



Program of Study Guide:

Aeronautics, Aviation, Aerospace Science and Technology

Comprehensive guidelines and course standards
for the Aeronautics, Aviation, Aerospace Science
Technology pathway

Office of College and Career Pathways

August 2025

MARYLAND STATE DEPARTMENT OF EDUCATION

Carey M. Wright, Ed.D.

State Superintendent of Schools

Tenette Smith, Ed.D.

Deputy State Superintendent
Office of Teaching and Leading

Richard W. Kincaid

Assistant State Superintendent
Division of College and Career Pathways

Wes Moore

Governor

MARYLAND STATE BOARD OF EDUCATION

Joshua L. Michael, Ph.D.

President, Maryland State Board of Education

Monica Goldson, Ed.D. (Vice President)

O'Marie Barnes (Student Member)

James C. Bell, Jr., Ed.D.

Chuen-Chin Bianca Chang, MSN, PNP, RN-BC

Alverne "Chet" Chesterfield

Kenny Clash

Nick Greer

Dr. Irma E. Johnson

Kim Lewis, Ed.D.

Rachel L. McCusker

Xiomara V. Medina, M.Ed.

Samir Paul, Esq.

Table of Contents

Document Control Information.....	3
Purpose.....	4
Sources of Standards.....	5
Course Descriptions.....	7
Industry-Recognized Credentials and Career-Connected Learning	9
Labor Market Information: Definitions and Data	11
Course Standards: Introduction to Aeronautics, Aviation, Aerospace Science and Technology I	16
Course Standards: Aeronautics, Aviation, Aerospace Science and Technology II	19
Course Standards: Aeronautics, Aviation, Aerospace Science and Technology III	22

Document Control Information

Title:	Program of Study Guide: Aeronautics, Aviation, Aerospace Science and Technology
Security Level:	Approved for Distribution
File Name:	SCT_AeronauticsAviationAerospaceScienceTechnology_

DOCUMENT HISTORY

Document Version	Date	Summary of Change
1.0	November 2024	Initial Document
2.0	November 2024	Revisions
3.0	November 2024	Revisions
4.0	December 2024	Revisions
5.0	January 2025	Revisions
6.0	March 2025	Revisions
7.0	April 2025	Revisions
8.0	June 2025	Revisions
9.0	July 2025	Revisions
10.0	August 2025	Revisions

Purpose

The Aeronautics, Aviation, and Aerospace Science and Technology Program of Study (POS) is designed to prepare students for careers in aviation, aerospace engineering, flight operations, and related fields. This POS offers a rigorous academic and technical education, equipping students with the skills, knowledge, and hands-on experience necessary to transition seamlessly into postsecondary education, industry training programs, or immediate employment in the aviation and aerospace industries.

In addition to academic standards, the Maryland State Department of Education (MSDE) has incorporated into this document Labor Market Information (LMI) definitions and explanations for the Program of Study; program aligned Industry Recognized Credentials; and Work-Based Learning resources and requirements by course level.

This document is intended for use by educational administrators and practitioners. A similar document is available for each state-approved CTE Program of Study.

Sources of Standards

These sources collectively offer a robust foundation for developing comprehensive and industry-aligned standards for the program, ensuring that students acquire the necessary skills and knowledge to succeed.

Below is a list of these sources, along with descriptions, their applications in course development, and corresponding web links:

1. **Advance CTE's Career Clusters Framework**

- A. **Description:** The Advance CTE framework provides a nationally recognized structure for organizing career and technical education (CTE) into Career Clusters. Each cluster represents a grouping of occupations and industries, with the Public Service and Safety Career Cluster.
- B. **Use:** The framework serves as a foundational guideline ensuring alignment with industry-specific expectations and highlighting essential knowledge and skills for each level of study.
- C. **Source:** Advance CTE Career Clusters: <https://careertech.org/career-clusters/>

2. **Federal Aviation Administration (FAA)**

- A. **Description:** The FAA is the national authority responsible for regulating all aspects of civil aviation in the United States, including pilot certification and training standards.
- B. **Use:** Incorporating FAA regulations and guidelines ensures that the program adheres to national standards for aviation safety, pilot training, and certification processes.
- C. **Source:** Federal Aviation Administration: <https://www.faa.gov/>

3. **International Civil Aviation Organization (ICAO)**

- A. **Description:** ICAO is a specialized agency of the United Nations that sets international standards and regulations necessary for aviation safety, security, efficiency, and environmental protection.
- B. **Use:** Aligning the curriculum with ICAO standards facilitates international recognition and compliance, essential for students pursuing global aviation careers.
- C. **Source:** International Civil Aviation Organization: <https://www.icao.int/en/training/>

4. **Aircraft Owners and Pilots Association (AOPA) Air Safety Institute**

- A. **Description:** AOPA wanting a stronger safer pilot community.
- B. **Use:** AOPA facilitates recognition and compliance for students pursuing aviation careers.
- C. **Source:** <https://www.aopa.org/training-and-safety/air-safety-institute>
<https://youcanfly.aopa.org/high-school/>

5. **Aerospace Industries Association (AIA)**

- A. **Description:** AIA represents the nation's leading aerospace and defense manufacturers and provides standards and best practices for the industry.
- B. **Use:** Incorporating AIA's National Aerospace Standards (NAS) supports the development of a curriculum that meets industry expectations for quality and performance.
- C. **Source:** Aerospace Industries Association: <https://www.aia-aerospace.org/>

6. **International Aerospace Quality Group (IAQG)**

- A. **Description:** IAQG establishes quality standards and guidelines for the aerospace industry, focusing on continuous improvement and safety.

- B. **Use:** Aligning the program with IAQG standards, such as AS9100, ensures that students are trained in quality management systems relevant to aerospace manufacturing and services.
 - C. **Source:** International Aerospace Quality Group: <https://iaqg.org/>
7. **National Center for Aerospace & Transportation Technologies (NCATT)**
- A. **Description:** NCATT provides certifications and standards for aerospace technicians, emphasizing avionics and aircraft electronics.
 - B. **Use:** Incorporating NCATT standards and certifications into the curriculum prepares students for technical roles in aerospace maintenance and manufacturing.
 - C. **Source:** NCATT Certifications: <https://www.astm.org/products-services/certification.html>
8. **Occupational Safety and Health Administration (OSHA)**
- A. **Description:** OSHA sets and enforces standards to ensure safe and healthful working conditions.
 - B. **Use:** Incorporating OSHA standards into the curriculum ensures that students are aware of safety protocols and regulations pertinent to the aerospace industry.
 - C. **Source:** Occupational Safety and Health Administration: <https://www.osha.gov/>
9. **University of Maryland Eastern Shore Aviation Certification Program**
- A. **Description:** preparation of students for careers in the aviation industry.
 - B. **Use:** 4-year residential program, also a 2-year associate degree in aviation at partnering school, Community College can matriculate to complete a bachelor's degree.
 - C. **Source:** University of Maryland Eastern Shore Aviation Certification Program: <https://www.wcp.umes.edu/aviation/umes-aviation-sciences-program/>

Course Descriptions

Course Level	Course Information	Description
Required Core: Course 1	Introduction to Aeronautics, Aviation, Aerospace Science and Technology I SCED: Pending Grades: 9-12 Prerequisite: None Credit: 1	This foundational course introduces students to the principles of aeronautics, aviation science, and aerospace technology. Emphasizing professional behavior, teamwork, and an understanding of the roles and responsibilities in aviation and aerospace industries, students gain an overview of the profession and its critical importance in global transportation and space exploration. Topics include the history of aviation, fundamentals of flight, and an introduction to aerospace careers. AOPA High School Aviation STEM Standards Sets 1-3 to ensure statewide consistency.
Required Core: Course 2	Aeronautics, Aviation, Aerospace Science and Technology II SCED: Pending Grades: 10-12 Prerequisite: Required Course I Credit: 1	Building on the foundational knowledge acquired in Course 1, this course focuses on aerospace systems and technologies, including aircraft systems, navigation, propulsion, and flight simulation. Students will engage in hands-on activities involving unmanned aircraft systems (drones) and gain insights into aerospace engineering concepts. The course is designed to prepare students for the FAA Part 107 Remote Pilot Certification, ensuring alignment with FAA standards.
Optional Flex: Course 1	Advanced Aeronautics, Aviation, Aerospace Science and Technology III SCED: Pending Grades: 11-12 Prerequisite: Required Courses I and II Credit: 1	This course delves deeper into advanced aerodynamics, meteorology, and aviation operations. Students will analyze flight dynamics, weather systems impacting flight, and airport operations management. They will also engage in flight simulation training and explore real-world applications of aerospace technologies. This course aligns with industry standards and prepares students for advanced aviation certifications, including NCATT Aircraft Electronics Technician (AET).

Course Level	Course Information	Description
Optional Flex: Course 2	Career Connected Learning I SCED: Pending Grades: 11-12 Prerequisite: See Course Description Credits: 1-3	Prerequisites: - Alignment to the student's 6-Year Plan - Completion of: - Minimum two sequential courses in a CTE pathway; OR - Minimum two years of the same world language; OR - Minimum two sequential courses in a comprehensive arts program; OR - Inclusion in the IEP/504 transition plan with supporting documentation (as required) - Endorsement from an educator, mentor, employer, or career coach - No more than one course recovery credit in core subjects is needed by the student. This flexible, work-based learning course introduces students to real-world applications of classroom knowledge and technical skills through on-the-job experiences and reflective practices. Students engage in career exploration, skill development, and professional networking by participating in youth apprenticeships, registered apprenticeships, pre-apprenticeships, internships, capstone projects, or other approved career-connected opportunities. Variable credit (1–3) accommodates the required on-the-job training hours and related instruction. By integrating industry standards, employability skills, and personalized learning goals, Career Connected Learning I equips students to make informed career decisions, develop a professional portfolio, and build a strong foundation for success in postsecondary education, training, or the workforce.
Optional Flex: Course 3	Career Connected Learning II SCED: Pending Grades: 11-12 Prerequisite: Required Courses I and II Credits: 1-3	Building on the foundational experiences of Career Connected Learning I, this advanced work-based learning course provides students with deeper on-the-job practice, leadership opportunities, and refined career exploration. Students continue to enhance their technical and professional skills, expanding their industry networks and aligning personal goals with evolving career interests. Variable credit (1–3) remains aligned with the required training hours and related instruction. Through elevated responsibilities and skill application, Career Connected Learning II prepares students to confidently transition into higher-level postsecondary programs, apprenticeships, or the workforce.

Dual Enrollment and Career Connected Learning Experiences Must be Aligned to the CTE Core.

Industry-Recognized Credentials and Career-Connected Learning

The *Blueprint for Maryland's Future* and the High School Level of a Registered Apprenticeship

The Maryland State Department of Education recognizes the high-school level of a Registered Apprenticeship (RA), defined as a State-approved Registered Apprenticeship begun during high school in which students complete at least 144 hours of related technical instruction and 250 hours of paid on-the-job training before graduation, with the remaining required apprenticeship hours completed post-graduation, as the gold standard of Career Connected Learning.

The CTE Committee of the Governor's Workforce Development Board, in alignment with federal apprenticeship standards, requires 144 hours of RTI for all high school RA participants, and the Apprenticeship Maryland Program (AMP) defines the minimum RTI as **one course credit equivalent**. This high-school-level Registered Apprenticeship is the preferred career-connected learning option for students to meet the Blueprint's goal that 45% of public high school graduates complete either the high-school level of a Registered Apprenticeship or another industry-recognized credential.

To the extent practicable, the greatest number of students should achieve this goal through participation in a high-school level Registered Apprenticeship, with schools ensuring these requirements are scheduled, completed, and documented for transcript and reporting purposes.

To the extent practicable, the greatest number of students should achieve this goal through the high-school level of a Registered Apprenticeship.

Career-Connected Learning Resources		
Course 1: Career Awareness	Course 2: Career Preparation	Flex Courses: Career-Connected Learning
• Industry Visits • Guest Speakers • Participation in Career and Technical Student Organizations • Postsecondary Visits – Program Specific Site Tours • Mock Interviews	• All of Career Awareness plus the following: • Job Shadow • Employer Mentoring	• Registered Apprenticeship • Internship • School-Based Enterprise • Employer-Directed Capstone

Industry-Recognized Credentials – The standards in this document are aligned to the following certifications:

By the end of Course I: OSHA 10-Hour General Industry Outreach Training

By the end of Course II: FAA Part 107 Remote Pilot Certificate – Federal Aviation Administration

Optional Credentials (via the Flex Course options):

NCATT Radio Frequency Line Maintenance Certification

ESRI Geographic Information Systems (GIS) Certification

Certified Aerospace Technician (NCATT)

NCATT Aircraft Electronics Technician (AET)

Labor Market Information: Definitions and Data

Labor market information (LMI) plays a crucial role in shaping Career and Technical Education (CTE) programs by providing insights into industry demands, employment trends, and skills gaps. This data helps education leaders assess the viability of existing programs and identify opportunities for new offerings. By aligning CTE programs with real-time labor market needs, schools can better prepare students for in-demand careers and ensure that resources are effectively used to support pathways that lead to high-quality, sustainable employment.

Standard Occupational Code (SOC) and Aligned Industry:

Indicator	Definition	Pathway Labor Market Data
High Wage¹	Those occupations that have a 25th percentile wage equal to or greater than the most recent MIT Living Wage Index for one adult in the state of Maryland, and/or leads to a position that pays at least the median hourly or annual wage for the DC-VA-MD-WV Metropolitan Statistical Area (MSA). <i>Note: A 25th percentile hourly wage of \$24.74 or greater is required to meet this definition.</i>	Standard Occupational Code: 53-2012: Commercial Pilots 53-2011: Airline Pilots, Copilots, and Flight Engineers Hourly Wage/Annual Salary: 25th Percentile: \$79.25 / \$164,836 50th Percentile: \$116.62/ \$242,567 75th Percentile: \$175.68 / \$365,414

¹ Living Wage Calculator: <https://livingwage.mit.edu/states/24>

Indicator	Definition	Pathway Labor Market Data
High Skill	Those occupations located within the DC-VA-MD-WV Metropolitan Statistical Area (MSA) with the following education or training requirements: completion of an apprenticeship program; completion of an industry-recognized certification or credential; associate's degree, bachelor's degree, or higher.	Typical Entry-Level Education: High School Diploma or Equivalent. Additional Requirements: Flight Training: Aspiring commercial pilots must complete flight training through an FAA-certified flight school or independent instructor. This training includes both ground school and in-flight instruction, covering topics such as aerodynamics, navigation, and flight regulations. Certification: Commercial Pilot Certificate: After completing the necessary flight training and accumulating a specified number of flight hours, candidates must pass the FAA's written and practical exams to obtain a Commercial Pilot Certificate. Licensure: Federal Aviation Administration (FAA) Licensure: Pilots must hold an FAA-issued Commercial Pilot Certificate to legally operate as a commercial pilot in the United States.

Indicator	Definition	Pathway Labor Market Data
High Skill	Those occupations located within the DC-VA-MD-WV Metropolitan Statistical Area (MSA) with the following education or training requirements: completion of an apprenticeship program; completion of an industry-recognized certification or credential; associate's degree, bachelor's degree, or higher.	Airline Pilot, Copilot, or Flight Engineer: Education: High School Diploma or Equivalent: A high school diploma is generally required. Bachelor's Degree: While not always mandatory, many airlines prefer candidates with a bachelor's degree. The degree can be in any field, though degrees in aviation, aeronautical science, or related disciplines are advantageous. Training: Aspiring airline pilots must complete flight training through an FAA-certified flight school or independent instructor. This training includes both ground school and in-flight instruction, covering topics such as aerodynamics, navigation, and flight regulations. Pilots must accumulate a specified number of flight hours, including cross-country, nighttime, and instrument flying experience. Certification: Commercial Pilot Certificate: After completing the necessary flight training and accumulating the required flight hours, candidates must pass the FAA's written and practical exams to obtain a Commercial Pilot Certificate. Airline Transport Pilot (ATP) Certificate: To serve as a captain for an airline, pilots must obtain an ATP certificate, which requires additional flight experience and successful completion of FAA exams. Licensure: Federal Aviation Administration (FAA) Licensure: Pilots must hold an FAA-issued Commercial Pilot Certificate and, for captains, an ATP certificate to legally operate as an airline pilot in the United States.

Indicator	Definition	Pathway Labor Market Data
In-Demand	Annual growth plus replacement, across all Maryland occupations, is <u>405</u> openings between 2024-2029.	Annual Openings 498

Lightcast Data Updated August 2025

Labor Market Information Data Source

Lightcast occupation employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates are also affected by county-level Lightcast earnings by industry. Foundational data for the state of Maryland is collected and reported by the Maryland Department of Labor.

Methodology for High Wage Calculations

To combine labor market data across multiple Standard Occupational Classifications (SOCs), a weighted average approach was used to ensure accurate representation of the marketplace. Median wages for each SOC were weighted based on their respective employment levels, reflecting the relative demand for each occupation. This method ensures that occupations with higher employment contribute proportionately to the overall wage calculation. Additionally, job openings from all relevant SOCs were summed to determine the total projected demand. For example, if Mechanical Engineers account for 67% of total employment and Electrical Engineers for 33%, their respective wages are weighted accordingly, and job openings are aggregated to provide a comprehensive view of labor market opportunities. This approach delivers a balanced and accurate representation of both wages and employment demand for the program.

Methodology for In-Demand Calculations

The baseline for annual job openings, considering new positions and replacement positions, was determined by taking the average of all annual job openings between 2024 and 2029 across all 797 career sectors at the 5-digit SOC code level. For the 2024-2029 period, average job openings (growth + replacement) is 405.

Course Standards: Introduction to Aeronautics, Aviation, Aerospace Science and Technology I

1. GENERAL REQUIREMENTS This course is recommended for students in Grades 9-10.

2. INTRODUCTION

- A. Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
- B. The Supply Chain and Transportation Career Cluster focuses on preparing students for foundational careers in aeronautics, aviation, aerospace science, and related industries. This cluster emphasizes the essential skills needed for careers in air transportation, aerospace engineering, aviation management, and logistics. Professionals in this field operate in diverse settings, including airports, aerospace manufacturing plants, and research facilities.
- C. The Aeronautics, Aviation, Aerospace Science, and Technology Program of Study (POS) offers students foundational knowledge in aviation systems, flight principles, and aerospace technology. Students will gain hands-on experience through structured coursework and practical applications, enabling them to explore the essential functions of aviation and aerospace careers.
- D. Introduction to Aeronautics, Aviation, Aerospace Science, and Technology I introduces students to foundational topics such as the history of aviation, fundamentals of flight, aerospace engineering principles, and ethical responsibilities in the industry. This course lays the groundwork for understanding the critical role of aviation and aerospace in global transportation and exploration.
- E. Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, such as attending guest lectures, airport tours, or visits to aerospace manufacturing facilities.
- F. Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland (e.g., [SkillsUSA Aviation Maintenance](#)).

3. KNOWLEDGE AND SKILLS

- A. **The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:**
 - 1. Identify and demonstrate positive work behaviors that enhance employability, including punctuality, professional appearance, and adherence to protocols.
 - 2. Exhibit effective communication and active listening skills when collaborating in aviation and aerospace projects or responding to industry-specific scenarios.
 - 3. Solve problems using critical thinking and decision-making skills, particularly during time-sensitive or high-pressure situations in aviation or aerospace operations.
 - 4. Demonstrate leadership and teamwork skills through group activities, project based learning, and focused exercises.
 - 5. Demonstrate an understanding of ethical and legal responsibilities in emergency response professions.

B. The student identifies various career pathways. The student is expected to:

1. Design a career plan includes a clear pathway for advancement within supply chain and transportation services within Aeronautics, Aviation, Aerospace Science and Technology, highlighting continuous education and specialization opportunities.
2. Develop a career plan that includes necessary education, certifications, job skills, and experience for roles in aviation and aerospace (e.g., Commercial Pilot, Aerospace Engineer, or Air Traffic Controller).
3. Demonstrate effective interview skills for roles in aviation and aerospace, with a focus on entry-level positions.

C. The student develops technology and digital literacy skills. The student is expected to:

1. Use technology as a tool for flight simulation, navigation, and data analysis.
2. Apply digital tools for creating and managing technical reports, flight logs, and project presentations.
3. Demonstrate proficiency in using industry-standard aviation software, including flight simulation platforms and GIS mapping tools.
4. Adhere to ethical and legal considerations for technology use, including FAA regulations and secure data management.

D. The student integrates core academic skills into practices. The student is expected to:

1. Demonstrate the use of clear communication techniques, both written and verbal, that are consistent with industry standards in aviation and aerospace operations.
2. Apply English concepts such as writing technical reports, creating flight plans, and documenting design processes and project goals.
3. Apply scientific principles relevant to aviation and aerospace, including aerodynamics, propulsion systems, and principles of physics in flight dynamics and navigation.
4. Recognize the roles and responsibilities of government agencies, aviation regulations, and public policies that impact aviation and aerospace. This includes knowledge of laws, ethical considerations, and regulatory compliance in the field.
5. Utilize mathematical skills, including measurement, ratios, and data interpretation, for navigation calculations, weight distribution, and aircraft performance analysis.

E. The student demonstrates knowledge and skills for ensuring safety in aviation and aerospace scenarios. The student is expected to:

1. Understand and implement safety protocols to minimize risks during flight operations – including in classroom-based or approved simulation environments, maintenance, and ground handling.
2. Demonstrate knowledge of appropriate selection and personal protective equipment (PPE) and its proper use in aviation and aerospace environments.
3. Recognize the importance of mental and physical fitness for roles in aviation and aerospace, emphasizing the ability to handle high-pressure and safety-critical situations effectively.

F. The student develops physical and mental resilience for aviation and aerospace careers.**The student is expected to:**

1. Understand strategies for managing stress and preventing fatigue in high-stress and time-critical aviation environments.
2. Practice mindfulness and coping techniques to enhance focus, situational awareness, and emotional regulation during flight operations, maintenance tasks, and emergency scenarios.

Course Standards: Aeronautics, Aviation, Aerospace Science and Technology II

1. **GENERAL REQUIREMENTS** This course is recommended for students in Grades 10-11.
2. **INTRODUCTION**
 - A. Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
 - B. The Supply Chain and Transportation Career Cluster focuses on preparing students for foundational careers in aeronautics, aviation, aerospace science, and related industries. This cluster emphasizes the essential skills needed for careers in air transportation, aerospace engineering, aviation management, and logistics. Professionals in this field operate in diverse settings, including airports, aerospace manufacturing plants, and research facilities.ms.
 - C. The Aeronautics, Aviation, Aerospace Science, and Technology Program of Study (POS) offers students foundational knowledge in aviation systems, flight principles, and aerospace technology. Students will gain hands-on experience through structured coursework and practical applications, enabling them to explore the essential functions of aviation and aerospace careers.
 - D. Aeronautics, Aviation, Aerospace Science, and Technology II introduces students to foundational topics such as the history of aviation, fundamentals of flight, aerospace engineering principles, and ethical responsibilities in the industry. This course lays the groundwork for understanding the critical role of aviation and aerospace in global transportation and exploration.
 - E. Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, such as attending guest lectures, airport tours, or visits to aerospace manufacturing facilities.
 - F. Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland (e.g., [SkillsUSA Aviation Maintenance](#)).
3. **KNOWLEDGE AND SKILLS**
 - A. **The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:**
 1. Identify and demonstrate positive work behaviors that enhance employability, including punctuality, professional appearance, and adherence to protocols.
 2. Exhibit effective communication and active listening skills when collaborating in aviation and aerospace projects or responding to industry-specific scenarios.
 3. Solve problems using critical thinking and decision-making skills, particularly during time-sensitive or high-pressure situations in aviation or aerospace operations.
 4. Demonstrate leadership and teamwork skills through group activities, project based learning, and focused exercises.
 5. Demonstrate an understanding of ethical and legal responsibilities in emergency response professions.

B. The student identifies career pathways. The student is expected to:

6. Design a career plan includes a clear pathway for advancement within supply chain and transportation services within Aeronautics, Aviation, Aerospace Science and Technology, highlighting continuous education and specialization opportunities.
7. Develop a career plan that includes necessary education, certifications, job skills, and experience for roles in aviation and aerospace (e.g., Commercial Pilot, Aerospace Engineer, or Air Traffic Controller).
8. Demonstrate effective interview skills for roles in aviation and aerospace, with a focus on entry-level positions.

C. The student develops technology and digital literacy skills. The student is expected to:

1. Use technology as a tool for flight simulation, navigation, and data analysis.
2. Apply digital tools for creating and managing technical reports, flight logs, and project presentations.
3. Demonstrate proficiency in using industry-standard aviation software, including flight simulation platforms and GIS mapping tools.
4. Adhere to ethical and legal considerations for technology use, including FAA regulations and secure data management.

D. The student integrates core academic skills into aviation and aerospace practices. The student is expected to:

1. Demonstrate the use of clear communication techniques, both written and verbal, that are consistent with industry standards in aviation and aerospace operations.
2. Apply English concepts such as writing technical reports, creating flight plans, and documenting design processes and project goals.
3. Apply scientific principles relevant to aviation and aerospace, including aerodynamics, propulsion systems, and principles of physics in flight dynamics and navigation.
4. Recognize the roles and responsibilities of government agencies, aviation regulations, and public policies that impact aviation and aerospace. This includes knowledge of laws, ethical considerations, and regulatory compliance in the field.
5. Utilize mathematical skills, including measurement, ratios, and data interpretation, for navigation calculations, weight distribution, and aircraft performance analysis.

E. The student demonstrates knowledge and skills for ensuring safety in aviation and aerospace scenarios. The student is expected to:

1. Understand and implement safety protocols to minimize risks during flight operations – including in classroom-based or approved simulation environments, maintenance, and ground handling.
2. Demonstrate knowledge of personal protective equipment (PPE) and its proper use in aviation and aerospace environments.
3. Recognize the importance of mental and physical fitness for roles in aviation and aerospace, emphasizing the ability to handle high-pressure and safety-critical situations effectively.

F. The student develops physical and mental resilience for aviation and aerospace careers.**The student is expected to:**

1. Understand strategies for managing stress and preventing fatigue in high-stress and time-critical aviation environments.
2. Practice mindfulness and coping techniques to enhance focus, situational awareness, and emotional regulation during flight operations, maintenance tasks, and emergency scenarios.

Course Standards: Aeronautics, Aviation, Aerospace Science and Technology III

1. **GENERAL REQUIREMENTS** This course is recommended for students in Grades 11-12.
2. **INTRODUCTION**
 - A. Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
 - B. The Supply Chain and Transportation Career Cluster focuses on preparing students for foundational careers in aeronautics, aviation, aerospace science, and related industries. This cluster emphasizes the essential skills needed for careers in air transportation, aerospace engineering, aviation management, and logistics. Professionals in this field operate in diverse settings, including airports, aerospace manufacturing plants, and research facilities.
 - C. The Aeronautics, Aviation, Aerospace Science, and Technology Program of Study (POS) offers students foundational knowledge in aviation systems, flight principles, and aerospace technology. Students will gain hands-on experience through structured coursework and practical applications, enabling them to explore the essential functions of aviation and aerospace careers.
 - D. Aeronautics, Aviation, Aerospace Science, and Technology II introduces students to foundational topics such as the history of aviation, fundamentals of flight, aerospace engineering principles, and ethical responsibilities in the industry. This course lays the groundwork for understanding the critical role of aviation and aerospace in global transportation and exploration.
 - E. Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, such as attending guest lectures, airport tours, or visits to aerospace manufacturing facilities.
 - F. Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland.
3. **KNOWLEDGE AND SKILLS**
 - A. **The student demonstrates skills in aviation and aerospace operations. The student is expected to:**
 1. Analyze flight dynamics and interpret meteorological data for safe flight operations.
 2. Perform advanced navigation tasks, including GPS and flight planning.
 3. Operate unmanned aircraft systems (UAS) in simulated and real-world scenarios.
 4. Demonstrate knowledge of propulsion systems, aircraft maintenance, and troubleshooting procedures.

B. The student develops advanced career readiness skills in aviation and aerospace. The student is expected to:

1. Develop a career plan that includes necessary education, certifications, job skills, and experience for specific roles in aviation and aerospace (e.g., commercial pilot, aeronautical engineer).
2. Create a professional resume and portfolio that reflect skills, projects, certifications, and recommendations.
3. Demonstrate effective interview skills for roles in aviation and aerospace.

C. The student develops technology and digital literacy skills. The student is expected to:

1. Use technology as a tool for flight simulation, navigation, and data analysis.
2. Apply digital tools for creating and managing technical reports, flight logs, and project presentations.
3. Demonstrate proficiency in using industry-standard aviation software, including flight simulation platforms and GIS mapping tools.
4. Adhere to ethical and legal considerations for technology use, including FAA regulations and secure data management.

D. The student integrates core academic skills into practices. The student is expected to:

1. Demonstrate the use of clear communication techniques, both written and verbal, that are consistent with industry standards.
2. Apply English concepts such as writing technical manuals, creating flight plans, and documenting project objectives.
3. Apply scientific principles, including aerodynamics, weather systems, and propulsion physics, to understand and solve aerospace challenges.
4. Recognize the roles and responsibilities of government agencies, aviation regulations, and public policies that impact aviation and aerospace. This includes knowledge of laws, ethical considerations, and regulatory compliance in the field.
5. Utilize mathematical skills, including navigation calculations, weight and balance analysis, and aircraft performance evaluations.

E. The student participates in extended learning opportunities to enhance career readiness. The student is expected to:

1. Engage in apprenticeships with local aviation, aerospace, or transportation organizations to gain hands-on experience in industry practices.
2. Participate in internships with aviation or aerospace companies, focusing on areas such as maintenance, operations, or engineering.
3. Collaborate with aviation and aerospace professionals to gain firsthand insights into industry standards, technologies, and career pathway.

F. The student prepares for a work-based learning experience by demonstrating professional skills. The student is expected to:

1. Develop a professional resume, portfolio, or skills showcase highlighting technical competencies and industry-aligned projects.
2. Review and prepare for FAA certifications, including the Part 107 Remote Pilot Certification.
3. Practice interview skills and demonstrate knowledge of workplace expectations in aviation and aerospace settings.
4. Set career-related goals for a work-based learning experience, identifying specific skills to develop and refine for future roles in aviation and aerospace.

G. The student develops physical and mental resilience for aviation and aerospace careers.

The student is expected to:

1. Understand strategies for managing stress and preventing fatigue in high-stress and time-critical aviation environments.
2. Practice mindfulness and coping techniques to enhance focus, situational awareness, and emotional regulation during flight operations, maintenance tasks, and emergency scenarios.