batteries, starting, charging, lighting, gauges, warning devices, and related electrical system diagnostics, service, and repair.

For every task in Diesel Electrical and Electronics Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Electrical and Electronics Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

EE Task List:	
P-1 =	**38**
P-2 =	**15**
P-3 =	**12**
Total	**65**

CTE Standards and Benchmarks		Priority Number
07.0	Diagnose and repair general electrical systems--The student will be able to:	
07.01	Read and interpret electrical/electronic circuits using wiring diagrams.	P-1
07.02	Check continuity in electrical/electronic circuits using appropriate test equipment.	P-1
07.03	Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using appropriate test equipment.	P-1
07.04	Check current flow in electrical/electronic circuits and components using appropriate test equipment.	P-1
07.05	Check resistance in electrical/electronic circuits and components using appropriate test equipment.	P-1
07.06	Locate shorts, grounds, and opens in electrical/electronic circuits.	P-1
07.07	Diagnose parasitic (key-off) battery drain problems; perform tests; determine needed action.	P-1
07.08	Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed.	P-1
07.09	Inspect and test spike suppression devices; replace as needed.	P-3
07.10	Check frequency and pulse width signal in electrical/electronic circuits using appropriate test equipment.	P-3
08.0	Diagnose and repair battery systems--The student will be able to:	

CTE Standards and Benchmarks		Priority Number
08.01	Identify battery type; perform appropriate battery load test; determine needed action.	P-1
08.02	Determine battery state of charge using an open circuit voltage test.	P-1
08.03	Inspect, clean, and service battery; replace as needed.	P-1
08.04	Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed.	P-1
08.05	Charge battery using appropriate method for battery type.	P-1
08.06	Inspect, test, and clean battery cables and connectors; repair or replace as needed.	P-1
08.07	Jump start a vehicle using jumper cables and a booster battery or auxiliary power supply using proper safety procedures.	P-1
08.08	Perform battery capacitance test; determine needed action.	P-2
08.09	Identify and test low voltage disconnect (LVD) systems; determine needed repair.	P-2
09.0	Diagnose and repair starting systems--The student will be able to:	
09.01	Perform starter circuit cranking voltage and voltage drop tests; determine needed action.	P-1
09.02	Inspect and test components (key switch, push button and/or magnetic switch) and wires and harnesses in the starter control circuit; replace as needed	P-2
09.03	Inspect and test starter relays and solenoids/switches; replace as needed.	P-1
09.04	Remove and replace starter; inspect flywheel ring gear or flex plate.	P-1
10.0	Diagnose and repair charging systems--The student will be able to:	
10.01	Test instrument panel mounted volt meters and/or indicator lamps; determine needed action.	P-1
10.02	Identify causes of a no charge, low charge, or overcharge problems; determine needed action.	P-1
10.03	Inspect and replace alternator drive belts, pulleys, fans, tensioners, and mounting brackets; adjust drive belts and check alignment.	P-1
10.04	Perform charging system voltage and amperage output tests; perform AC ripple test; determine needed action.	P-1
10.05	Perform charging circuit voltage drop tests; determine needed action.	P-1
10.06	Remove and replace alternator.	P-1
10.07	Inspect, repair, or replace cables, wires, and connectors in the charging circuit.	P-1
11.0	Diagnose and repair lighting systems--The student will be able to:	
11.01	Interface with vehicle’s on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
11.02	Identify causes of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation.	P-1

CTE Standards and Benchmarks		Priority Number
11.03	Test, aim, and replace headlights.	P-1
11.04	Test headlight and dimmer circuit switches, relays, wires, terminals, connectors, sockets, and control components/modules; repair or replace as needed.	P-1
11.05	Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, and control components/modules of parking, clearance, and taillight circuits; repair or replace as needed.	P-1
11.06	Inspect and test instrument panel light circuit switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires, and printed circuits/control modules; repair or replace as needed.	P-2
11.07	Inspect and test interior cab light circuit switches, bulbs/LEDs, sockets, low voltage disconnect (LVD), connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-2
11.08	Inspect and test tractor-to-trailer multi-wire connector(s); repair or replace as needed.	P-1
11.09	Inspect, test, and adjust stoplight circuit switches, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
11.10	Inspect and test turn signal and hazard circuit flasher(s), switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
11.11	Inspect and test reverse lights and warning device circuit switches, bulbs/LEDs, sockets, horns, buzzers, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
12.0	Diagnose and repair gauges and warning devices--The student will be able to:	
12.01	Interface with vehicle's on-board computer; perform diagnostic procedure, verify instrument cluster operations using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
12.02	Identify causes of intermittent, high, low, or no gauge readings; determine needed action.	P-2
12.03	Identify causes of data bus-driven gauge malfunctions; determine needed action.	P-3
12.04	Inspect and test gauge circuit sensor/sending units, gauges, connectors, terminals, and wires; repair or replace as needed.	P-2
12.05	Inspect and test warning devices (lights and audible) circuit sensor/sending units, bulbs/LEDs, sockets, connectors, wires, and control components/modules; repair or replace as needed.	P-1
12.06	Inspect, test, replace, and calibrate (if applicable) electronic speedometer, odometer, and tachometer systems.	P-2
13.0	Diagnose and repair related electrical systems--The student will be able to:	
13.01	Interface with vehicle’s on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
13.02	Identify causes of constant, intermittent, or no horn operation; determine needed action.	P-1
13.03	Inspect and test horn circuit relays, horns, switches, connectors, wires, clock springs, and control components/modules; repair or replace as needed.	P-2
13.04	Identify causes of constant, intermittent, or no wiper operation; diagnose the cause of wiper speed control and/or park problems; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
13.05	Inspect and test wiper motor, resistors, park switch, relays, switches, connectors, wires and control components/modules; repair or replace as needed.	P-2
13.06	Inspect wiper motor transmission linkage, arms, and blades; adjust or replace as needed.	P-2
13.07	Inspect and test windshield washer motor or pump/relay assembly, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.08	Inspect and test side view mirror motors, heater circuit grids, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.09	Inspect and test heater and A/C electrical components including: A/C clutches, motors, resistors, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.10	Inspect and test auxiliary power outlet, integral fuse, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
13.11	Identify causes of slow, intermittent, or no power window operation; determine needed action.	P-3
13.12	Inspect and test motors, switches, relays, connectors, terminals, wires, and control components/modules of power window circuits; repair or replace as needed.	P-3
13.13	Inspect and test block heaters; determine needed repairs.	P-2
13.14	Inspect and test cruise control electrical components; repair or replace as needed.	P-3
13.15	Inspect and test switches, relays, controllers, actuator/solenoids, connectors, terminals, and wires of electric door lock circuits.	P-3
13.16	Check operation of keyless and remote lock/unlock devices; determine needed action.	P-3
13.17	Inspect and test engine cooling fan electrical control components/modules, wiring; repair or replace as needed.	P-2
13.18	Identify causes of data bus communication problems; determine needed action.	P-2

Florida Department of Education
Student Performance Standards

Course Number: DIM0104
Occupational Completion Point: C
Diesel Engine Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine, cylinder head, valve train, engine block, lubrication, cooling, air induction, exhaust, fuel, and engine brakes diagnostics, service, and repair.

For every task in Diesel Engine Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Engine Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

DE Task List:	
P-1	**35**
P-2	**32**
P-3	**21**
Total	**88**

CTE Standards and Benchmarks		Priority Number
14.0	General engine diagnosis and repair--The student will be able to:	
14.01	Inspect fuel, oil, Diesel Exhaust Fluid (DEF) and coolant levels, and condition; determine needed action.	P-1
14.02	Identify and diagnose the causes of engine fuel, oil, coolant, air, and other leaks; determine needed action.	P-1
14.03	Listen and interpret engine noises; determine needed action.	P-3
14.04	Observe engine exhaust smoke color and quantity; determine needed action.	P-2
14.05	Check and diagnose no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action.	P-1
14.06	Identify and diagnose causes of engine surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed action.	P-1
14.07	Identify and diagnose engine vibration problems; determine needed action.	P-2
14.08	Check, record, and clear electronic diagnostic (fault) codes; monitor electronic data; determine needed action.	P-1
14.09	Perform air intake system restriction and leakage tests; determine needed action.	
14.10	Perform intake manifold pressure (boost) test; determine needed action.	

CTE Standards and Benchmarks		Priority Number
14.11	Perform exhaust back pressure test; determine needed action.	
14.12	Perform cylinder compression test; determine needed action.	
15.0	Cylinder head and valve train diagnosis and repair--The student will be able to:	
15.01	Inspect cylinder head for cracks/damage; check mating surfaces for warpage; check condition of passages; inspect core/expansion and gallery plugs; determine needed action.	P-2
15.02	Disassemble head and inspect valves, guides, seats, springs, retainers, rotators, locks, and seals; determine needed action.	P-3
15.03	Measure valve head height relative to deck, valve face-to-seat contact; determine needed action.	P-3
15.04	Inspect injector sleeves and seals; measure injector tip or nozzle protrusion; perform needed action.	P-3
15.05	Inspect valve train components; determine needed action.	P-1
15.06	Reassemble cylinder head.	P-3
15.07	Inspect, measure, and replace/reinstall overhead camshaft; measure/adjust end play and backlash.	P-3
15.08	Inspect electronic wiring harness and brackets for wear, bending, cracks, and looseness; determine needed action.	P-1
15.09	Inspect and adjust valve bridges (crossheads); adjust valve clearances and injector settings.	P-2
15.10	Remove, clean, inspect for visible damage, and replace cylinder head(s) assembly.	
15.11	Clean and inspect threaded holes, studs, and bolts for serviceability; determine needed action.	
15.12	Inspect pushrods, rocker arms, rocker arm shafts, and blocked oil passages; perform needed action.	
15.13	Inspect cam followers; perform needed action.	
16.0	Engine block diagnosis and repair--The student will be able to:	
16.01	Perform crankcase pressure test; determine needed action	P-1
16.02	Remove, inspect, service, and install pans, covers, gaskets, seals, wear rings, and crankcase ventilation components.	P-2
16.03	Disassemble, clean, and inspect engine block for cracks/damage; measure mating surfaces for warpage; check condition of passages, core/expansion and gallery plugs; inspect threaded holes, studs, dowel pins, and bolts for serviceability; determine needed action.	P-2
16.04	Inspect cylinder sleeve counter bore and lower bore; check bore distortion; determine needed action.	P-2
16.05	Clean, inspect, and measure cylinder walls or liners for wear and damage; determine needed action.	P-2
16.06	Replace/reinstall cylinder liners and seals; check and adjust liner height (protrusion).	P-2
16.07	Inspect in-block camshaft bearings for wear and damage; determine needed action.	P-3
16.08	Inspect, measure, and replace/reinstall in-block camshaft; measure/adjust end play.	P-3

CTE Standards and Benchmarks		Priority Number
16.09	Clean and inspect crankshaft for surface cracks and journal damage; check condition of oil passages; check passage plugs; measure journal diameter; determine needed action.	P-2
16.10	Inspect main bearings for wear patterns and damage; replace as needed; check bearing clearances; check and correct crankshaft end play.	P-2
16.11	Inspect, install, and time gear train; measure gear backlash; determine needed action.	P-2
16.12	Inspect connecting rod and bearings for wear patterns; measure pistons, pins, retainers, and bushings; perform needed action.	P-3
16.13	Determine piston-to-cylinder wall clearance; check ring-to-groove fit and end gap; install rings on pistons.	P-3
16.14	Assemble pistons and connecting rods; install in block; install rod bearings and check clearances.	P-2
16.15	Check condition of piston cooling jets (nozzles); determine needed action.	P-2
16.16	Inspect and measure crankshaft vibration damper; determine needed action.	P-3
16.17	Install and align flywheel housing; inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.	P-3
16.18	Inspect flywheel/flexplate (including ring gear) and mounting surfaces for cracks and wear; measure runout; determine needed action.	P-2
17.0	Lubrication systems diagnosis and repair--The student will be able to:	
17.01	Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit, test engine oil temperature and check operation of temperature sensor; determine needed action.	P-1
17.02	Check engine oil level, condition, and consumption; determine needed action.	P-1
17.03	Inspect and measure oil pump, drives, inlet pipes, and pick-up screens; check drive gear clearances; determine needed action.	P-3
17.04	Inspect oil pressure regulator valve(s), by-pass and pressure relief valve(s), oil thermostat, and filters; determine needed action.	P-3
17.05	Inspect, clean, and test oil cooler and components; determine needed action.	P-3
17.06	Inspect turbocharger lubrication system; determine needed action.	P-2
17.07	Determine proper lubricant and perform oil and filter change.	P-1
18.0	Cooling system diagnosis and repair--The student will be able to:	
18.01	Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action.	P-1
18.02	Test coolant temperature and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action.	P-1
18.03	Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment.	P-1
18.04	Inspect thermostat(s), by-passes, housing(s), and seals; replace as needed.	P-2
18.05	Recover coolant, flush, and refill with recommended coolant/additive package; bleed cooling system.	P-1

CTE Standards and Benchmarks			Priority Number
	18.06	Inspect coolant conditioner/filter assembly for leaks; inspect valves, lines, and fittings; replace as needed.	P-1
	18.07	Inspect water pump and hoses; replace as needed.	P-1
	18.08	Inspect, clean, and pressure test radiator. Pressure test cap, tank(s), and recovery systems; determine needed action.	P-1
	18.09	Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.	P-1
	18.10	Inspect turbo charger cooling systems; determine needed action.	P-2
19.0	Air induction and exhaust systems diagnosis and repair--The student will be able to:		
	19.01	Perform air intake system restriction and leakage test; determine needed action.	P-1
	19.02	Perform intake manifold pressure (boost) test; determine needed action.	P-3
	19.03	Check exhaust back pressure; determine needed action.	P-3
	19.04	Inspect turbocharger(s), wastegate, and piping systems; determine needed action.	P-2
	19.05	Inspect turbocharger(s) (variable ratio/geometry VGT), pneumatic, hydraulic, electronic controls, and actuators.	P-2
	19.06	Check air induction system: piping, hoses, clamps, and mounting; service or replace air filter as needed.	P-1
	19.07	Remove and reinstall turbocharger/wastegate assembly.	P-3
	19.08	Inspect intake manifold, gaskets, and connections; replace as needed.	P-3
	19.09	Inspect, clean, and test charge air cooler assemblies; replace as needed.	P-2
	19.10	Inspect exhaust manifold, piping, mufflers, and mounting hardware; repair or replace as needed.	P-2
	19.11	Inspect exhaust after treatment devices; determine necessary action.	P-2
	19.12	Inspect and test preheater/inlet air heater, or glow plug system and controls; perform needed action.	P-2
	19.13	Inspect exhaust gas recirculation (EGR) system including EGR valve, cooler, piping, filter, electronic sensors, controls, and wiring; determine needed action.	P-2
20.0	Fuel system diagnosis and repair--The student will be able to:		
	20.01	Fuel supply system	
		20.01.1 Check fuel level, and condition; determine needed action.	P-1
		20.01.2 Perform fuel supply and return system tests; determine needed action.	P-1
		20.01.3 Inspect fuel tanks, vents, caps, mounts, valves, screens, crossover system, supply and return lines and fittings; determine needed action.	P-1

CTE Standards and Benchmarks			Priority Number
	20.01.4	Inspect, clean, and test fuel transfer (lift) pump, pump drives, screens, fuel/water separators/indicators, filters, heaters, coolers, ECM cooling plates, and mounting hardware; determine needed action.	P-1
	20.01.5	Inspect and test pressure regulator systems (check valves, pressure regulator valves, and restrictive fittings); determine needed action.	P-1
	20.01.6	Check fuel system for air; determine needed action; prime and bleed fuel system; check primer pump.	P-1
	20.01.7	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time a distributor (rotary) type injection pump; determine needed action.	
	20.01.8	Perform on-engine inspections, tests, and adjustments; check and adjust timing or replace and time an in-line type injection pump; determine needed action.	
	20.01.9	Inspect and adjust throttle control linkage; determine needed action.	
	20.01.10	Inspect air/fuel ratio control systems; determine needed action.	
	20.01.11	Inspect, test, and adjust engine fuel shut-down devices and controls; determine needed action.	
20.02	Electronic fuel management system		
	20.02.1	Inspect and test power and ground circuits and connections; measure and interpret voltage, voltage drop, amperage, and resistance readings using a digital multimeter (DMM); determine needed action.	P-1
	20.02.2	Interface with vehicle's on-board computer; perform diagnostic procedures using electronic service tool(s) (to include PC based software and/or data scan tools); determine needed action.	P-1
	20.02.3	Check and record electronic diagnostic codes and trip/operational data; monitor electronic data; clear codes; determine further diagnosis.	P-1
	20.02.4	Locate and use relevant service information (to include diagnostic procedures, flow charts, and wiring diagrams).	P-1
	20.02.5	Inspect and replace electrical connector terminals, seals, and locks.	P-1
	20.02.6	Inspect and test switches, sensors, controls, actuator components, and circuits; adjust or replace as needed.	P-1
	20.02.7	Using electronic service tool(s) access and interpret customer programmable parameters.	P-1
	20.02.8	Perform on-engine inspections, test and adjustments on electronic unit injectors (EUI); determine needed action	P-2
	20.02.9	Remove and install electronic unit injectors (EUI) and related components; recalibrate ECM (if applicable).	P-2
	20.02.10	Perform cylinder contribution test utilizing electronic service tool(s).	P-1
	20.02.11	Perform on-engine inspections and tests on hydraulic electronic unit injectors (HEUI) and system electronic controls; determine needed action.	P-2

CTE Standards and Benchmarks			Priority Number
	20.02.12	Perform on-engine inspections and tests on hydraulic electronic unit injector (HEUI) high pressure oil supply and control systems; determine needed action.	P-2
	20.02.13	Perform on-engine inspections and tests on high pressure common rail (HPCR) type injection systems; determine needed action.	P-2
	20.02.14	Inspect high pressure injection lines, hold downs, fittings and seals; determine needed action.	P-2
	20.02.15	Perform engine timing sensor calibration (if applicable).	
	20.02.16	Perform on-engine inspections and tests on distributor-type injection pump electronic controls; determine needed action.	
	20.02.17	Perform on-engine inspections and tests on in-line type injection pump electronic controls; determine needed action.	
21.0	Diagnose and repair engine brakes--The student will be able to:		
	21.01	Inspect and adjust engine compression/exhaust brakes; determine needed action.	P-2
	21.02	Inspect, test, and adjust engine compression/exhaust brake control circuits, switches, and solenoids; determine needed action.	P-3
	21.03	Inspect engine compression/exhaust brake housing, valves, seals, lines, and fittings; repair or replace as needed.	P-3

Florida Department of Education
Student Performance Standards

Course Number: DIM0105
Occupational Completion Point: D
Diesel Brakes Technician – 300 Hours – SOC Code 49-3031

Course Description:
The Diesel Brakes Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of air, and hydraulic brakes.

For every task in Diesel Brakes Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Brakes Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

BR Task List:	
P-1 =	**39**
P-2 =	**9**
P-3 =	**7**
Total	**55**

CTE Standards and Benchmarks		Priority Number
22.0	Diagnose and repair air supply and service systems--The student will be able to:	
22.01	Identify and diagnose poor stopping, air leaks, premature wear, pulling, grabbing, dragging, or balance problems caused by supply and service system malfunctions; determine needed action.	P-1
22.02	Check air system build-up time; determine needed action.	P-1
22.03	Drain air reservoir/tanks; check for oil, water, and foreign material; determine needed action.	P-1
22.04	Inspect air compressor drive gear, belts and coupling; adjust or replace as needed.	P-3
22.05	Inspect air compressor inlet; inspect oil supply and coolant lines, fittings, and mounting brackets; repair or replace as needed.	P-1
22.06	Inspect and test air system pressure controls: governor, unloader assembly valves, filters, lines, hoses, and fittings; replace as needed.	P-1
22.07	Inspect air system lines, hoses, fittings, and couplings; repair or replace as needed.	P-1
22.08	Inspect and test air tank relief (safety) valves, one-way (single) check valves, two-way (double) check-valves, manual and automatic drain valves; replace as needed.	P-1
22.09	Inspect and clean air drier systems, filters, valves, heaters, wiring, and connectors; repair or replace as needed.	P-1
22.10	Inspect and test brake application (foot/treadle) valve, fittings, and mounts; check pedal operation; replace as needed.	P-1

CTE Standards and Benchmarks		Priority Number
22.11	Inspect and test stop light circuit switches, wiring, and connectors; repair or replace as needed.	P-1
22.12	Inspect and test hand brake (trailer) control valve, lines, fittings, and mountings; repair or replace as needed.	P-1
22.13	Inspect and test brake relay valve; replace as needed.	P-1
22.14	Inspect and test quick release valves; replace as needed.	P-1
22.15	Inspect and test tractor protection valve; replace as needed.	P-1
22.16	Inspect and test emergency (spring) brake control/modulator valve(s); replace as needed.	P-1
22.17	Inspect and test low pressure warning devices, wiring, and connectors; repair or replace as needed.	P-1
22.18	Inspect and test air pressure gauges, lines, and fittings; replace as needed.	P-2
22.19	Inspect and test front and rear axle limiting (proportioning) valves; replace as needed.	
23.0	Diagnose and repair mechanical/foundation air brake systems--The student will be able to:	
23.01	Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, or dragging problems caused by the foundation brake, slack adjuster, and brake chamber problems; determine needed action.	P-1
23.02	Inspect and test service brake chambers, diaphragm, clamp, spring, pushrod, clevis, and mounting brackets; repair or replace as needed.	P-1
23.03	Identify type, inspect and service slack adjusters; perform needed action.	P-1
23.04	Inspect camshafts, tubes, rollers, bushings, seals, spacers, retainers, brake spiders, shields, anchor pins, and springs; replace as needed.	P-1
23.05	Inspect, clean, and adjust air disc brake caliper assemblies; determine needed repairs.	P-2
23.06	Inspect and measure brake shoes or pads; perform needed action.	P-1
23.07	Inspect and measure brake drums or rotors; perform needed action.	P-1
24.0	Diagnose and repair parking brakes--The student will be able to**:**	
24.01	Inspect and test parking (spring) brake chamber diaphragm and seals; replace parking (spring) brake chamber; dispose of removed chambers in accordance with local regulations.	P-1
24.02	Inspect and test parking (spring) brake check valves, lines, hoses, and fittings; replace as needed.	P-1
24.03	Inspect and test parking (spring) brake application and release valve; replace as needed.	P-1
24.04	Manually release (cage) and reset (uncage) parking (spring) brakes in accordance with manufacturers' recommendations.	P-1
24.05	Identify and test anti compounding brake function.	P-1
25.0	Diagnose and repair hydraulic systems--The student will be able to:	
25.01	Identify and diagnose poor stopping, premature wear, pulling, dragging, balance, or pedal feel problems caused by the hydraulic system; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
25.02	Inspect and test master cylinder for internal/external leaks and damage; replace as needed.	P-1
25.03	Inspect hydraulic system brake lines for leaks and damage, flexible hoses, and fittings for leaks and damage; replace as needed.	P-1
25.04	Inspect and test metering (hold-off), load sensing/proportioning, proportioning, and combination valves; replace as needed.	P-3
25.05	Inspect and test brake pressure differential valve and warning light circuit switch, bulbs/LEDs, wiring, and connectors; repair or replace as needed.	P-2
25.06	Inspect disc brake caliper assemblies; replace as needed.	P-1
25.07	Inspect/test brake fluid; bleed and/or flush system; determine proper fluid type.	P-1
25.08	Check and adjust brake pedal pushrod length.	
25.09	Inspect and clean wheel cylinders; replace as needed.	
25.10	Test and adjust brake stop light switch, bulbs, wiring, and connectors; repair or replace as needed.	
26.0	Diagnose and repair mechanical/foundation hydraulic brake systems--The student will be able to:	
26.01	Identify and diagnose poor stopping, brake noise, premature wear, pulling, grabbing, dragging, or pedal feel problems caused by mechanical components; determine needed action.	P-2
26.02	Inspect and measure rotors; perform needed action.	P-1
26.03	Inspect and measure disc brake pads; inspect mounting hardware; perform needed action.	P-1
26.04	Check parking brake operation; inspect parking brake application and holding devices; adjust and replace as needed.	P-2
26.05	Inspect and measure drum brake shoes and linings; inspect mounting hardware, adjuster mechanisms, and backing plates; perform needed action.	
27.0	Diagnose and repair power assist units--The student will be able to:	
27.01	Identify and diagnose stopping problems caused by the brake assist (booster) system; determine needed action.	P-3
27.02	Inspect, test, repair, or replace hydraulic brake assist (booster), hoses, and control valves; determine proper fluid type.	P-3
27.03	Check emergency (back-up, reserve) brake assist system.	P-3
28.0	Diagnose and repair air and hydraulic antilock brake systems (ABS) and automatic traction control (ATC)--The student will be able to:	
28.01	Observe antilock brake system (ABS) warning light operation (includes trailer and dash mounted ABS warning light); determine needed action.	P-1
28.02	Diagnose antilock brake system (ABS) electronic control(s) and components using self-diagnosis and/or electronic service tool(s); determine needed action.	P-1
28.03	Identify poor stopping and wheel lock-up caused by failure of the antilock brake system (ABS); determine needed action.	P-1

CTE Standards and Benchmarks		Priority Number
28.04	Test and check operation of antilock brake system (ABS) air, hydraulic, electrical, and mechanical components; perform needed action.	P-1
28.05	Test antilock brake system (ABS) wheel speed sensors and circuits; adjust or replace as needed.	P-1
28.06	Bleed the ABS hydraulic circuits according to manufacturers' procedures.	P-2
28.07	Observe automatic traction control (ATC) warning light operation; determine needed action.	P-3
28.08	Diagnose automatic traction control (ATC) electronic control(s) and components using self-diagnosis and/or specified test equipment (scan tool, PC computer); determine needed action.	P-3
28.09	Verify power line carrier (PLC) operations.	P-2
28.10	Diagnose, service, and adjust antilock brake system (ABS) wheel speed sensors and circuits following manufacturers' recommended procedures (including voltage output, resistance, shorts to voltage/ground, and frequency data).	
29.0	Diagnose and repair wheel bearings--The student will be able to:	
29.01	Clean, inspect, lubricate and replace wheel bearings and races/cups; replace seals and wear rings; inspect spindle/tube; inspect and replace retaining hardware; adjust wheel bearings. Verify end play with dial indicator method.	P-1
29.02	Identify, inspect or replace unitized/preset hub bearing assemblies.	P-2

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

The purpose of this program is to prepare students for employment as bus, truck and diesel engine mechanics, diesel mechanics helpers, mobile heavy equipment mechanics, construction equipment mechanics, industrial truck mechanics.

The safety guidelines in the student performance standards have been recommended in the ASE Program Certification Standards for Medium/Heavy Truck Technician Training Program administered by National Automotive Technicians Education Foundation (NATEF).

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Medium and Heavy Duty Truck and Bus Technician 2**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T650200
CIP Number	0647061306
Grade Level	30, 31
Standard Length	750 hours
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to maintaining and repairing diesel engines and electrical systems; reconditioning diesel fuel injection systems; overhauling diesel engines; and performing diesel engine preventive maintenance.

The course content should also include training in communication, leadership, human relations and employability skills; and safe efficient work practices.

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 five occupational completion points.

The courses may be taken in any sequence. However, an individual must take the Diesel Engine Preventive Maintenance Technician course (DIM0103).

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	DIM0103	Diesel Engine Preventative Maintenance Technician	150 hours	49-3031
B	DIM0106	Diesel Heating and Air Conditioning Technician	150 hours	49-3031
C	DIM0107	Diesel Steering and Suspension Technician	150 hours	49-3031
D	DIM0108	Diesel Drivetrain Technician	150 hours	49-3031
E	DIM0109	Diesel Hydraulics Technician	150 hours	49-3031

National Standards

Programs identified as having Industry or National Standards corresponding to the standards and/or benchmarks for the Medium and Heavy Duty Bus and Truck program can be found using the following link:

http://www.natef.org/Achieving-Accreditation/Program-Standards.aspx

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 Diagnose and repair Engine systems.
02.0 Diagnose and repair Fuel system
03.0 Diagnose and repair Air induction and exhaust system
04.0 Diagnose and repair Cooling system
05.0 Diagnose and repair Lubrication system
06.0 Diagnose and repair Instruments and controls
07.0 Diagnose and repair Safety equipment
08.0 Diagnose and repair Hardware
09.0 Diagnose and repair Heating, ventilation, and air conditioning (HVAC)
10.0 Diagnose and repair Battery and starting systems
11.0 Diagnose and repair Electrical/Electronic charging systems
12.0 Diagnose and repair Lighting systems.
13.0 Diagnose and repair Air brake systems.
14.0 Diagnose and repair Hydraulic brake systems.
15.0 Diagnose and repair Drive Train systems.
16.0 Diagnose and repair Suspension and steering systems.
17.0 Diagnose and repair Tires and wheels.
18.0 Diagnose and repair Frame and fifth wheel.
19.0 HVAC systems diagnosis, service, and repair.
20.0 A/C system and component diagnosis, service, and repair.
21.0 Diagnose and repair Compressor and clutch.
22.0 Diagnose and repair Evaporator, condenser, and related components.
23.0 Heating and engine cooling systems diagnosis, service, and repair.
24.0 Electrical system diagnosis, service, and repair.
25.0 Air/vacuum/mechanical diagnosis, service, and repair.
26.0 Refrigerant recovery, recycling, and handling.
27.0 Steering column diagnosis, service, and repair.
28.0 Steering units diagnosis, service, and repair.
29.0 Steering linkage diagnosis, service, and repair.
30.0 Suspension systems diagnosis and repair.
31.0 Wheel alignment diagnosis, adjustment, and repair.
32.0 Wheels and tires diagnosis, service, and repair.
33.0 Frame and coupling diagnosis, service, and repair.
34.0 Clutch diagnosis and repair.
35.0 Transmission diagnosis and repair.
36.0 Driveshaft and universal joint diagnosis and repair.
37.0 Drive axle diagnosis and repair.
38.0 General hydraulic system diagnosis and repair.

39.0 Diagnose and repair hydraulic pumps.
40.0 Diagnose and repair hydraulic filtration/reservoirs (tanks).
41.0 Diagnose and repair hydraulic hoses, fittings, and connections.
42.0 Diagnose and repair hydraulic control valves.
43.0 Diagnose and repair hydraulic actuators.

Florida Department of Education
Student Performance Standards

Course Number: DIM0103
Occupational Completion Point: A
Diesel Engine Preventative Maintenance Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Preventative Maintenance Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study engine system, cab and hood systems, electrical/electronic systems, frame and chassis systems diagnostics, service, and repair.

For every task in Diesel Engine Preventative Maintenance Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The tasks included in the Diesel Engine Preventative Maintenance Technician area are entry-level technician inspection tasks designed to introduce the student to correct procedures and practices of vehicle inspection in a teaching/learning environment. They are not intended to satisfy the Annual Federal Vehicle Inspection requirement as prescribed in the Federal Motor Carrier Safety Regulations, Part 396, Appendix G to Subchapter B, Minimum Periodic Inspection Standards.

The first task in Diesel Engine Preventative Maintenance Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

PM Task List:	
P-1 =	**132**
P-2 =	**11**
P-3 =	**0**
Total	**143**

CTE Standards and Benchmarks		Priority Number
01.0	Diagnose and repair Engine systems--The student will be able to:	
01.01	Check engine starting/operation (including unusual noises, vibrations, exhaust smoke, etc.); record idle and governed rpm.	P-1
01.02	Inspect vibration damper.	P-1
01.03	Inspect belts, tensioners, and pulleys; check and adjust belt tension; check belt alignment.	P-1
01.04	Check engine oil level and condition; check dipstick seal.	P-1
01.05	Inspect engine mounts for looseness and deterioration.	P-1
01.06	Check engine for oil, coolant, air, fuel and exhaust leaks (Engine Off and Running).	P-1
01.07	Check engine compartment wiring harnesses, connectors, and seals for damage and proper routing.	P-1

CTE Standards and Benchmarks		Priority Number
01.08	Check electrical wiring, routing, and hold-down clamps, including Engine Control Module/Powertrain Control Module (ECM/PCM).	
02.0	Diagnose and repair Fuel system--The student will be able to:	
02.01	Check fuel tanks, mountings, lines, caps, and vents.	P-1
02.02	Drain water from fuel system.	P-1
02.03	Service water separator/fuel heater; replace fuel filter(s); prime and bleed fuel system.	P-1
02.04	Inspect throttle linkages and return springs.	
03.0	Diagnose and repair Air induction and exhaust system--The student will be able to:	
03.01	Check exhaust system mountings for looseness and damage.	P-1
03.02	Check engine exhaust system for leaks, proper routing, and damaged or missing components to include exhaust gas recirculation (EGR) system and after treatment devices, if equipped.	P-1
03.03	Check air induction system: piping, charge air cooler, hoses, clamps, and mountings; check for air restrictions and leaks.	P-1
03.04	Inspect turbocharger for leaks; check mountings and connections.	P-1
03.05	Check operation of engine compression/exhaust brake.	P-2
03.06	Service or replace air filter as needed; check and reset air filter restriction indicator.	P-1
03.07	Inspect and service crankcase ventilation system.	P-1
03.08	Inspect diesel exhaust fluid (DEF) system, to include tanks, lines, gauge pump, and filter.	P-1
03.09	Inspect selective catalyst reduction (SCR) system; including diesel exhaust fluid (DEF) for proper levels, leaks, mounting and connections.	P-2
04.0	Diagnose and repair Cooling system--The student will be able to:	
04.01	Check operation of fan clutch.	P-1
04.02	Inspect radiator (including air flow restriction, leaks, and damage) and mountings.	P-1
04.03	Inspect fan assembly and shroud.	P-1
04.04	Pressure test cooling system and radiator cap.	P-1
04.05	Inspect coolant hoses and clamps.	P-1
04.06	Inspect coolant recovery system.	P-1
04.07	Check coolant for contamination, additive package concentration, aeration, and protection level (freeze point).	P-1
04.08	Service coolant filter.	P-1

CTE Standards and Benchmarks		Priority Number
	04.09 Inspect water pump.	P-1
05.0	Diagnose and repair Lubrication system--The student will be able to:	
	05.01 Change engine oil and filters; visually check oil for coolant or fuel contamination; inspect and clean magnetic drain plugs.	P-1
	05.02 Take an engine oil sample for analysis.	P-1
06.0	Diagnose and repair Instruments and control systems--The student will be able to:	
	06.01 Inspect key condition and operation of ignition switch.	P-1
	06.02 Check warning indicators.	P-1
	06.03 Check instruments; record oil pressure and system voltage.	P-1
	06.04 Check operation of electronic power take off (PTO) and engine idle speed controls (if applicable)	P-2
	06.05 Check HVAC controls.	P-1
	06.06 Check operation of all accessories.	P-1
	06.07 Using electronic service tool(s) or on-board diagnostic system; retrieve engine monitoring information; check and record diagnostic codes and trip/operational data (including engine, transmission, ABS, and other systems).	P-1
	06.08 Check mechanical, electronic, and emergency shutdown operation.	
	06.09 Check mechanical and electronic engine speed controls.	
07.0	Diagnose and repair Safety equipment--The student will be able to:	
	07.01 Check operation of electric/air horns and back-up warning devices.	P-1
	07.02 Check condition of spare fuses, safety triangles, fire extinguisher, and all required decals.	P-1
	07.03 Inspect seat belts and sleeper restraints.	P-1
	07.04 Inspect wiper blades and arms.	P-1
08.0	Diagnose and repair Hardware--The student will be able to:	
	08.01 Check operation of wiper and washer.	P-1
	08.02 Inspect windshield glass for cracks or discoloration; check sun visor.	P-1
	08.03 Check seat condition, operation, and mounting.	P-1
	08.04 Check door glass and window operation.	P-1
	08.05 Inspect steps and grab handles.	P-1
	08.06 Inspect mirrors, mountings, brackets, and glass.	P-1

CTE Standards and Benchmarks		Priority Number
	08.07 Record all observed physical damage.	P-2
	08.08 Lubricate all cab and hood grease fittings.	P-2
	08.09 Inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables.	P-1
	08.10 Inspect cab mountings, hinges, latches, linkages and ride height; service as needed.	P-1
	08.11 Inspect tilt cab hydraulic pump, lines, and cylinders for leakage; inspect safety devices; service as needed.	
09.0	Diagnose and repair Heating, ventilation, and air conditioning (HVAC)--The student will be able to:	
	09.01 Inspect A/C condenser and lines for condition and visible leaks; check mountings.	P-2
	09.02 Inspect A/C compressor and lines for condition and visible leaks; check mountings.	P-2
	09.03 Check A/C system condition and operation; check A/C monitoring system, if applicable.	P-1
	09.04 Check HVAC air inlet filters and ducts; service as needed.	P-1
10.0	Diagnose and repair Electrical/Electronic battery and starting systems--The student will be able to:	
	10.01 Inspect battery box(es), cover(s), and mountings.	P-1
	10.02 Inspect battery hold-downs, connections, cables, and cable routing; service as needed.	P-1
	10.03 Check/record battery state-of-charge (open circuit voltage) and condition.	P-1
	10.04 Perform battery test (load and/or capacitance).	P-1
	10.05 Inspect starter, mounting, and connections.	P-1
	10.06 Engage starter; check for unusual noises, starter drag, and starting difficulty.	P-1
11.0	Diagnose and repair Electrical/Electronic charging systems--The student will be able to:	
	11.01 Inspect alternator, mountings, cable, wiring, and wiring routing; determine needed action.	P-1
	11.02 Perform alternator output tests.	P-1
12.0	Diagnose and repair Electrical/Electronic lighting systems--The student will be able to:	
	12.01 Check operation of interior lights; determine needed action.	P-1
	12.02 Check all exterior lights, lenses, reflectors, and conspicuity tape; check headlight alignment; determine needed action.	P-1
	12.03 Inspect and test tractor-to-trailer multi-wire connector(s), cable(s), and holder(s); determine needed action.	P-1
13.0	Diagnose and repair Air brake systems--The student will be able to:	
	13.01 Check operation of parking brake.	P-1
	13.02 Record air governor cut-in and cut-out setting (psi).	P-1

CTE Standards and Benchmarks		Priority Number
13.03	Check operation of air reservoir/tank drain valves.	P-1
13.04	Check air system for leaks (brakes released).	P-1
13.05	Check air system for leaks (brakes applied).	P-1
13.06	Test one-way and double-check valves.	P-1
13.07	Check low air pressure warning devices.	P-1
13.08	Check emergency (spring) brake control/modulator valve, if applicable.	P-1
13.09	Check tractor protection valve.	P-1
13.10	Test air pressure build-up time.	P-1
13.11	Inspect coupling air lines, holders, and gladhands.	P-1
13.12	Check brake chambers and air lines for secure mounting and damage.	P-1
13.13	Check operation of air drier.	P-1
13.14	Inspect and record brake shoe/pad condition, thickness, and contamination.	P-1
13.15	Inspect and record condition of brake drums/rotors.	P-1
13.16	Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing	P-1
13.17	Check operation and adjustment of brake automatic slack adjusters (ASA); check and record push rod stroke.	P-1
13.18	Lubricate all brake component grease fittings.	P-1
13.19	Check condition and operation of hand brake (trailer) control valve, if applicable.	P-2
13.20	Perform antilock brake system (ABS) operational system self-test.	P-1
13.21	Drain air tanks and check for contamination.	P-1
13.22	Check condition of pressure relief (safety) valves.	P-1
13.23	Check air governor cut-in pressure.	
13.24	Check operation of brake manual slack adjusters; adjust as needed.	
14.0	Diagnose and repair Hydraulic brake systems--The student will be able to:	
14.01	Check master cylinder fluid level and condition.	P-1
14.02	Inspect brake lines, fittings, flexible hoses, and valves for leaks and damage.	P-1
14.03	Check parking brake operation; inspect parking brake application and holding devices; adjust as needed.	P-1
14.04	Check operation of hydraulic system: pedal travel, pedal effort, pedal feel.	P-1

CTE Standards and Benchmarks		Priority Number
14.05	Inspect calipers for leakage, binding and damage.	P-1
14.06	Inspect brake assist system (booster), hoses and control valves; check reservoir fluid level and condition.	P-1
14.07	Inspect and record brake lining/pad condition, thickness, and contamination.	P-1
14.08	Inspect and record condition of brake rotors.	P-1
14.09	Check antilock brake system wiring, connectors, seals, and harnesses for damage and proper routing.	P-1
14.10	Adjust drum brakes.	
15.0	Diagnose and repair Drive Train systems--The student will be able to:	
15.01	Check operation of clutch, clutch brake, and gearshift.	P-1
15.02	Check clutch linkage/cable for looseness or binding, if applicable.	P-1
15.03	Check hydraulic clutch slave and master cylinders, lines, fittings, and hoses, if applicable.	P-1
15.04	Check clutch adjustment; adjust as needed.	P-1
15.05	Check transmission case, seals, filter, hoses, lines and cooler for cracks and leaks.	P-1
15.06	Inspect transmission breather.	P-1
15.07	Inspect transmission mounts.	P-1
15.08	Check transmission oil level, type, and condition.	P-1
15.09	Inspect U-joints, yokes, driveshafts, boots/seals, center bearings, and mounting hardware for looseness, damage, and proper phasing.	P-1
15.10	Inspect axle housing(s) for cracks and leaks.	P-1
15.11	Inspect axle breather(s).	P-1
15.12	Lubricate all drivetrain grease fittings.	P-1
15.13	Check drive axle(s) oil level, type, and condition.	P-1
15.14	Change drive axle(s) oil and filter/screen, if applicable; check and clean magnetic plugs.	P-2
15.15	Check transmission wiring, connectors, seals, and harnesses for damage and proper routing.	P-1
15.16	Change transmission oil and filter, if applicable; check and clean magnetic plugs.	P-2
15.17	Check interaxle differential lock operation.	P-1
15.18	Check transmission range shift operation.	P-1
15.19	Check two-speed axle unit operation and oil level.	
16.0	Diagnose and repair Suspension and steering systems--The student will be able to:	

CTE Standards and Benchmarks		Priority Number
16.01	Check steering wheel operation for free play and binding.	P-1
16.02	Check power steering pump, mounting, and hoses for leaks, condition, and routing; check fluid level.	P-1
16.03	Change power steering fluid and filter.	P-1
16.04	Inspect steering gear for leaks and secure mounting.	P-1
16.05	Inspect steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, and linkages.	P-1
16.06	Check kingpins for wear.	P-1
16.07	Check wheel bearings for looseness and noise.	P-1
16.08	Check oil level and condition in all non-drive hubs; check for leaks.	P-1
16.09	Inspect springs, pins, hangers, shackles, spring U-bolts, and insulators.	P-1
16.10	Inspect shock absorbers for leaks and secure mounting.	P-1
16.11	Inspect air suspension springs, mounts, hoses, valves, linkage, and fittings for leaks and damage.	P-1
16.12	Check and record suspension ride height.	P-1
16.13	Lubricate all suspension and steering grease fittings.	P-1
16.14	Check axle locating components (radius, torque, and/or track rods).	P-1
16.15	Check tandem axle alignment and spacing.	
16.16	Remove and inspect wheel bearings; reassemble and adjust.	
16.17	Check toe adjustment.	
17.0	Diagnose and repair Tires and wheels--The student will be able to:	
17.01	Inspect tires for wear patterns and proper mounting.	P-1
17.02	Inspect tires for cuts, cracks, bulges, and sidewall damage.	P-1
17.03	Inspect valve caps and stems; determine needed action.	P-1
17.04	Measure and record tread depth; probe for imbedded debris.	P-1
17.05	Check and record air pressure; adjust air pressure in accordance with manufacturers' specifications.	P-1
17.06	Check wheel mounting hardware condition; determine needed action.	P-1
17.07	Inspect wheels for cracks, damage and proper hand hold alignment.	P-1
17.08	Check tire matching (diameter and tread) on single and dual tire applications.	P-1
17.09	Retorque lugs in accordance with manufacturer's specifications.	

CTE Standards and Benchmarks		Priority Number
18.0	Diagnose and repair Frame and fifth wheel--The student will be able to:	
18.01	Inspect fifth wheel mounting, bolts, air lines, and locks.	P-1
18.02	Test operation of fifth wheel locking device; adjust if necessary.	P-1
18.03	Check quarter fenders, mud flaps, and brackets.	P-1
18.04	Check pintle hook assembly and mounting; if applicable.	P-2
18.05	Lubricate all fifth wheel grease fittings and plate; if applicable	P-1
18.06	Inspect frame and frame members for cracks and damage.	P-1

Florida Department of Education
Student Performance Standards

Course Number: DIM0106
Occupational Completion Point: B
Diesel Heating and Air Conditioning Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Heating and Air Conditioning Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of HVAC, and A/C systems.

For every task in Diesel Heating and Air Conditioning Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Heating and Air Conditioning Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

HV Task List:	
P-1	**31**
P-2	**17**
P-3	**10**
Total	**58**

CTE Standards and Benchmarks		Priority Number
19.0	HVAC systems diagnosis, service, and repair--The student will be able to:	
19.01	Verify the need for service or repair of HVAC systems based on unusual operating noises; determine needed action.	P-1
19.02	Verify the need for service or repair of HVAC systems based on unusual visual, smell, and touch conditions; determine needed action.	P-1
19.03	Identify system type and components (cycling clutch orifice tube - CCOT, expansion valve) and conduct performance test(s) on HVAC systems; determine needed action.	P-1
19.04	Retrieve diagnostic codes; determine needed action.	P-3
20.0	A/C system and component diagnosis, service, and repair--The student will be able to:	
20.01	Identify causes of temperature control problems in the A/C system; determine needed action.	P-1
20.02	Identify refrigerant and lubricant types; check for contamination; determine needed action.	P-1
20.03	Identify A/C system problems indicated by pressure gauge and temperature readings; determine needed action.	P-1
20.04	Identify A/C system problems indicated by visual, audible, smell, and touch procedures; determine needed action.	P-1
20.05	Perform A/C system leak test; determine needed action.	P-1

CTE Standards and Benchmarks		Priority Number
	20.06 Recover, evacuate, and recharge A/C system using appropriate equipment.	P-1
	20.07 Identify contamination in the A/C system components; determine needed action.	P-3
	20.08 Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-2
	20.09 Charge A/C system with refrigerant.	
	20.10 Identify lubricant type needed for system application.	
21.0	Diagnose and repair Compressor and clutch--The student will be able to:	
	21.01 Identify and diagnose A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action.	P-1
	21.02 Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices.	P-2
	21.03 Inspect, and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension and check alignment.	P-1
	21.04 Inspect, test, adjust, service, or replace A/C compressor clutch components or assembly.	P-2
	21.05 Inspect and correct A/C compressor lubricant level (if applicable).	P-2
	21.06 Inspect, test, or replace A/C compressor.	P-1
	21.07 Inspect, repair, or replace A/C compressor mountings and hardware.	P-2
22.0	Diagnose and repair Evaporator, condenser, and related components--The student will be able to:	
	22.01 Correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses.	P-1
	22.02 Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action.	P-1
	22.03 Inspect and test A/C system condenser. Check for proper airflow and mountings; determine needed action.	P-1
	22.04 Inspect and replace receiver/drier or accumulator/drier.	P-1
	22.05 Inspect and test cab/sleeper refrigerant solenoid, expansion valve(s); check placement of thermal bulb (capillary tube); determine needed action.	P-3
	22.06 Remove and replace orifice tube.	P-1
	22.07 Inspect and test cab/sleeper evaporator core; determine needed action.	P-3
	22.08 Inspect, clean, and repair evaporator housing and water drain; inspect and service/replace evaporator air filter.	P-1
	22.09 Identify and inspect A/C system service ports (gauge connections); determine needed action.	P-1
	22.10 Identify the cause of system failures resulting in refrigerant loss from the A/C system high pressure relief device; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
	22.11 Inspect and test A/C system condenser and mountings; determine needed action.	
23.0	Heating and engine cooling systems diagnosis, service, and repair--The student will be able to:	
	23.01 Identify causes of outlet air temperature control problems in the HVAC system; determine needed action.	P-1
	23.02 Diagnose window fogging problems; determine needed action.	P-2
	23.03 Perform engine cooling system tests for leaks, protection level, contamination, coolant level, coolant type, temperature, and conditioner concentration; determine needed action.	P-1
	23.04 Inspect engine cooling and heating system hoses, lines, and clamps; determine needed action.	P-1
	23.05 Inspect and test radiator, pressure cap, and coolant recovery system (surge tank); determine needed action.	P-1
	23.06 Inspect water pump; determine needed action.	P-1
	23.07 Inspect and test thermostats, by-passes, housings, and seals; determine needed repairs.	P-2
	23.08 Recover, flush and refill with recommended coolant/additive package; bleed cooling system.	P-1
	23.09 Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.	P-2
	23.10 Inspect and test heating system coolant control valve(s) and manual shut-off valves; determine needed action.	P-2
	23.11 Inspect and flush heater core; determine needed action.	P-3
24.0	Electrical system diagnosis, service, and repair--The student will be able to:	
	24.01 Identify causes of HVAC electrical control system problems; determine needed action.	P-1
	24.02 Inspect and test A/C heater blower motors, resistors, switches, relays, modules, wiring, and protection devices; determine needed action.	P-2
	24.03 Inspect and test A/C compressor clutch relays, modules, wiring, sensors, switches, diodes, and protection devices; determine needed action.	P-2
	24.04 Inspect and test A/C related electronic engine control systems; determine needed action.	P-2
	24.05 Inspect and test engine cooling/condenser fan motors, relays, modules, switches, sensors, wiring, and protection devices; determine needed action.	P-2
	24.06 Inspect and test electric actuator motors, relays/modules, switches, sensors, wiring, and protection devices; determine needed action.	P-2
	24.07 Inspect and test HVAC system electrical/electronic control panel assemblies; determine needed action.	P-2
	24.08 Interface with vehicle’s on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-2
25.0	Air/vacuum/mechanical diagnostics, service, and repair--The student will be able to:	
	25.01 Identify causes of HVAC air and mechanical control problems; determine needed action.	P-3

CTE Standards and Benchmarks		Priority Number
25.02	Inspect and test HVAC system air and mechanical control panel assemblies; determine needed action.	P-3
25.03	Inspect, test, and adjust HVAC system air and mechanical control cables and linkages; determine needed action.	P-3
25.04	Inspect and test HVAC system actuators and hoses; determine needed action.	P-3
25.05	Inspect, test, and adjust HVAC system ducts, doors, and outlets; determine needed action.	P-3
25.06	Inspect and test HVAC system vacuum reservoir(s), check valve(s), and restrictors; determine needed action.	
NOTE: Tasks 1 through 5 should be accomplished in accordance with appropriate EPA regulations and SAE "J" standards.		
26.0	Refrigerant recovery, recycling, and handling--The student will be able to:	
26.01	Maintain and verify correct operation of certified equipment.	P-1
26.02	Identify and recover A/C system refrigerant.	P-1
26.03	Recycle or properly dispose of refrigerant.	P-1
26.04	Handle, label, and store refrigerant.	P-1
26.05	Test recycled refrigerant for non-condensable gases.	P-1

Florida Department of Education
Student Performance Standards

Course Number: DIM0107
Occupational Completion Point: C
Diesel Steering and Suspension Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Steering and Suspension Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of steering, suspension, wheel alignment, wheels, tires, and frame systems.

For every task in Diesel Steering and Suspension Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Steering and Suspension Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

SS Task List:	
P-1 =	**23**
P-2 =	**14**
P-3 =	**8**
Total	**45**

CTE Standards and Benchmarks		**Priority Number**
27.0	Steering column diagnosis, service, and repair--The student will be able to:	
27.01	Identify and diagnose fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action.	P-1
27.02	Inspect and service steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft.	P-1
27.03	Check cab mounting and adjust ride height.	P-2
27.04	Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components); install and center the steering wheel. Inspect, test, replace and calibrate steering angle sensor.	P-1
27.05	Disable and enable supplemental restraint system (SRS) in accordance with manufacturers' procedures.	P-1
28.0	Steering units diagnosis, service, and repair--The student will be able to:	
28.01	Identify and diagnose power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action.	P-1
28.02	Determine recommended type of power steering fluid; check level and condition; determine needed action.	P-1
28.03	Flush and refill power steering system; purge air from system.	P-2

CTE Standards and Benchmarks		Priority Number
28.04	Perform power steering system pressure, temperature, and flow tests; determine needed action.	P-3
28.05	Inspect, service, or replace power steering reservoir including filter, seals, and gaskets.	P-2
28.06	Inspect power steering pump drive gear and coupling; replace as needed.	P-3
28.07	Inspect, adjust, or replace power steering pump, mountings, and brackets.	P-3
28.08	Inspect and replace power steering system cooler, lines, hoses, clamps/mountings, hose routings, and fittings.	P-2
28.09	Inspect, adjust, repair, or replace integral type power steering gear(s) (single and/or dual) and mountings.	P-2
28.10	Inspect, and reinstall/replace pulleys, tensioners, and drive belts; adjust drive belts and check alignment.	
28.11	Inspect, adjust, or replace linkage-assist type power steering cylinder or gear (dual system).	
28.12	Adjust manual and automatic steering gear poppet/relief valves.	
29.0	Steering linkage diagnosis, service, and repair--The student will be able to:	
29.01	Inspect and align pitman arm; replace as needed.	P-1
29.02	Check and adjust steering (wheel) stops; verify relief pressures.	P-1
29.03	Inspect and lubricate steering components.	P-1
29.04	Inspect drag link (relay rod) and tie rod ends; adjust or replace as needed.	
29.05	Inspect steering arm and levers, and linkage pivot joints; replace as needed.	
29.06	Inspect clamps and retainers on cross tube/relay rod/centerline/tie rod; position or replace as needed.	
30.0	Suspension systems diagnosis, service, and repair--The student will be able to:	
30.01	Inspect front axles and attaching hardware; determine needed action.	P-1
30.02	Inspect and service kingpins, steering knuckle bushings, locks, bearings, seals, and covers; determine needed action.	P-1
30.03	Inspect shock absorbers, bushings, brackets, and mounts; replace as needed.	P-1
30.04	Inspect leaf springs, center bolts, clips, pins and bushings, shackles, U-bolts, insulators, brackets, and mounts; determine needed action.	P-1
30.05	Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, torque arms, related bushings, mounts, shims, and cams; determine needed action.	P-1
30.06	Inspect tandem suspension equalizer components; determine needed action.	P-3
30.07	Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; adjust, repair or replace as needed.	P-1
30.08	Inspect air springs, mounting plates, springs, suspension arms, and bushings; replace as needed.	P-1

CTE Standards and Benchmarks		Priority Number
	30.09 Measure and adjust vehicle ride height; determine needed action.	P-1
	30.10 Identify rough ride problems; determine needed action.	P-3
	30.11 Inspect walking beams, center (cross) tube, bushings, mounts, load pads, and saddles/caps; replace as needed.	
31.0	Wheel alignment diagnosis, adjustment, and repair--The student will be able to:	
	31.01 Identify and diagnose vehicle wandering, pulling, shimmy, hard steering and off-center steering wheel problems; adjust or repair as needed.	P-1
	31.02 Check camber; determine needed action.	P-2
	31.03 Check caster; adjust as needed.	P-2
	31.04 Check and adjust toe settings.	P-1
	31.05 Check rear axle(s) alignment (thrust line/centerline) and tracking; adjust or repair as needed.	P-2
	31.06 Diagnose turning/Ackerman angle (toe-out-on-turns) problems; determine needed action.	P-3
	31.07 Check front axle alignment (centerline); adjust or repair as needed.	P-2
32.0	Wheels and tires diagnosis, service, and repair --The student will be able to:	
	32.01 Identify and diagnose tire wear patterns; check tread depth and pressure; determine needed action.	P-1
	32.02 Identify and diagnose wheel/tire vibration, shimmy, pounding, hop (tramp) problems; determine needed action.	P-2
	32.03 Remove and install steering and drive axle wheel/tier assemblies; torque mounting hardware to specifications with a torque wrench.	P-1
	32.04 Inspect tire for proper application, (size, load range, position, and tread design); determine needed action.	P-2
	32.05 Inspect wheel/rims for proper application, hand hold alignment, load range, and design; determine needed action.	P-2
	32.06 Check operation of tire pressure monitoring system (TPMS); determine needed action if applicable.	P-3
33.0	Frame and coupling diagnosis, service, and repair --The student will be able to:	
	33.01 Inspect, service, and/or adjust fifth wheel, pivot pins, bushings, locking mechanisms, and mounting hardware.	P-1
	33.02 Inspect and service sliding fifth wheel, tracks, stops, locking systems, air cylinders, springs, lines, hoses, and controls.	P-2
	33.03 Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage; determine needed repairs.	P-1
	33.04 Inspect, install, or repair frame hangers, brackets, and cross members in accordance with manufacturers' recommended procedures.	P-3

CTE Standards and Benchmarks	Priority Number
33.05 Inspect, repair or replace pintle hooks and draw bars, if applicable.	P-2

Florida Department of Education
Student Performance Standards

Course Number: DIM0108
Occupational Completion Point: D
Diesel Drivetrain Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Drivetrain Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of clutch, transmission, driveshaft, universal joint, and drive axle systems.

For every task in Diesel Drivetrain Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Drivetrain Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

DT Task List:	
P-1 =	**27**
P-2 =	**18**
P-3 =	**12**
Total	**57**

CTE Standards and Benchmarks		**Priority Number**
34.0	Clutch diagnosis and repair--The student will be able to:	
34.01	Identify causes of clutch noise, binding, slippage, pulsation, vibration, grabbing, dragging, and chatter problems; determine needed action.	P-1
34.02	Inspect and adjust clutch linkage, cables, levers, brackets, bushings, pivots, springs, and clutch safety switch (includes push and pull-type assemblies); check pedal height and travel; perform needed action.	P-1
34.03	Inspect, adjust, repair, and replace hydraulic clutch slave and master cylinders, lines, and hoses; bleed system.	P-2
34.04	Inspect, adjust, lubricate or replace release (throw-out) bearing, sleeve, bushings, springs, housing, levers, release fork, fork pads, rollers, shafts, and seals.	P-1
34.05	Inspect, adjust, and replace single-disc clutch pressure plate and clutch disc.	P-1
34.06	Inspect, adjust, and replace two-plate clutch pressure plate, clutch discs, intermediate plate, and drive pins/lugs.	P-1
34.07	Inspect and/or replace clutch brake assembly; inspect input shaft and bearing retainer; perform needed action.	P-1
34.08	Inspect, adjust, and replace self-adjusting/continuous-adjusting clutch mechanisms.	P-1
34.09	Inspect and replace pilot bearing.	P-1

CTE Standards and Benchmarks		Priority Number
34.10	Remove and reinstall flywheel, inspect mounting area on crankshaft, rear main oil seal, and measure crankshaft end play; determine needed action.	P-1
34.11	Inspect flywheel, starter ring gear and measure flywheel face and pilot bore runout; determine needed action.	P-1
34.12	Inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.	P-2
35.0	Transmission diagnosis and repair--The student will be able to:	
35.01	Identify causes of transmission noise, shifting concerns, lockup, jumping-out-of-gear, overheating, and vibration problems; determine needed action.	P-1
35.02	Inspect, test, repair, or replace air shift controls, lines, hoses, valves, regulators, filters, and cylinder assemblies.	P-2
35.03	Inspect and replace transmission mounts, insulators, and mounting bolts.	P-1
35.04	Inspect for leakage and replace transmission cover plates, gaskets, seals, and cap bolts; inspect seal surfaces and vents; repair as needed.	P-1
35.05	Check transmission fluid level and condition; determine needed service; add proper type of lubricant.	P-1
35.06	Inspect, adjust, and replace transmission shift lever, cover, rails, forks, levers, bushings, sleeves, detents, interlocks, springs, and lock bolts/safety wires.	P-2
35.07	Remove and reinstall transmission.	P-1
35.08	Inspect input shaft, gear, spacers, bearings, retainers, and slingers; determine needed action.	P-3
35.09	Inspect transmission oil filters and coolers and related components; replace as needed.	P-2
35.10	Inspect speedometer components; determine needed action.	P-2
35.11	Inspect and adjust power take-off (P.T.O.) assemblies, controls, and shafts; determine needed action.	P-3
35.12	Inspect and test function of reverse light, neutral start, and warning device circuits; determine needed action.	P-1
35.13	Inspect and test transmission temperature gauge, wiring harnesses and sensor/sending unit; determine needed action.	P-2
35.14	Inspect and test operation of automated mechanical transmission and manual electronic shift controls, shift, range and splitter solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU) neutral/in gear and reverse switches, and wiring harnesses; determine needed action.	P-2
35.15	Inspect and test operation of automated mechanical transmission electronic shift selectors, air and electrical switches, displays and indicators, wiring harnesses, and air lines; determine needed action.	P-2
35.16	Use appropriate electronic service tool(s) and procedures to diagnose automated mechanical transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed action.	P-1

CTE Standards and Benchmarks		Priority Number
35.17	Inspect and test operation of automatic transmission electronic shift controls, shift solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU), neutral/in gear and reverse switches, and wiring harnesses.	P-2
35.18	Inspect and test operation of automatic transmission electronic shift selectors, switches, displays and indicators, wiring harnesses.	P-2
35.19	Use appropriate electronic service tool(s) and procedures to diagnose automatic transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed repairs.	P-3
35.20	Diagnose transmission component failure cause, both before and during disassembly procedures; determine needed action.	
35.21	Inspect, adjust, service, repair, or replace transmission remote shift linkages, brackets, bushings, pivots, and levers.	
35.22	Inspect and adjust main shaft, gears, sliding clutches, washers, spacers, bushings, bearings, auxiliary drive assemblies, retainers, and keys; replace as needed.	
35.23	Inspect countershafts, gears, bearings, retainers, and keys; adjust bearing preload and time multiple countershaft gears; replace as needed.	
35.24	Inspect output shafts, gears, washers, spacers, bearings, retainers, and keys; replace as needed.	
35.25	Inspect and/or replace reverse idler shafts, gears, bushings, bearings, thrust washers, and retainers; check reverse idler gear end play (where applicable).	
35.26	Inspect synchronizer hub, sleeve, keys (inserts), springs, blocking rings, synchronizer plates, blocker pins, and sliding clutches; replace as needed.	
35.27	Inspect transmission cases including surfaces, bores, bushings, pins, studs, and magnets; replace as needed.	
35.28	Inspect transmission lubrication system pumps, troughs, collectors, and slingers; service or replace as needed.	
36.0	Driveshaft and universal joint diagnosis and repair--The student will be able to:	
36.01	Identify causes of driveshaft and universal joint noise and vibration problems; determine needed action.	P-1
36.02	Inspect, service, or replace driveshaft, slip joints, yokes, drive flanges, and universal joints; driveshaft boots and seals, and retaining hardware; check phasing of all shafts.	P-1
36.03	Inspect driveshaft center support bearings and mounts; determine needed action.	P-1
36.04	Measure drive line angles; determine needed action.	P-1
37.0	Drive axle diagnosis and repair--The student will be able to:	
37.01	Identify causes of drive axle(s) drive unit noise and overheating problems; determine needed action.	P-2
37.02	Check and repair fluid leaks; inspect and replace drive axle housing cover plates, gaskets, sealants, vents, magnetic plugs, and seals.	P-1
37.03	Check drive axle fluid level and condition; determine needed service; add proper type of lubricant.	P-1

CTE Standards and Benchmarks		Priority Number
37.04	Remove and replace differential carrier assembly.	P-2
37.05	Inspect and replace differential case assembly including spider gears, cross shaft, side gears, thrust washers, case halves, and bearings.	P-3
37.06	Inspect and replace components of locking differential case assembly.	P-3
37.07	Inspect differential carrier housing and caps, side bearing bores, and pilot (spigot, pocket) bearing bore; determine needed action.	P-3
37.08	Measure ring gear runout; determine needed action.	P-2
37.09	Inspect and replace ring and drive pinion gears, spacers, sleeves, bearing cages, and bearings.	P-3
37.10	Measure and adjust drive pinion bearing preload.	P-3
37.11	Measure and adjust drive pinion depth.	P-3
37.12	Measure and adjust side bearing preload and ring gear backlash.	P-2
37.13	Check and interpret ring gear and pinion tooth contact pattern; determine needed action.	P-2
37.14	Inspect, adjust, or replace ring gear thrust block/bolt.	P-3
37.15	Inspect power divider (inter-axle differential) assembly; determine needed action.	P-3
37.16	Inspect, adjust, repair, or replace air operated power divider (inter-axle differential) lockout assembly including diaphragms, seals, springs, yokes, pins, lines, hoses, fittings, and controls.	P-2
37.17	Inspect, repair, or replace drive axle lubrication system: pump, troughs, collectors, slingers, tubes, and filters.	P-3
37.18	Inspect and replace drive axle shafts.	P-1
37.19	Remove and replace wheel assembly; check rear wheel seal and axle flange gasket for leaks; perform needed action.	P-1
37.20	Identify causes of drive axle wheel bearing noise and check for damage; perform needed action.	P-1
37.21	Inspect and test drive axle temperature gauge, wiring harnesses, and sending unit/sensor; determine needed action.	P-2
37.22	Clean, inspect, lubricate and replace wheel bearings; replace seals and wear rings; inspect and replace retaining hardware; adjust drive axle wheel bearings. Verify end play with dial indicator method	P-1
37.23	Inspect, adjust, repair, or replace planetary gear-type 2-speed axle assembly including: case, idler pinion, pins, thrust washers, sliding clutch gear, shift fork, pivot, seals, cover, and springs.	
37.24	Inspect, repair, or replace 2-speed axle shift control system, speedometer adapters, motors, axle shift units, wires, air lines, and connectors.	

Florida Department of Education
Student Performance Standards

Course Number: DIM0109
Occupational Completion Point: E
Diesel Hydraulics Technician – 150 Hours – SOC Code 49-3031

Course Description:
The Diesel Hydraulics Technician course prepares students for entry into the Diesel Engine Service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study diagnostic, service, and repair of hydraulic, pumps, filtration/reservoir, hoses, fittings, connectors, control valves, and actuator systems.

For every task in Diesel Hydraulics Technician, the following safety task must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.

The first task in Diesel Hydraulics Technician is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.

HY Task List:	
P-1 =	**27**
P-2 =	**5**
P-3 =	**0**
Total	**32**

CTE Standards and Benchmarks		**Priority Number**
38.0	General hydraulic system diagnosis and repair--The student will be able to:	
38.01	Identify system type (closed and open) and verify proper operation.	P-1
38.02	Read and interpret system diagrams and schematics.	P-1
38.03	Perform system temperature, pressure, flow, and cycle time tests; determine needed action.	P-1
38.04	Verify placement of equipment /component safety labels and placards; determine needed action.	P-1
39.0	Diagnose and repair hydraulic pumps--The student will be able to:	
39.01	Identify system fluid type.	P-1
39.02	Identify causes of pump failure, unusual pump noises, temperature flow, and leakage problems; determine needed action.	P-1
39.03	Determine pump type, rotation, and drive system.	P-1
39.04	Remove and install pump; prime and/or bleed system.	P-2
39.05	Inspect pump inlet for restrictions and leaks; determine needed action.	P-2
39.06	Inspect pump outlet for restrictions and leaks; determine needed action.	P-2

CTE Standards and Benchmarks		Priority Number
40.0	Diagnose and repair hydraulic filtration/reservoirs (tanks)--The student will be able to:	
40.01	Identify type of filtration system; verify filter application and flow direction.	P-1
40.02	Service filters and breathers.	P-1
40.03	Identify causes of system contamination; determine needed action.	P-2
40.04	Take a hydraulic oil sample for analysis.	P-1
40.05	Check reservoir fluid level and condition; determine needed action.	P-1
40.06	Inspect and repair or replace reservoir, sight glass, vents, caps, mounts, valves, screens, supply and return lines.	P-1
41.0	Diagnose and repair hydraulic hoses, fittings, and connections--The student will be able to:	
41.01	Diagnose causes of component leakage, damage, and restriction; determine needed action.	P-2
41.02	Inspect hoses and connections (length, size, routing, bend radii, and protection); repair or replace as needed.	P-1
41.03	Assemble hoses, tubes, connectors, and fittings in accordance with manufacturers' specifications; use proper procedures to avoid contamination.	P-1
41.04	Inspect and replace fitting seals and sealants.	P-1
42.0	Diagnose and repair hydraulic control valves--The student will be able to:	
42.01	Pressure test system safety relief valve; determine needed action.	P-1
42.02	Perform control valve operating pressure and flow tests; determine needed action.	P-1
42.03	Inspect, test, and adjust valve controls (electrical/electronic, mechanical, and pneumatic).	P-1
42.04	Identify causes of control valve leakage problems (internal/external); determine needed action.	P-1
42.05	Inspect pilot control valve linkages, cables, and PTO controls; adjust, repair, or replace as needed.	P-1
43.0	Diagnose and repair hydraulic actuators--The student will be able to:	
	Comply with manufacturers' and industry accepted safety practices associated with equipment lock out/tag out; pressure line release; implement/support (blocked or resting on ground); and articulated cylinder devices/machinery safety locks.	
43.01	Identify actuator type (single/double acting, multi-stage/telescopic, and motors).	P-1
43.02	Identify the cause of seal failure; determine needed repairs.	P-1
43.03	Identify the cause of incorrect actuator movement and leakage (internal and external); determine needed repairs.	P-1
43.04	Inspect actuator mounting, frame components, and hardware for looseness, cracks, and damage; determine needed action.	P-1
43.05	Remove, repair, and/or replace actuators in accordance with manufacturers' recommended procedures.	P-1

CTE Standards and Benchmarks	Priority Number
43.06 Inspect actuators for dents, cracks, damage, and leakage; determine needed action.	P-1
43.07 Purge and/or bleed system in accordance with manufacturers' recommended procedures.	P-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.

Special Notes

The purpose of this program is to prepare students for employment as bus, truck and diesel engine mechanics, diesel mechanics helpers, mobile heavy equipment mechanics, construction equipment mechanics, industrial truck mechanics.

The safety guidelines in the student performance standards have been recommended in the ASE Program Certification Standards for Medium/Heavy Truck Technician Training Program administered by National Automotive Technicians Education Foundation (NATEF).

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Transit Technician 1**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T660100
CIP Number	0647061307
Grade Level	30, 31
Standard Length	620 hours
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: maintaining and repairing diesel engines, performing diesel engine and bus preventive maintenance (PMI) inspections, maintaining and repairing ADA accessible lifts and ramps, maintaining and repairing basic electrical systems, and maintaining, and repairing steering and suspension systems.

The course content will also include training in communication, leadership, human relations, transit safety awareness, Safety Data Sheets (SDS), employability skills, and safe efficient work practices.

The purpose of this program is to prepare students for employment as transit technicians, train existing employees to become FTMC certified transit technicians and to prepare existing technicians for the ASE series of Transit Bus tests.

It is recommended that students complete the five occupational completion points (OCP's) for each technician level before advancing to the next tier. Transit technician I and II are prerequisites for the Transit Technician III, and ultimately, the FTMC Transit Technician certification.

The courses may be taken in any sequence within their respective tier, but tiers must be taken sequentially, starting with tier 1, then tier 2, and ending with tier 3. Students must demonstrate proficiency in the preceding tier prior to advancement to the next higher tier.

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 programs of instruction consisting of 15 occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	DIM0810	Transit Equipment Preventive Maintenance Technician	200 hours	49-3031
B	DIM0811	Transit Basic Electrical Systems Technician	120 hours	49-3031
C	DIM0812	Transit Wheelchair Lift/Ramp Technician	60 hours	49-3031
D	DIM0813	Transit Diesel Engine Preventive Maintenance Technician	120 hours	49-3031
E	DIM0814	Transit Steering and Suspension Technician	120 hours	49-3031

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 shop organization, management, and safety requirements.
02.0 Demonstrate infection control procedures and general shop safety.
03.0 Demonstrate SDS, AED, and CPR procedures and practice general shop safety.
04.0 Demonstrate the use of hardware and fasteners, basic tools and equipment.
05.0 Demonstrate and apply proper oxy-acetylene gas practices and techniques.
06.0 Demonstrate workplace communication skills.
07.0 Demonstrate shop and occupational safety procedures.
08.0 Perform transit bus and forklift preventive maintenance.
09.0 Perform tire service, identification and repair.
10.0 Demonstrate the qualifications for employment.
11.0 Demonstrate shop and occupational safety procedures.
12.0 Maintain and repair transit bus basic electrical systems and components.
13.0 Demonstrate the qualifications for employment.
14.0 Demonstrate shop and occupational safety procedures.
15.0 Maintain and repair transit bus wheelchair lift and ramp systems and components.
16.0 Demonstrate the qualifications for employment.
17.0 Demonstrate shop and occupational safety procedures.
18.0 Perform engine preventive maintenance.
19.0 Demonstrate the qualifications for employment.
20.0 Demonstrate shop and occupational safety procedures.
21.0 Maintain and repair transit bus steering and suspension systems.
22.0 Demonstrate the qualifications for employment.

Florida Department of Education
Student Performance Standards

Program Title: **Transit Technician 1**
PSAV Number: **T660100**

Course Number: DIM0810
Occupational Completion Point: A
Transit Equipment Preventive Maintenance Technician – 200 Hours – SOC Code 49-3031

Course Description:
The Transit Equipment Preventive Maintenance Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study shop safety, infection control, SDS, AED, and CPR procedures, basic tools and equipment, welding, communication, occupational safety, bus and forklift preventative maintenance, tire service, and employability.

CTE Standards and Benchmarks	
01.0	Identify shop and occupational safety procedures--The student will be able to:
01.01	Identify basic shop organization and management regulations.
01.02	Identify required shop-safety practices.
01.03	Identify and describe shop-maintenance procedures, including precautions for handling and storing work-related chemicals and hazardous materials.
02.0	Demonstrate infection control procedures and general shop safety--The student will be able to:
02.01	Understand how blood-borne pathogens are spread and how to clean contamination on environmental surfaces.
02.02	Identify cleaning solutions that will kill the AIDS virus on environmental surfaces.
02.03	Practice general shop safety.
03.0	Demonstrate SDS, AED, and CPR procedures and practice general shop safety--The student will be able to:
03.01	Understand where the Safety Data Sheet (SDS) booklet is located and how it is used.
03.02	Understand, set-up, and use the Automated External Defibrillator (AED).
03.03	Learn the capabilities and limitations of cardiopulmonary resuscitation (CPR).
04.0	Demonstrate the use of hardware and fasteners, basic tools and equipment--The student will be able to:
04.01	Identify and use the following correctly and safely:
a)	Basic hand tools

CTE Standards and Benchmarks	
	b) Basic welding tools and equipment
	c) Power tools
	d) Measuring and precision tools.
	e) Basic and specialty hardware and fasteners.
04.02	Read a digital multimeter.
05.0	Demonstrate and apply proper oxy-acetylene gas practices, and techniques - - The student will be able to:
05.01	Perform safety inspections of equipment and accessories.
05.02	Perform external inspections of equipment and accessories.
05.03	Set up equipment safely and prepare for operations.
05.04	Examine and prepare working surfaces.
05.05	Adjust gas pressure properly.
05.06	Identify a neutral flame.
05.07	Apply proper flux.
05.08	Apply proper heat.
05.09	Perform proper shutdown procedures.
05.10	Properly store equipment and accessories according to OSHA regulations.
05.11	Inspect, clean, and secure work area.
06.0	Demonstrate workplace communication skills--The student will be able to:
06.01	Locate information in technical literature, such as a manufacturer's manual, in both print and computer versions.
06.02	Read, interpret, and apply information from parts and service manuals.
06.03	Read and follow written and oral instructions.
06.04	Read and interpret graphs, charts, diagrams, and tables commonly used in the diesel technology industry.
06.05	Answer and ask questions coherently and concisely.
06.06	Use basic keyboarding and computer skills.
06.07	Use industry-related computer software.
06.08	Interpret technical specification information and diagnose problems, both verbally and in writing.
06.09	Solve basic transit technology problems by combining knowledge of transit systems with technical information and diagnostic data.

CTE Standards and Benchmarks	
06.10	Complete accurately the required information for journals, repair orders, invoices, time cards, job sheets, and forms.
06.11	Demonstrate telephone and interpersonal communication skills to accurately and courteously exchange information with customers, co-worker, and supervisors.
07.0	Demonstrate shop and occupational safety procedures--The student will be able to:
07.01	Comply with safety regulations for all preventive maintenance technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
07.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
08.0	Perform transit bus and forklift preventive maintenance--The student will be able to:
08.01	Identify the types of preventive maintenance, including oil analysis, required for components and systems, according to manufacturer and company specifications.
08.02	Schedule preventive-maintenance inspections at the miles and/or times required by manufacturer and company specifications.
08.03	Perform preventive maintenance inspections and record results according to manufacturer and company specifications, including:
a)	Air, parking, and anti-locking brake systems.
b)	Wheels, bearings, hubs, and tires.
c)	Heating and air-conditioning components, refrigerants, and system operations.
d)	Hydraulic systems, including fluids, filters, lines, and reservoirs.
e)	Tires, suspension, and drive train.
f)	Other interior and exterior items as indicated on the Preventive Maintenance Work Order/Checklist.
08.04	Test-drive equipment, where liability and safety allow such tests, and identify needed repairs.
09.0	Perform tire service, identification, and repair--The student will be able to:
09.01	Identify the types of tires, wheels, tread depth measurement, and sidewall inspection criteria.
09.02	Understand relationship between tire size and speedometer, odometer, hubometer.
09.03	Identify different wear indicator patterns and relationship to defective components.
10.0	Demonstrate the qualifications for employment--The student will be able to:
10.01	Demonstrate shop organization, management, and safety requirements for a preventive maintenance technician.
10.02	Demonstrate the use of tools and equipment required for a preventive maintenance technician.
10.03	Demonstrate workplace communication skills required by a preventive maintenance technician.
10.04	Demonstrate the application of math and science principles required for a preventive maintenance technician’s job tasks.
10.05	Identify and demonstrate work habits of successful employees concerning:

CTE Standards and Benchmarks	
	a) Quality of work
	b) Work hours and schedule
	c) Actions, initiative, teamwork, dependability, and responsible decision making
	d) Self-control, responses to criticism, and relationships with customers and supervisors
	e) Time management, cost effectiveness, and fair pricing
	f) Personal hygiene, health habits, and professional appearance
	g) Driving records, drug-free workplace, and industry policies
10.06	Obtain information about training and licensing requirements, equipment needs, responsibilities, pay, benefits, work conditions, risks, and opportunities for advancement.
10.07	Demonstrate knowledge of the “Right-to-Know” law, as recorded in (29 CFR 1910.1200)
10.08	Demonstrate employability skills as a transit bus preventive maintenance technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0811
Occupational Completion Point: B
Transit Basic Electrical Systems Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Basic Electrical Systems Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, basic electrical systems, and employability.

CTE Standards and Benchmarks	
11.0	Demonstrate shop and occupational safety procedures--The student will be able to:
11.01	Comply with safety regulations for all basic electrical technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
11.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
12.0	Maintain and repair transit bus basic electrical systems and components--The student will be able to:
12.01	Explain the theory and nature of electricity.
12.02	Understand basic electrical terminology and symbols.
12.03	Analyze electrical circuits.
12.04	Work problems using Ohm's and Kirchoff's laws.
12.05	Understand circuit characteristics: series, parallel, open, short, and grounded.
12.06	Explain the principals of relays and transistors.
12.07	Understand mystery harness application.
12.08	Explain magnetism and electromagnetic induction.
12.09	Explain applications of alternating current (AC).
12.10	Explain principles of direct current (DC) motors and generators.
12.11	Explain principles of AC motors.
12.12	Locate and match electrical units by their symbols on a wiring diagram.
12.13	Set up and use voltmeters, ammeters, and ohmmeters.
13.0	Demonstrate the qualifications for employment--The student will be able to:

CTE Standards and Benchmarks	
13.01	Demonstrate shop organization, management, and safety requirements for a basic electrical systems technician.
13.02	Demonstrate the use of tools and equipment required for a basic electrical systems technician.
13.03	Demonstrate workplace communication skills required by a basic electrical systems technician.
13.04	Demonstrate the application of math and science principles required for a basic electrical systems technician’s job tasks.
13.05	Demonstrate employability skills as a transit bus basic electrical systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0812
Occupational Completion Point: C
Transit Wheelchair Lift/Ramp Technician – 60 Hours – SOC Code 49-3031

Course Description:
The Transit Wheelchair Lift/Ramp Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, wheelchair lift and ramp systems, employability.

CTE Standards and Benchmarks	
14.0	Demonstrate shop and occupational safety procedures--The student will be able to:
14.01	Comply with safety regulations for all wheelchair lift and ramp activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
14.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
15.0	Maintain and repair transit bus wheelchair lift/ramp systems and components--The student will be able to:
15.01	Troubleshoot and repair the following:
15.02	Wheelchair lift, pumps, hoses, and components
15.03	Wheelchair ramp and associated hardware
15.04	Troubleshoot and repair kneeler faults and components.
15.05	Troubleshoot and repair lift hydraulic/electrical system.
16.0	Demonstrate the qualifications for employment--The student will be able to:
16.01	Demonstrate shop organization, management, and safety requirements for a wheelchair lift/ramp systems technician.
16.02	Demonstrate the use of tools and equipment required for a wheelchair lift/ramp systems technician.
16.03	Demonstrate workplace communication skills required by a wheelchair lift/ramp systems technician.
16.04	Demonstrate the application of math and science principles required for a wheelchair lift/ramp systems technician’s job tasks.
16.05	Demonstrate employability skills as a transit bus wheelchair lift/ramp systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0813
Occupational Completion Point: D
Transit Diesel Engine Preventive Maintenance Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Diesel Engine Preventive Maintenance Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, diesel engine preventive maintenance skills, employability.

CTE Standards and Benchmarks	
17.0	Demonstrate shop and occupational safety procedures--The student will be able to:
17.01	Comply with safety regulations for all diesel engine technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
17.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
18.0	Perform diesel engine preventive maintenance--The student will be able to:
18.01	Identify types of bearings and their uses.
18.02	Identify seals, gaskets, and fasteners.
18.03	Identify drive power train components and functions.
18.04	Identify threaded fasteners by size, type, thread series, thread classes, material hardness, and compatibility.
18.05	Identify the types of preventive maintenance, including oil analysis, required for components and systems, according to manufacturer and company specifications.
18.06	Schedule preventive-maintenance inspections at the miles and/or times required by manufacturer and company specifications.
18.07	Perform preventive-maintenance inspections and record results according to manufacturer and company specifications.
18.08	Demonstrate the ability to remove correctly an oil sample for analysis.
19.0	Demonstrate the qualifications for employment--The student will be able to:
19.01	Demonstrate shop organization, management, and safety.
19.02	Demonstrate the use of tools and equipment required for a diesel engine technician.
19.03	Demonstrate workplace communication skills required by a diesel engine technician.
19.04	Demonstrate the application of math and science principles required for a diesel engine technician’s job tasks.

CTE Standards and Benchmarks
19.05 Demonstrate employability skills as a transit diesel engine technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0814
Occupational Completion Point: E
Transit Steering and Suspension Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Steering and Suspension Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, steering and suspension systems, employability.

CTE Standards and Benchmarks	
20.0	Demonstrate shop and occupational safety procedures--The student will be able to:
20.01	Comply with safety regulations for all steering and suspension technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
20.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
21.0	Maintain and repair steering and suspension systems--The student will be able to:
21.01	Troubleshoot and repair the following:
a)	Conventional steering systems
b)	Hydraulic steering systems
c)	Rear-axle suspensions
d)	Front-axle suspensions
e)	Air ride suspension system
21.02	Service wheels, bearings, hubs, and seals.
21.03	Service tires.
21.04	Align bus frame.
21.05	Align bus height.
22.0	Demonstrate the qualifications for employment--The student will be able to:
22.01	Demonstrate shop organization, management, and safety requirements for a steering and suspension technician.
22.02	Demonstrate the use of tools and equipment required for a steering and suspension technician.
22.03	Demonstrate workplace communication skills required by a steering and suspension maintenance technician.
22.04	Demonstrate the application of math and science principles required for a steering and suspension technician’s job tasks.

CTE Standards and Benchmarks
22.05 Demonstrate employability skills as a transit bus steering and suspension maintenance technician.

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

The safety guidelines in the student performance standards have been recommended in the ASE Program Certification Standards administered by the National Automotive Technicians Education Foundation (NATEF).

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Transit Technician 2**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T660200
CIP Number	0647061308
Grade Level	30, 31
Standard Length	620 hours
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: maintaining and repairing diesel engines, maintaining and repairing hydraulic systems, maintaining and repairing electrical systems, maintaining and repairing heavy duty bus drive train systems and components, maintaining and repairing brake and air systems.

The course content will also include training in communication, leadership, human relations, transit safety awareness, Safety Data Sheets (SDS), employability skills, and safe efficient work practices.

The purpose of this program is to prepare students for employment as transit technicians, train existing employees to become FTMC certified transit technicians and to prepare existing technicians for the ASE series of Transit Bus tests.

It is recommended that students complete the five OCP's for each technician level before advancing to the next tier. Transit technician 1 and 2 are prerequisites for the Transit Technician 3, and ultimately, the FTMC Transit Technician certification.

The courses may be taken in any sequence within their respective tier, but tiers must be taken sequentially, starting with tier 1, then tier 2, and ending with tier 3. Students must demonstrate proficiency in the preceding tier prior to advancement to the next higher tier.

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 programs of instruction consisting of 15 occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	DIM0820	Transit Hydraulics Technician	60 hours	49-3031
B	DIM0821	Transit Diesel Electrical and Diesel Engine Electronics Technician	120 hours	49-3031
C	DIM0822	Transit Drivetrain Technician	120 hours	49-3031
D	DIM0823	Transit Intermediate Electrical Systems Technician	120 hours	49-3031
E	DIM0824	Transit Brakes/Air System Technician	200 hours	49-3031

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate shop and occupational safety procedures.
02.0 Maintain and repair transit bus hydraulic systems.
03.0 Demonstrate the qualifications for employment.
04.0 Demonstrate shop and occupational safety procedures.
05.0 Identify and apply electrical principles related to diesel technology.
06.0 Identify and apply electronic principles related to diesel technology.
07.0 Maintain and repair electrical systems.
08.0 Demonstrate the qualifications for employment.
09.0 Demonstrate shop and occupational safety procedures.
10.0 Maintain and repair transit bus power train systems and components.
11.0 Demonstrate the qualifications for employment.
12.0 Demonstrate shop and occupational safety procedures.
13.0 Maintain and repair transit bus intermediate electrical systems and components.
14.0 Demonstrate the qualifications for employment.
15.0 Demonstrate shop and occupational safety procedures.
16.0 Maintain and repair transit bus brake and air systems.
17.0 Demonstrate the qualifications for employment.

Florida Department of Education
Student Performance Standards

Program Title: **Transit Technician 2**
PSAV Number: **T660200**

Course Number: DIM0820
Occupational Completion Point: A
Transit Hydraulics Technician – 60 Hours – SOC Code 49-3031

Course Description:
The Transit Hydraulics Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, hydraulic systems, and employability.

CTE Standards and Benchmarks	
01.0	Demonstrate shop and occupational safety procedures--The student will be able to:
01.01	Comply with safety regulations for all hydraulic systems technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
01.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
02.0	Maintain and repair hydraulic system components--The student will be able to:
02.01	Explain the basic principles of hydraulics.
02.02	Identify and explain the operating components of hydraulic systems.
02.03	Locate and identify hydraulic units by their symbols on a diagram.
02.04	Troubleshoot hydraulic circuits using test equipment.
02.05	Maintain hydraulic fluids, filters, lines, and reservoirs.
02.06	Identify and explain the operating components of the following:
a)	Hydraulic pumps and motors
b)	Control valves
c)	Hydraulic cylinders
d)	Hydraulic accessories
03.0	Demonstrate the qualifications for employment--The student will be able to:
03.01	Demonstrate shop organization, management, and safety requirements for a hydraulic systems technician.

CTE Standards and Benchmarks	
03.02	Demonstrate the use of tools and equipment required for a hydraulic systems technician.
03.03	Demonstrate workplace communication skills required by a hydraulic systems technician.
03.04	Demonstrate the application of math and science principles required for a hydraulic maintenance technician’s job tasks.
03.05	Demonstrate employability skills as a transit bus hydraulic systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0821
Occupational Completion Point: B
Transit Diesel Electrical and Diesel Engine Electronics Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Diesel Electrical and Diesel Engine Electronics Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, electrical and electronic principles, and employability.

CTE Standards and Benchmarks	
04.0	Demonstrate shop and occupational safety procedures--The student will be able to:
04.01	Comply with safety regulations for all diesel electrical and diesel engine electronics technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
04.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment, and the handling, storage, and disposal of chemicals and hazardous materials.
05.0	Identify and apply electrical principles related to diesel technology--The student will be able to:
05.01	Explain the basic concept of electricity.
05.02	Analyze electrical circuits.
05.03	Determine problems using Ohm's and Kirchoff's laws.
05.04	Understand and explain magnetism and electromagnetic induction.
05.05	Understand and explain applications of alternating current (AC).
05.06	Understand and explain principles of direct current (DC) motors and generators.
05.07	Understand and explain principles of AC motors.
05.08	Locate and match electrical units by their symbols on a wiring diagram.
05.09	Set up and use voltmeters, ammeters, and ohmmeters.
06.0	Identify and apply electronic principles related to diesel technology--The student will be able to:
06.01	Understand and explain the principles of diodes and rectifiers.
06.02	Understand and explain the principles of voltage regulation and power supply circuits.
06.03	Understand and explain the principles of transistors.

CTE Standards and Benchmarks	
	06.04 Understand and explain the principles of the silicon-controlled rectifier (SCR).
	06.05 Identify components of electronic systems and explain their functions.
07.0	Maintain and repair electrical systems--The student will be able to:
	07.01 Test and service the following:
	a) Batteries
	b) Instruments and gauges
	07.02 Test and repair the following systems:
	a) Starting
	b) Charging
	c) Ignition
	d) Lighting and accessories
	07.03 Inspect, remove, clean, and install batteries and cables for parallel and/or series hookups.
	07.04 Install batteries correctly where two or more batteries are used.
	07.05 Perform load test on batteries.
	07.06 Identify, diagnose, remove and replace electronic sensors.
	07.07 Identify the methods for testing and repair of electronic governors.
08.0	Demonstrate the qualifications for employment--The student will be able to:
	08.01 Demonstrate shop organization, management, and safety requirements for a diesel electrical and diesel engine electronics technician.
	08.02 Demonstrate the use of tools and equipment required for a diesel electrical and diesel engine electronics technician.
	08.03 Demonstrate workplace communication skills required by a diesel electrical and diesel engine electronics technician.
	08.04 Demonstrate the application of math and science principles required for a diesel electrical and diesel engine electronics technician’s job tasks.
	08.05 Demonstrate employability skills as a diesel electrical and diesel engine electronics technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0822
Occupational Completion Point: C
Transit Drivetrain Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Drivetrain Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, powertrain systems and components, and employability.

CTE Standards and Benchmarks	
09.0	Demonstrate shop and occupational safety procedures--The student will be able to:
09.01	Comply with safety regulations for all drive-train technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
09.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
10.0	Maintain and repair transit bus power train systems and components--The student will be able to:
10.01	Explain power train operating principles and identify components.
10.02	Service and Repair automatic transmissions.
10.03	Troubleshoot power trains.
10.04	Troubleshoot transmission shift patterns
10.05	Service and repair differentials.
10.06	Identify and service drivelines.
11.0	Demonstrate the qualifications for employment--The student will be able to:
11.01	Demonstrate shop organization, management, and safety requirements for a drive-train technician.
11.02	Demonstrate the use of tools and equipment required for a drive-train technician.
11.03	Demonstrate workplace communication skills required by a drive-train technician.
11.04	Demonstrate the application of math and science principles required for a drive-train technician’s job tasks.
11.05	Demonstrate employability skills as a transit bus drive-train systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0823
Occupational Completion Point: D
Transit Intermediate Electrical Systems Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Intermediate Electrical Systems Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, intermediate electrical systems, and employability.

CTE Standards and Benchmarks	
12.0	Demonstrate shop and occupational safety procedures--The student will be able to:
12.01	Comply with safety regulations for all intermediate electrical systems technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
12.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
13.0	Maintain and repair transit bus intermediate electrical systems and components--The student will be able to:
13.01	Explain the principles of operation and purposes of transistors, relays, and switches found on transit equipment.
13.02	Understand and explain the principle and design of starter motor and solenoid.
13.03	Understand the design and characteristics of generator, alternator, and battery equalizer.
13.04	Test and Trouble-shoot the following components:
	a) 50 DN Generator
	b) Niehoff Generator
13.05	Perform an Equalizer test and a Diode test.
13.06	Analyze a Nova component and corresponding schematic.
13.07	Build and diagnose electrical circuits utilizing the ATEC circuit simulation modules.
13.08	Read and understand electrical schematics and charts.
14.0	Demonstrate the qualifications for employment--The student will be able to:
14.01	Demonstrate shop organization, management, and safety requirements for an intermediate electrical systems technician.
14.02	Demonstrate the use of tools and equipment required for an intermediate electrical systems technician.
14.03	Demonstrate workplace communication skills required by an intermediate electrical systems technician.
14.04	Demonstrate the application of math and science principles required for an intermediate electrical systems technician's job tasks.

CTE Standards and Benchmarks
14.05 Demonstrate employability skills as a transit bus intermediate electrical systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0824
Occupational Completion Point: E
Transit Brakes/Air System Technician – 200 Hours – SOC Code 49-3031

Course Description:
The Transit Brakes/Air System Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, transit bus brake and air systems, and employability.

CTE Standards and Benchmarks	
15.0	Demonstrate shop and occupational safety procedures--The student will be able to:
15.01	Comply with safety regulations for all transit brake and air system technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
15.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
16.0	Maintain and repair brake systems--The student will be able to:
16.01	Explain the principles and identify components of air brake systems.
16.02	Service and recondition air brake systems.
16.03	Identify the principles and components of the following brake systems.
a)	Air
b)	Parking
c)	Anti-locking (ABS)
d)	Wedge
e)	S-Cam
16.04	Troubleshoot brake systems.
16.05	Service and recondition air brake systems.
16.06	Service and adjust air compressors and governors.
16.07	Service and recondition parking brakes.
16.08	Troubleshoot and service hydraulic booster.

CTE Standards and Benchmarks	
16.09	Remove, inspect, repair, and replace brake pads, shoes, linings, cams, cam bearings, springs, brake air chambers, drums, and rotors.
16.10	Troubleshoot and service air system valves, tanks, lines, and fittings.
16.11	Troubleshoot brake and air system utilizing air brake board.
17.0	Demonstrate the qualifications for employment--The student will be able to:
17.01	Demonstrate shop organization, management, and safety requirements for a transit brake and air system technician.
17.02	Demonstrate the use of tools and equipment required for a transit brake and air system technician.
17.03	Demonstrate workplace communication skills required by a transit brake and air system technician.
17.04	Demonstrate the application of math and science principles required for a transit brake and air system technician’s job tasks.
17.05	Demonstrate employability skills as a transit brake and air system technician.

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

The safety guidelines in the student performance standards have been recommended in the ASE Program Certification Standards administered by the National Automotive Technicians Education Foundation (NATEF).

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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: **Transit Technician 3**
Program Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Career Preparatory	
Program Number	T660300
CIP Number	0647061309
Grade Level	30, 31
Standard Length	680 hours
Teacher Certification	DIESEL MECH @7 7G
CTSO	SkillsUSA
SOC Codes (all applicable)	49-3031 – Bus and Truck Mechanics and Diesel Engine Specialists
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to the following: maintaining and repairing diesel engines, maintaining and repairing transmission and cooling systems, maintaining and repairing digital multiplex electrical systems, overhauling diesel engines and bus transmissions, maintaining and repairing heavy duty (10 ton) A/C systems and components, maintaining and repairing alternative fuel vehicles and components, and troubleshooting, maintaining, and repairing electronic computer controls and sensors and advanced electrical systems.

The course content will also include training in communication, leadership, human relations, transit safety awareness, Safety Data Sheets (SDS), employability skills, and safe efficient work practices.

The purpose of this program is to prepare students for employment as transit technicians, train existing employees to become FTMC certified transit technicians and to prepare existing technicians for the ASE series of Transit Bus tests.

It is recommended that students complete the five OCP's for each technician level before advancing to the next tier. Transit technician 1 and 2 are prerequisites for the Transit Technician 3, and ultimately, the FTMC Transit Technician certification.

The courses may be taken in any sequence within their respective tier, but tiers must be taken sequentially, starting with tier 1, then tier 2, and ending with tier 3. Student must demonstrate proficiency in the preceding tier prior to advancement to the next higher tier.

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 programs of instruction consisting of 15 occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The following table illustrates the **PSAV** program structure:

OCP	Course Number	Course Title	Course Length	SOC Code
A	DIM0830	Transit Alternative Fuels System Technician	120 hours	49-3031
B	DIM0831	Transit Advanced Electrical Systems Technician	120 hours	49-3031
C	DIM0832	Transit Heating And Air-Conditioning Technician	200 hours	49-3031
D	DIM0833	Transmission Diagnosis, Rebuild And Repair Technician	120 hours	49-3031
E	DIM0834	Diesel Engine Diagnosis, Rebuild And Repair Technician	120 hours	49-3031

Common Career Technical Core – Career Ready Practices

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

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

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

01.0 Demonstrate shop and occupational safety procedures.
02.0 Maintain and repair transit bus alternative fuels systems and components.
03.0 Demonstrate the qualifications for employment.
04.0 Demonstrate shop and occupational safety procedures.
05.0 Maintain and repair transit bus advanced electrical systems and components.
06.0 Demonstrate the qualifications for employment.
07.0 Demonstrate shop and occupational safety procedures.
08.0 Maintain and repair transit bus heating and air-conditioning systems.
09.0 Demonstrate the qualifications for employment.
10.0 Demonstrate shop and occupational safety procedures.
11.0 Maintain, diagnose, repair, and rebuild transit bus transmission assemblies.
12.0 Demonstrate the qualifications for employment.
13.0 Demonstrate shop and occupational safety procedures.
14.0 Identify principles, assemblies, and systems of engine operation.
15.0 Apply math skills to diesel technology tasks.
16.0 Apply scientific principles common to diesel technology operations.
17.0 Troubleshoot and repair engine systems.
18.0 Rebuild a cylinder-head assembly.
19.0 Remove and replace camshaft assemblies.
20.0 Rebuild a block assembly.
21.0 Demonstrate the qualifications for employment.

Florida Department of Education
Student Performance Standards

Program Title: **Transit Technician 3**
PSAV Number: **T660300**

Course Number: DIM0830
Occupational Completion Point: A
Transit Alternative Fuels System Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Alternative Fuels System Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, alternative fuel systems and components, and employability.

CTE Standards and Benchmarks	
01.0	Demonstrate shop and occupational safety procedures--The student will be able to:
01.01	Comply with safety regulations for all alternative fuels system technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
01.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
02.0	Maintain and repair transit bus alternative fuels systems and components--The student will be able to:
02.01	Troubleshoot, analyze, and diagnose the following:
	a) ESS Energy Storage System
	b) DPIM Dual Power Inverter Module
	c) TCM/VCM
02.02	Identify and comprehend torque blending.
02.03	Identify and comprehend Fuel Cells, ULSD, PC-10 and CJ-4 Oils.
02.04	Identify and comprehend the characteristics and limitations of Bio-diesel, CNG, E85 Ethanol, and EP40 hybrid-electric.
02.05	Demonstrate the unique characteristics of CNG as an Alternative Fuel.
02.06	Demonstrate a working knowledge of CNG fuel systems and components.
02.07	Demonstrate proper diagnostic procedures for the CNG fuel system.
02.08	Understand the principles of “Cooled EGR” system.
02.09	Understand the principles of the 3-way exhaust catalyst system.

CTE Standards and Benchmarks	
02.10	Demonstrate CNG gas safety, Maintenance, Base Engine, Combustion Air System, Fuel system & Fuel Control system, Electronic Control System.
02.11	Identify various CNG cylinders types and installations, Inspect CNG cylinders for damage and disposition of damaged cylinders
02.12	Define Mass Air Flow Management Systems and identify the following sensors; Temperature Sensors, Pressure Sensors, Position Sensors, Voltage Producing Sensors, Mass Gas and Air Flow Sensors.
03.0	Demonstrate the qualifications for employment--The student will be able to:
03.01	Demonstrate shop organization, management, and safety requirements for an alternative fuels systems technician.
03.02	Demonstrate the use of tools and equipment required for an alternative fuels systems technician.
03.03	Demonstrate workplace communication skills required by an alternative fuels systems technician.
03.04	Demonstrate the application of math and science principles required for an alternative fuels systems technician's job tasks.
03.05	Demonstrate employability skills as a transit bus alternative fuels systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0831
Occupational Completion Point: B
Transit Advanced Electrical Systems Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transit Advanced Electrical Systems Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, advanced electrical systems, and employability.

CTE Standards and Benchmarks	
04.0	Demonstrate shop and occupational safety procedures--The student will be able to:
04.01	Comply with safety regulations for all advanced electrical system technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
04.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
05.0	Maintain and repair transit bus advanced electrical systems and components--The student will be able to:
05.01	Build and diagnose electrical circuits utilizing the ATEC circuit simulation modules.
05.02	Understand Programmable logic controller (PLC), Multiplex system and its components, Ladder logic/chart, various electrical instruments, and various types of sensors.
05.03	Identify and troubleshoot multiplex electrical system and components.
05.04	Read and understand complex electrical schematics and charts.
06.0	Demonstrate the qualifications for employment--The student will be able to:
06.01	Demonstrate shop organization, management, and safety requirements for an advanced electrical systems technician.
06.02	Demonstrate the use of tools and equipment required for an advanced electrical systems technician.
06.03	Demonstrate workplace communication skills required by an advanced electrical systems technician.
06.04	Demonstrate the application of math and science principles required for an advanced electrical systems technician’s job tasks.
06.05	Demonstrate employability skills as a transit bus advanced electrical systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0832
Occupational Completion Point: C
Transit Heating and Air-Conditioning Technician – 200 Hours – SOC Code 49-3031

Course Description:
The Transit Heating and Air-Conditioning Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, heating and air-conditioning systems, and employability.

CTE Standards and Benchmarks	
07.0	Demonstrate shop and occupational safety procedures--The student will be able to:
07.01	Comply with safety regulations for all transit heating and air conditioning systems technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
07.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
08.0	Maintain and repair transit bus heating and air-conditioning systems--The student will be able to:
08.01	Identify basic heating and air-conditioning components.
08.02	Recognize and identify different types of refrigerants.
08.03	Describe EPA requirements for handling recycled refrigerants.
08.04	Demonstrate the use of recovery and reclaim systems.
08.05	Inspect and pressure tests a basic air-conditioning (AC) system.
08.06	Inspect, remove, and replace compressor belts.
08.07	Perform Leak-test on a basic AC system.
08.08	Evaluate and charge a basic AC system using recovery equipment.
08.09	Assess, repair and/or service AC electrical circuits.
08.10	Assess, repair and/or service vacuum circuits.
08.11	Diagnose basic AC system problems.
08.12	Remove and replace components in basic AC systems.
08.13	Remove, repair, and replace engine fan clutches and controls.

CTE Standards and Benchmarks	
	08.14 Remove and replace blower motors.
	08.15 Diagnose heater malfunctions.
	08.16 Remove and replace heater cores, control units, and cables.
	08.17 Obtain 608 certification.
09.0	Demonstrate the qualifications for employment--The student will be able to:
	09.01 Demonstrate shop organization, management, and safety requirements for a transit heating and air conditioning systems technician.
	09.02 Demonstrate the use of tools and equipment required for a transit heating and air conditioning systems technician.
	09.03 Demonstrate workplace communication skills required by a transit heating and air conditioning systems technician.
	09.04 Demonstrate the application of math and science principles required for a transit heating and air conditioning systems technician's job tasks.
	09.05 Demonstrate employability skills as a transit bus heating and air conditioning systems technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0833
Occupational Completion Point: D
Transmission Diagnosis, Rebuild and Repair Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Transmission Diagnosis, Rebuild and Repair Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, transit bus transmission assemblies, and employability.

CTE Standards and Benchmarks	
10.0	Demonstrate shop and occupational safety procedures--The student will be able to:
10.01	Comprehend and comply with safety regulations for all transmission diagnosis, rebuild and repair technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
10.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
11.0	Maintain, diagnose, repair, and rebuild transit bus transmission assemblies--The student will be able to:
11.01	Identify the basic transmission components and functions.
11.02	Apply scientific principles common to transmission technology operations.
11.03	Identify principles of operation, assemblies, and systems of transmission operation.
11.04	Troubleshoot and repair transmission systems.
11.05	Rebuild transmission assemblies.
11.06	Remove and replace transmission assemblies.
11.07	Rebuild/troubleshoot retarder assembly.
12.0	Demonstrate the qualifications for employment--The student will be able to:
12.01	Demonstrate shop organization, management, and safety requirements for a transit transmission diagnosis, rebuild and repair technician.
12.02	Demonstrate the use of tools and equipment required for a transit transmission diagnosis, rebuild and repair technician.
12.03	Demonstrate workplace communication skills required by a transit transmission diagnosis, rebuild and repair technician.
12.04	Demonstrate the application of math and science principles required for a transit transmission diagnosis, rebuild and repair technician's job tasks.

CTE Standards and Benchmarks
12.05 Demonstrate employability skills as a transit bus transmission diagnosis, rebuild and repair technician.

Florida Department of Education
Student Performance Standards

Course Number: DIM0834
Occupational Completion Point: E
Diesel Engine Diagnosis, Rebuild and Repair Technician – 120 Hours – SOC Code 49-3031

Course Description:
The Diesel Engine Diagnosis, Rebuild and Repair Technician course prepares students for entry into the transit bus service industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study occupational safety, engine operations, math science, troubleshooting skills, cylinder-heads, camshaft assemblies, engine block assemblies, and employability.

CTE Standards and Benchmarks	
13.0	Demonstrate shop and occupational safety procedures--The student will be able to:
13.01	Comply with safety regulations for all diesel engine diagnosis, rebuild and repair technician activities and job tasks, in accordance with local, state, and federal safety and environmental regulations.
13.02	Identify and comply with personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment; and the handling, storage, and disposal of chemicals and hazardous materials.
14.0	Identify principles, assemblies, and systems of engine operation--The student will be able to:
14.01	Explain the basic principles in the operation of the four-stroke-cycle diesel engine.
14.02	Identify engine assemblies and systems.
14.03	Explain the operating principles of two-and four-stroke cycle engines.
14.04	Identify the components of two-and four-stroke-cycle engines.
15.0	Apply math skills to diesel technology tasks--The student will be able to:
15.01	Apply math skills commonly required for performing job duties in diesel technology occupations.
a)	Recognize, identify, and make metric conversions.
b)	Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
c)	Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
d)	Add, subtract, multiply, and divide using fractions, decimals, and whole numbers.
15.02	Determine the correct purchase price, including sales tax, for a materials list containing a minimum of six items.
15.03	Calculate federal, state, and local taxes.
15.04	Explain industry time standards, including the use of flat-rate information.

CTE Standards and Benchmarks	
16.0	Apply scientific principles common to diesel technology operations--The student will be able to:
16.01	Explain molecular action caused by temperature extremes, chemical reaction, and moisture content.
16.02	Interpret and draw reasonable conclusions from information provided in graphs, scales, and gauges.
16.03	Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
16.04	Read and interpret pressure measurement in terms of pounds per square inch (PSI), inches of mercury, and kilopascal (KPA).
17.0	Troubleshoot and repair engine systems--The student will be able to:
17.01	Troubleshoot and repair cooling systems.
17.02	Troubleshoot and repair lubrication systems.
17.03	Troubleshoot and repair induction and exhaust systems.
17.04	Troubleshoot and repair diesel fuel-injection systems and components.
a)	Inspect for operation and condition of the parts and systems, including fuel quality and consumption, safety shut-down devices, circuits, sensors, electronic governors, and flywheel.
b)	Prime and bleed fuel-injection system.
c)	Remove, test, and adjust injectors and nozzles.
d)	Remove, repair, and replace individual components as needed.
18.0	Rebuild a cylinder-head assembly--The student will be able to:
18.01	Diagnose valve and head problems using the visual inspection method.
18.02	Diagnose valve and head problems using the compression-tester or cylinder air-pressure method.
18.03	Diagnose valve and head problems using the stethoscope method.
18.04	Disassemble engines.
18.05	Clean and inspect the heads for cracks, warping, and injector sleeves.
18.06	Inspect the valve seat and check for warping, burns, cracks, and stem and tip wear.
18.07	Grinds valve seats and reface valves.
18.08	Check and inspect springs for free height, distortion, and installed height.
18.09	Adjust the valve lash.
19.0	Remove and replace camshaft assemblies--The student will be able to:
19.01	Remove and inspect camshaft bearings and lifters.
19.02	Time valve-drive assemblies.

CTE Standards and Benchmarks	
20.0	Rebuild a block assembly--The student will be able to:
20.01	Remove the pistons from the rod assemblies.
20.02	Measure out-of-round and cylinder taper using a dial bore gauge or micrometer.
20.03	Check the piston pins and boss for wear.
20.04	Measure the piston ring lands width, out-of-round, and taper.
20.05	Measure the piston ring gap in a cylinder bore.
20.06	Install and fit the piston pins.
20.07	Check the rod-and-piston assembly alignment.
20.08	Remove and replace the rod bearings.
20.09	Hone and clean the cylinders.
20.10	Install rings on the pistons.
20.11	Measure and check the crankshafts with a micrometer.
20.12	Check the bearing bore with a telescope gauge.
20.13	Reassemble engines using a plastic gauge.
20.14	Install oil seals.
20.15	Check for end play.
21.0	Demonstrate the qualifications for employment--The student will be able to:
21.01	Demonstrate shop organization, management, and safety requirements for a transit diesel engine diagnosis, rebuild and repair technician.
21.02	Demonstrate the use of tools and equipment required for a transit diesel engine diagnosis, rebuild and repair technician.
21.03	Demonstrate workplace communication skills required by a transit diesel engine diagnosis, rebuild and repair technician.
21.04	Demonstrate the application of math and science principles required for a transit diesel engine diagnosis, rebuild and repair technician’s job tasks.
21.05	Demonstrate employability skills as a transit bus diesel engine diagnosis, rebuild and repair technician.

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

The safety guidelines in the student performance standards have been recommended in the ASE Program Certification Standards administered by the National Automotive Technicians Education Foundation (NATEF).

Career and Technical Student Organization (CTSO)

SkillsUSA 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.

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

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 9.0, Language 9.0, and Reading 9.0. 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

Course Title: **Transportation, Distribution and Logistics Cooperative Education-OJT**
Course Type: **Career Preparatory**
Career Cluster: **Transportation, Distribution and Logistics**

PSAV – Cooperative Education - OJT	
Course Number	T809999
CIP Number	06499999CP
Grade Level	30, 31
Standard Length	Multiple hours
Teacher Certification	Any District Certification appropriate to the students' chosen career field
CTSO	SkillsUSA
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 Transportation, Distribution and Logistics 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 Transportation, Distribution and Logistics 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.

Transportation, Distribution and Logistics 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: **Transportation, Distribution and Logistics Cooperative Education OJT**
PSAV Number: **T809999**

Standards and Benchmarks	
01.0	Perform designated job skills--The student will be able to:
01.01	Perform tasks as outlined in the training plan.
01.02	Demonstrate job performance skills.
01.03	Demonstrate safety procedures on the job.
01.04	Maintain appropriate records.
01.05	Attain an acceptable level of productivity.
01.06	Demonstrate appropriate dress and grooming habits.
02.0	Demonstrate work ethics--The student will be able to:
02.01	Follow directions.
02.02	Demonstrate good human relations skills on the job.
02.03	Demonstrate good work habits.
02.04	Demonstrate acceptable business ethics.

Additional Information

Special Notes

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/urlt/steps-manual.pdf.

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