

Florida Department of Education
Curriculum Framework

The standards and/or benchmarks for this program were updated for the 2026-27 academic year.

Program Title: Aerospace Technologies
Program Type: Non-Career Preparatory
Career Cluster: Engineering & Technology Education

Secondary – Non-Career Preparatory	
Program Number	8600080
CIP Number	0821011800
Grade Level	9-12
Program Length	3 credits
Teacher Certification	Refer to the Program Structure section
CTSO	FL-TSA, SkillsUSA
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 provide students with a foundation of knowledge and technically oriented experiences in the study of Aerospace Technologies, its effect upon our lives, and the choosing of an occupation. The content and activities will also include the study of safety and leadership skills. This program focuses on transferable skills and stresses understanding and demonstration of the technological tools, machines, instruments, materials, processes and systems in business and industry.

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

Program Structure

This program is a planned sequence of instruction consisting of three credits.

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

The following table illustrates the secondary program structure:

Course Number	Course Title	Teacher Certification	Length	Level	Graduation Requirement
8600580	Aerospace Technologies I	AEROSPACE 7G ENG 7G ENG TEC 7G TEC ED 1 @2 ENG&TEC ED1@2	1 credit	3	EQ
8600680	Aerospace Technologies II		1 credit	3	EQ
8601780	Aerospace Technologies III		1 credit	3	EQ

(Graduation Requirement Codes: CT=Career & Technical Education, EQ= Equally Rigorous Science, EC= Economics, MA=Mathematics, PL=Personal Financial Literacy)

In addition to the above courses, the Advanced Technology Applications (8601900) course is appropriate to be used for content area continuation in this program after all three credits of this program have been completed. The purpose of the Advanced Technology Applications course is to provide students with a capstone opportunity to develop a school-based project from "vision" to "reality," working in teams to design, engineer, manufacture, construct, test, redesign, test again; and then produce a finished "project". This would involve using ALL the knowledge previously learned, not only in Engineering & Technology Education but also across the curriculum. See the Advanced Technology Applications framework for more information.

Florida's Career Readiness Skills for CTE Programs

01.0	Apply academic skills to workplace scenarios.
01.01	Use reading skills.
01.02	Use writing skills.
01.03	Use mathematical strategies and procedures.
01.04	Use scientific principles and procedures.
02.0	Design a solution to an industry problem.
02.01	Use critical thinking.
02.02	Use creativity.
02.03	Make sound decisions.
02.04	Solve problems.
02.05	Reason.
02.06	Plan and organize.
03.0	Manage resources within an industry project
03.01	Manage time.
03.02	Manage money or resources.
03.03	Manage materials.
03.04	Manage personnel.
04.0	Oversee the subcomponents, operations and output of a technical or organizational system.
04.01	Manage systems.
04.02	Monitor systems.
04.03	Improve systems.
05.0	Use information for decision making.
05.01	Locate information.
05.02	Organize information.
05.03	Use information.

05.04	Analyze information.
05.05	Communicate information.
06.0	Apply relevant technology to workplace scenarios to aid productivity.
06.01	Use technology.
07.0	Interpret and express interpersonal communication.
07.01	Communicate verbally.
07.02	Listen actively.
07.03	Comprehend written material.
07.04	Convey information in writing.
07.05	Communicate nonverbally.
07.06	Interpret nonverbal communication.
08.0	Interact with others to accomplish workplace goals.
08.01	Collaborate with others in a team.
08.02	Respond to customer needs.
08.03	Exercise leadership.
08.04	Negotiate to resolve conflict.
08.05	Respect others.
09.0	Manage personal behavior to maximize productivity and professional growth.
09.01	Demonstrate responsibility and self-discipline.
09.02	Adapt and show flexibility.
09.03	Work independently.
09.04	Demonstrate a willingness to learn.
09.05	Demonstrate integrity.
09.06	Demonstrate professionalism.
09.07	Take initiative.
09.08	Display positive attitude.
09.09	Take responsibility for professional growth.

10.0	Explain career opportunities aligned with the regional economy and personal aspirations.
10.01	Describe regional occupations that are high-demand, high-growth, high-wage and/or high-skill.
10.02	Describe careers aligned with his or her interests, skills and values based on career assessment, experiential learning, career informational interviews, research and/or reflection.
11.0	Explain postsecondary pathways aligned with his or her career aspirations.
11.01	Compare and contrast postsecondary pathways, including education, employment, entrepreneurship and enlistment (the “Four Es”).
11.02	Compare and contrast regional postsecondary training provider options, including apprenticeships, technical colleges, state colleges, universities and industry-recognized certification providers.
11.03	Define postsecondary credentialing and stacking options, including industry-recognized certifications, apprenticeship certificates of completion, career certificates, licenses and associate or baccalaureate degrees.
11.04	Compare postsecondary training data for training programs of interest, such as total costs, average student loan debt, and median earnings and job placement rates after program completion.
12.0	Develop a personalized career and academic plan.
12.01	Prioritize an occupation, credential and postsecondary training provider for plan formation.
12.02	Self-assess progress toward meeting graduation requirements and skill-development goals.
12.03	Develop and complete a chronological checklist of steps and deadlines prior to postsecondary training or national service application that includes any required documentation to gather, writing prompts and examinations.
12.04	Identify a variety of financial aid opportunities, including scholarships, grants, savings, work, work-study programs, private loans and federal loans.
12.05	Develop a postsecondary training budget that is inclusive of living and school expenses.
13.0	Find, assess and apply to job opportunities.
13.01	Identify online job posts relevant to his or her career aspirations.
13.02	Compare and contrast the job posts’ required qualifications, job duties, compensation, benefits and employers.
13.03	Define what information, documentation and writing prompts are required for the positions.
14.0	Communicate personal competence, character and fit for a job opportunity.
14.01	Develop a resume.
14.02	Write a cover letter.
14.03	Curate a professional portfolio that includes work products.
14.04	Prepare for and experience a mock job interview.

15.0	Cultivate and leverage relationships to professionally advance.
15.01	Request a signed reference letter, letter of recommendation and/or an online skill/professionalism endorsement.
15.02	Develop a plan to cultivate a professional digital footprint.
15.03	Develop a networking plan for a specific industry of interest.

Standards

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

- 01.0 Demonstrate an understanding of the characteristics and scope of technology.
- 02.0 Demonstrate an understanding of the core concepts of technology.
- 03.0 Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.
- 04.0 Demonstrate an understanding of the cultural, social, economic, and political effects of technology.
- 05.0 Demonstrate an understanding of the effects of technology on the environment.
- 06.0 Demonstrate an understanding of the influence of aerospace technology on history.
- 07.0 Demonstrate an understanding of the attributes of engineering design.
- 08.0 Demonstrate an understanding of and be able to select and use information and communication technologies.
- 09.0 Demonstrate an understanding of and be able to select and use transportation technologies.
- 10.0 Demonstrate safe and appropriate use of tools and machines in aviation/aerospace technologies.
- 11.0 Demonstrate an understanding of the history and development of aviation and space transportation.
- 12.0 Describe the function of various aviation organizations.
- 13.0 Describe the aviation/aerospace environment.
- 14.0 Describe and demonstrate an understanding of the principles of flight.
- 15.0 Demonstrate an understanding of aviation electrical, mechanical, hydraulic, and pneumatic systems.
- 16.0 Demonstrate an understanding of power systems including, internal combustion engines, jet engines, rocket engines, solar cells and nuclear power used in aviation/aerospace applications.
- 17.0 Demonstrate knowledge of robotics as it relates to the aviation/aerospace industry.
- 18.0 Demonstrate a knowledge and understanding of various traditional and composite materials as related to aerospace technologies.
- 19.0 Demonstrate an understanding of career opportunities and requirements in the field of aerospace technologies.
- 20.0 Demonstrate problem solving using troubleshooting, research and development, invention and innovation, and experimentation.
- 21.0 Demonstrate the abilities to use and maintain technological products and systems.
- 22.0 Demonstrate the abilities to assess the impact of products and systems.
- 23.0 Demonstrate an understanding of the development of aviation and space transportation.
- 24.0 Assess the impact of various aviation organizations on aerospace activities.
- 25.0 Assess the aviation/aerospace environments' effects on flying and spaceflight.
- 26.0 Demonstrate an understanding of electrical, mechanical, fluid, and pneumatic systems that could be used in aerospace environments.
- 27.0 Demonstrate knowledge and understanding of processing skills on materials and composites as they relate to aviation/aerospace technologies.
- 28.0 Describe and demonstrate principles of navigation.
- 29.0 Demonstrate an understanding of the effects of flight as it relates to physiology.
- 30.0 Demonstrate the abilities to apply the design process.
- 31.0 Describe various factors critical to aircraft performance.
- 32.0 Demonstrate an understanding of electrical, mechanical, fluid, and pneumatic systems that could be used on/in aviation/aerospace environments.
- 33.0 Demonstrate technical knowledge of computer control as it is related to aviation/aerospace projects.

- 34.0 Explore the role of civilian spacecraft in the exploration and colonization of space.
- 35.0 Perform advanced study and technical skills related to aerospace technologies.

**Florida Department of Education
Student Performance Standards**

Course Title: Aerospace Technologies I
Course Number: 8600580
Course Credit: 1

Course Description:

This course provides students with an introduction to the knowledge, human relations, and technological skills found today in Aerospace Technologies.

Lab Statement:

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

CTE Standards and Benchmarks	
01.0	Demonstrate an understanding of the characteristics and scope of technology. The student will be able to:
01.01	Discuss the nature and development of technological knowledge and processes.
01.02	Explain the rapid increase in the rate of technological development and diffusion.
01.03	Conduct specific goal-directed research related to inventions and innovations.
02.0	Demonstrate an understanding of the core concepts of technology. The student will be able to:
02.01	Define technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems.
03.0	Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study. The student will be able to:
03.01	Identify technology transfer and innovation occurring when a new user applies an existing technology innovation developed for one purpose in a different function.
04.0	Demonstrate an understanding of the cultural, social, economic, and political effects of technology. The student will be able to:
04.01	Classify the use of technology involving weighing the trade-offs between the positive and the negative effects.

CTE Standards and Benchmarks	
04.02	Identify ethical considerations important in the development, selection, and use of technologies.
05.0	Demonstrate an understanding of the effects of technology on the environment. The student will be able to:
05.01	List trade-offs of developing technologies to reduce the use of resources.
05.02	Identify technologies devised to reduce the negative consequences of other technologies.
06.0	Demonstrate an understanding of the influence of aerospace technology on history. The student will be able to:
06.01	Define the history of aerospace technology as a powerful force in reshaping the social, cultural, political, and economic landscape.
07.0	Demonstrate an understanding of the attributes of engineering design. The student will be able to:
07.01	Recognize the engineering design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results.
07.02	Check and critique a design continually, and improve and revise the idea of the design as needed.
07.03	List competing requirements of a design, such as criteria, constraints, and efficiency.
07.04	Describe the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process.
07.05	Construct a prototype or a working model used to test a design concept by making actual observations and necessary adjustments.
08.0	Demonstrate an understanding of and be able to select and use information and communication technologies. The student will be able to:
08.01	Discuss information and communication technologies including the inputs, processes, and outputs associated with sending and receiving information.
08.02	Classify information and communication systems that allow information to be transferred as human to human, human to machine, machine to human, or machine to machine.
08.03	Use information and communication systems to inform, plan, and manage tasks.
08.04	Identify components of a communications system, including source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.
08.05	Identify many ways to communicate information, such as graphic and electronic means.
08.06	Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli.

CTE Standards and Benchmarks

09.0 Demonstrate an understanding of and be able to select and use transportation technologies. The student will be able to:

09.01 Analyze the vital role played by transportation in the development and operation of other technologies and commerce.

09.02 Discuss how transportation services and methods have led to increased societal mobility.

10.0 Demonstrate safe and appropriate use of tools and machines in aviation/aerospace technologies. The student will be able to:

10.01 Select appropriate tools, procedures, and/or equipment.

10.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment.

10.03 Maintain and troubleshoot equipment used in a variety of technological systems.

10.04 Follow laboratory safety rules and procedures.

10.05 Demonstrate good housekeeping at workstation within total laboratory.

10.06 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

11.0 Demonstrate an understanding of the history and development of aviation and space transportation. The student will be able to:

11.01 Describe early attempts at flight prior to the Wright Brothers flight in 1902.

11.02 Outline the early attempts at heavier than air powered flight.

11.03 Describe the effect of air power on the outcome of world conflict.

11.04 Describe the history of aviation in Florida.

11.05 Outline the beginnings of commercial aviation.

11.06 Identify the early research centers for aeronautics in the United States.

11.07 Describe the role of aviation research and development.

11.08 Outline the development of space exploration.

11.09 Describe the role of NACA, NASA, and commercial entities in the development of aeronautics and space exploration.

11.10 Prepare a forecast of aerospace developments, and interplanetary space travel.

11.11 Demonstrate an understanding of the expanding role that Unmanned Aerial Systems (UAS) are making throughout the field of aeronautics.

CTE Standards and Benchmarks	
11.12	Identify the legal operating restrictions related to UAVs as defined by the FAA.
11.13	Demonstrate an understanding of the critical roles that Aeronautical Decision Making (ADM) and Crew Resource (CRM) play in aircrew decision making.
11.14	Demonstrate an understanding of the major innovations in both technology and procedures that the military has made in the advancement of aeronautics.
12.0	Describe the function of various aviation organizations. The student will be able to:
12.01	Describe the function of various governmental organizations.
12.02	Describe the function of various non-governmental organizations.
13.0	Describe the aviation/aerospace environment. The student will be able to:
13.01	Identify atmospheric regions and elements.
13.02	Describe the roles of water and particulate matter in the atmosphere.
13.03	Describe and identify the elements of the atmosphere in motion.
13.04	Explain the role weather forecasting has as it relates to Aerospace Technologies.
13.05	Demonstrate an understanding of the principal bodies of the solar system.
13.06	Utilize astronomical principles, and technology to study the solar systems.
13.07	Define interplanetary space.
13.08	Describe the physical properties of interplanetary space including the structure, formation, forces, and bodies.
13.09	Describe interstellar and intergalactic space.
14.0	Describe and demonstrate an understanding of the principles of flight. The student will be able to:
14.01	Define terminology associated with flight and flight principles.
14.02	Identify the structural components of aircraft.
14.03	Construct and test flying aircraft models.
14.04	Demonstrate an understanding of aircraft lift and the use of control surfaces to control pitch, yaw, and roll.

CTE Standards and Benchmarks

14.05	Demonstrate an understanding of rocketry design and systems.
14.06	Develop and construct models to test flight characteristics of powered aircraft.
14.07	Explain the application of Newton's laws and Bernoulli's Principle to flight and rocketry.
15.0	Demonstrate an understanding of aviation electrical, mechanical, hydraulic, and pneumatic systems. The student will be able to:
15.01	State which aircraft systems are powered by electricity, mechanics, hydraulics and pneumatics.
16.0	Demonstrate an understanding of power systems including, internal combustion engines, jet engines, rocket engines, solar cells and nuclear power used in aviation/aerospace applications. The student will be able to:
16.01	Identify the basic types of engines used for aircraft propulsion.
16.02	Describe the change from linear motion to rotary motion in a reciprocating engine.
16.03	Identify the elements of an aircraft engine and fuel system.
16.04	Describe the operation of aircraft turbine and ramjet engines.
16.05	Explain chemical propulsion systems.
16.06	Explain advanced propulsion systems including heavy lift launch systems, electrical propulsion, and nuclear propulsion.
16.07	Describe the use and operation of solar cells to generate electrical power.
16.08	Perform experimental testing, including designing test devices to determine the power (thrust) of a model rocket engine.
17.0	Demonstrate knowledge of robotics as it relates to the aviation/aerospace industry. The student will be able to:
17.01	Identify different types of robots.
17.02	State the function of effectors, sensors, controllers, and auxiliary parts in robotics system.
17.03	Explain how robotics technology is used in the space program.
17.04	Forecast how robotics technology will be used in the exploration of space, space colonization or interplanetary space travel.
17.05	Explain how UAS's are a type of robot to include sensors, controllers, and auxiliary parts.
18.0	Demonstrate a knowledge and understanding of various traditional and composite materials as related to aerospace technologies. The student will be able to:

CTE Standards and Benchmarks

18.01 Identify various structural materials used over the history of aviation manufacturing.

18.02 Compare traditional vs. composite materials and their effect on aerospace vehicle design.

19.0 Demonstrate an understanding of career opportunities and requirements in the field of aerospace technologies. The student will be able to:

19.01 Discuss individual interests related to a career in Aerospace Technologies.

19.02 Explore career opportunities related to Aerospace Technologies.

19.03 Explore secondary education opportunities related to Aerospace Technologies.

**Florida Department of Education
Student Performance Standards**

Course Title: Aerospace Technologies II
Course Number: 8600680
Course Credit: 1

Course Description:

This program provides students with an intermediate understanding of the knowledge, human relations, and technological skills found today in Aerospace Technologies.

Lab Statement:

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

CTE Standards and Benchmarks	
02.0	Demonstrate an understanding of the core concepts of technology. The student will be able to:
02.01	Define and develop a management system as the process of planning, organizing, and controlling work.
02.02	Identify and assess the stability of a technological system and its influence by all of the components in the system, especially those in the feedback loop.
02.03	Identify and analyze resources involving trade-offs between competing values, such as availability, cost, desirability, and waste.
02.04	Identify the criteria and constraints of a product or system and determine how they affect the final design and development.
03.0	Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study. The student will be able to:
03.01	Give examples of technology transfer occurring when a new user applies an existing technology innovation developed for one purpose in a different function.
04.0	Demonstrate an understanding of the cultural, social, economic, and political effects of technology. The student will be able to:
04.01	Compare the use of technology involving weighing the trade-offs between the positive and the negative effects.

CTE Standards and Benchmarks	
04.02	Discuss ethical considerations important in the development, selection, and use of technologies.
06.0	Demonstrate an understanding of the influence of aerospace technology on history. The student will be able to:
06.01	Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape.
06.02	Discuss the Information Age and its effect on the processing and exchange of information in the aerospace environment.
06.03	Explain how military aviation and technological developments in the 20 th century led to major innovations in aerospace up to and including major recent contributions to UAS's.
07.0	Demonstrate an understanding of the attributes of engineering design. The student will be able to:
07.01	Apply the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results.
07.02	Evaluate a design continually, and improve and revise the idea of the design as needed.
07.03	Analyze competing requirements of a design, such as criteria, constraints, and efficiency.
07.04	Investigate design principles used to evaluate existing designs, to collect data, and to guide the design process.
07.05	Construct a prototype or a working model used to test a design concept by making actual observations and necessary adjustments.
08.0	Demonstrate an understanding of and be able to select and use information and communication technologies. The student will be able to:
08.01	Compare information and communication technologies including the inputs, processes, and outputs associated with sending and receiving information.
08.02	Select appropriate information and communication systems to be used to transfer information human to human, human to machine, machine to human, and machine to machine.
08.03	Use information and communication systems to inform, plan, and manage tasks.
08.04	Compare components of a communications system, including source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.
08.05	Compare and contrast many ways to communicate information, such as graphic and electronic means.
08.06	Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli.
10.0	Demonstrate safe and appropriate use of tools and machines in aviation/aerospace technologies. The student will be able to:

CTE Standards and Benchmarks	
10.01	Select appropriate tools, procedures, and/or equipment.
10.02	Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment.
10.03	Maintain and troubleshoot equipment used in a variety of technological systems.
10.04	Follow laboratory safety rules and procedures.
10.05	Demonstrate good housekeeping at workstation within total laboratory.
10.06	Explain color-coding safety standards.
10.07	Demonstrate fire prevention and safety precautions and practices for extinguishing fires.
10.08	Analyze the harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
14.0	Describe and demonstrate an understanding of the principles of flight. The student will be able to:
14.01	Assess the structural components of aircraft.
14.02	Demonstrate an understanding of aircraft lift and the use of control surfaces to control pitch, yaw, and roll by using computer simulation.
14.03	Demonstrate an understanding of rocketry design and systems.
14.04	Develop and construct models to test flight characteristics of powered aircraft.
14.05	Explain the application of Newton's laws and Bernoulli's Principle to flight and rocketry.
16.0	Demonstrate an understanding of power systems including, internal combustion engines, jet engines, rocket engines, solar cells and nuclear power used in aviation/aerospace applications. The student will be able to:
16.01	Classify the basic types of engines used for aircraft propulsion.
16.02	Describe the change from linear motion to rotary motion in a reciprocating engine.
16.03	Describe the interrelationship between elements of an aircraft engine.
16.04	Describe the operation of aircraft turbine and ramjet engines.
16.05	Explain chemical propulsion systems.
16.06	Explain advanced propulsion systems including heavy lift launch systems, electrical propulsion, and nuclear propulsion.

CTE Standards and Benchmarks

16.07	Design and construct a system of solar cells to generate electrical power.
17.0	Demonstrate knowledge of robotics as it relates to the aviation/aerospace industry. The student will be able to:
17.01	Assess suitability of different types of robots.
17.02	Research how robotics technology is used in the exploration of space, space colonization or interplanetary space travel.
19.0	Demonstrate an understanding of career opportunities and requirements in the field of aerospace technologies. The student will be able to:
19.01	Discuss individual interests related to a career in Aerospace Technologies.
19.02	Explore career opportunities related to Aerospace Technologies.
19.03	Explore secondary education opportunities related to Aerospace Technologies.
19.04	Conduct a job search.
19.05	Complete a job application form correctly.
20.0	Demonstrate problem solving using troubleshooting, research and development, invention and innovation, and experimentation. The student will be able to:
20.01	Employ research and development as a specific problem solving approach to prepare devices and systems for the marketplace.
20.02	Conduct research needed to solve technological problems.
20.03	Utilize a multidisciplinary approach to solving technological problems.
21.0	Demonstrate the abilities to use and maintain technological products and systems. The student will be able to:
21.01	Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.
21.02	Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it.
21.03	Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision.
21.04	Operate systems so that they function in the way they were designed.
21.05	Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate.
22.0	Demonstrate the abilities to assess the impact of products and systems. The student will be able to:

CTE Standards and Benchmarks	
22.01	Collect information and evaluate its quality.
22.02	Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.
22.03	Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology.
23.0	Demonstrate an understanding of the development of aviation and space transportation. The student will be able to:
23.01	Describe the effect of air power on the outcome of world conflict by using one the major wars/conflicts of the 20 th /21 st century (WWI, WWII, Vietnam, Desert Storm, Afghanistan, etc.)
23.02	Describe the role of aviation research and development.
23.03	Describe the role of NASA in the development of aeronautics and space exploration.
23.04	Describe the expanding role UAS's are playing in the commercial, recreational, and military fields.
24.0	Assess the impact of various aviation organizations on aerospace activities. The student will be able to:
24.01	Assess the impact of various governmental organizations on aerospace activities
24.02	Assess the impact various non-governmental organizations on aerospace activities
25.0	Assess the aviation/aerospace environments' effects on flying and spaceflight. The student will be able to:
25.01	Identify atmospheric regions and elements.
25.02	Differentiate elements of the atmosphere and outer space to include space debris, radiation, solar flares, etc.
25.03	Explain the role of space weather forecasting has as it relates to the aerospace environment.
26.0	Demonstrate an understanding of electrical, mechanical, fluid, and pneumatic systems that could be used in aerospace environments.-- The student will be able to:
26.01	Describe an electrical circuit.
26.02	Describe basic parts and function of hydraulic and pneumatic systems.
26.03	Describe common uses of mechanical systems in aerospace vehicles.
27.0	Demonstrate knowledge and understanding of processing skills on materials and composites as they relate to aviation/aerospace technologies. The student will be able to:
27.01	Critique traditional vs. composite materials and their effect on aerospace vehicle design.

CTE Standards and Benchmarks

27.02 Predict the use of composite materials in the future of aerospace vehicle designs.

28.0 Describe and demonstrate principles of navigation. The student will be able to:

28.01 Describe navigation principles as they relate to aeronautical travel.

28.02 Demonstrate and ability to read and use an aeronautical navigational chart.

28.03 Examine navigational technologies and systems as they relate to aeronautical systems.

28.04 Complete a flight plan for a fixed wing aircraft, from destination to destination.

28.05 Demonstrate an understanding and application of mathematical concepts as they relate to determining space flight mechanics.

28.06 Define and describe a variety of orbital patterns.

29.0 Demonstrate an understanding of the effects of flight as it relates to physiology. The student will be able to:

29.01 Evaluate products and fixtures used in aerospace environments and assess their suitability for human use.

29.02 Describe the type of and effects of spatial disorientation on the ability to fly.

29.03 Describe the symptoms and effects of hypoxia on the ability to fly.

**Florida Department of Education
Student Performance Standards**

Course Title: Aerospace Technologies III
Course Number: 8601780
Course Credit: 1

Course Description:

This program provides students with an advanced understanding of the knowledge, human relations, and technological skills found today in Aerospace Technologies.

Lab Statement:

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

CTE Standards and Benchmarks	
08.0	Demonstrate an understanding of and be able to select and use information and communication technologies. The student will be able to:
08.01	Discuss the impact of advanced sensors and sensor integration in aerospace vehicles.
08.02	Critique use of automation in aerospace vehicles.
10.0	Demonstrate safe and appropriate use of tools and machines in aviation/aerospace technologies. The student will be able to:
10.01	Select appropriate tools, procedures, and/or equipment.
10.02	Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment.
10.03	Maintain and troubleshoot equipment used in a variety of technological systems.
10.04	Follow laboratory safety rules and procedures.
10.05	Demonstrate good housekeeping at workstation within total laboratory.
10.06	Identify color-coding safety standards.

CTE Standards and Benchmarks	
10.07	Explain fire prevention and safety precautions and practices for extinguishing fires.
10.08	Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
13.0	Describe the aviation/aerospace environment. The student will be able to:
13.01	Compare atmospheric regions and elements.
13.02	Predict the effect of space weather on space exploration.
14.0	Describe and demonstrate an understanding of the principles of flight. The student will be able to:
14.01	Define terminology associated with flight and flight principles.
14.02	Assess the structural components of aircraft.
14.03	Demonstrate an understanding of aircraft lift and the use of control surfaces to control pitch, yaw, and roll by using computer flight simulation.
14.04	Demonstrate an understanding of rocketry design and systems.
19.0	Demonstrate an understanding of career opportunities and requirements in the field of aerospace technologies. The student will be able to:
19.01	Discuss individual interests related to a career in Aerospace Technologies.
19.02	Explore career opportunities related to Aerospace Technologies.
19.03	Explore secondary education opportunities related to Aerospace Technologies.
19.04	Conduct a job search.
19.05	Complete a job application form correctly.
19.06	Demonstrate competence in job interview techniques.
19.07	Create a professional resume and letter of introduction.
21.0	Demonstrate the abilities to use and maintain technological products and systems. The student will be able to:
21.01	Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.
21.02	Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it.

CTE Standards and Benchmarks

21.03	Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision.
21.04	Operate systems so that they function in the way they were designed.
21.05	Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate.
27.0	Demonstrate knowledge and understanding of processing skills on materials and composites as they relate to aviation/aerospace technologies. The student will be able to:
27.01	Investigate modern aerospace processing skills on materials and composites.
27.02	Interpret and draw orthographic projections.
28.0	Describe and demonstrate principles of navigation. The student will be able to:
28.01	Describe navigation principles as they relate to aeronautical travel.
28.02	Demonstrate the ability to read and use an aeronautical navigational chart.
28.03	Examine advanced navigational technologies and systems as they relate to aeronautical systems. (e.g., ILS, GPS)
28.04	Define and describe a variety of orbital patterns.
30.0	Demonstrate the abilities to apply the design process. The student will be able to:
30.01	Interpret the design problem to solve and decide whether or not to address it.
30.02	Evaluate criteria and constraints and determine how these will affect the design process.
30.03	Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product.
30.04	Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed.
30.05	Produce a product or system using a design process.
30.06	Evaluate final solutions and communicate observations, processes, and results of the entire design process.
31.0	Describe various factors critical to aircraft performance. The student will be able to:
31.01	Describe aircraft weight and balance terms and factors.
31.02	Calculate an aircraft's center of gravity (CG).
31.03	Describe how runway length affects aircraft performance.

CTE Standards and Benchmarks	
31.04	Describe how aircraft performance is affected by changing atmospheric conditions (wind, temperature, pressure altitude, humidity, etc.).
31.05	Describe the weather requirements and basic rules for flight under Visual Flight Rules (VFR) and Instrument Flight Rules IFR).
31.06	Describe the major Airspace classes and the rules for flight within each type of Airspace Class.
31.07	Discuss engine and fuel issues/conditions relative to aircraft performance.
31.08	Explain the role of instrumentation relative to aircraft performance.
31.09	Describe how aircraft design impacts aircraft performance.
31.10	Describe how meteorological conditions affect aircraft performance.
31.11	Explain how the type of aircraft (e.g., fixed wing, rotary wing, commercial, military, utility, etc.) impacts aircraft performance.
32.0	Demonstrate an understanding of electrical, mechanical, fluid, and pneumatic systems that could be used on/in aviation/aerospace environments. The student will be able to:
32.01	Demonstrate the concepts of force, work, rate, resistance, energy and power through the use of various mechanical sub systems, include: gears, belts, valves, chains, pulleys, screws, cams, linkages, rods, and sprockets or mechanical trainers.
32.02	Demonstrate the concepts of force, work rate, resistance, and power through the use of various fluid subsystems, including: fluid manometers, hydraulic lifts, pipes, valves, tanks, air gauges of hydraulic trainers, and pneumatic trainers.
32.03	Demonstrate the concepts of force, work, rate, resistance, energy, and power through the use of various electrical sub system, including: conductors, control elements, electrical loads, voltage sources, current sources, circuits, components, and measurement equipment, or electrical/electronic trainers.
33.0	Demonstrate technical knowledge of computer control as it is related to aviation/aerospace projects. The student will be able to:
33.01	Demonstrate the application of a computer and software program to develop a plan for an aerospace vehicle.
33.02	Demonstrate an ability to use software programs to control flight operations and/or testing procedures.
34.0	Explore the role of civilian spacecraft in the exploration and colonization of space. The student will be able to:
34.01	Develop a plan for scientific research to be performed on a space station facility.
34.02	Develop a plan for flight crew training for a manned space flight.
34.03	Research, develop, plan, and build model structures of space colonization structures.
34.04	Develop plans, models and a visual presentation of a manned space flight to a distant planet in the solar system.

CTE Standards and Benchmarks

34.05 Examine methods of sending and receiving messages and controlling telemetry from space.

35.0 Perform advanced study and technical skills related to aerospace technologies. The student will be able to:

35.01 Identify an aerospace problem or product for improvement using the design methodology.

35.02 Develop a written plan of work for the design team to carry out the project.

35.03 Show evidence of technical study in support of the project.

35.04 Perform mathematical or computational skills related to the aerospace project.

35.05 Complete the project as planned.

35.06 Deliver a professional quality presentation of the design process and solution.

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.

Florida Standards for English Language Development (ELD)

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

Career and Technical Student Organization (CTSO)

CTSOs are co-curricular career and technical student organizations providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered. Other CTSOs not listed in this curriculum framework or recognized by the Florida Department of Education are permissible provided they support student mastery over the standards and benchmarks of this curriculum framework.

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.

Work-Based Experience (8601800) is the appropriate course to provide Engineering & Technology Education students with the opportunity, as Student Learners, to gain real world practical, first-hand exposure in broad occupational clusters or industry sectors through a structured, compensated or uncompensated experience. Work-Based Experience (WBE) is also designed to give the Student Learners an opportunity to apply and integrate the knowledge, skills, and abilities acquired during their School-Based Experience to actual work situations independent of school facilities. At least one credit of Engineering & Technology Education program consisting of three credits must be completed before enrolling in WBE. See the Work-Based Experience framework for more information.

Accommodations

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

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

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