

Course Description**ETI1043C | Introduction to Aerospace | 3.00 credits**

This course includes an overview of aerospace industry terminology and acronyms, along with practical activities involving tools, procedures, and standard practices. Additionally, it covers inspection procedures, workplace rules and regulations, safety measures, maintenance protocols, and career options in the aeronautical technician workforce.

Course Competencies

Competency 1: The student will outline the history and nature of flight by:

1. Describing the evolution of flight from a historical perspective
2. Describing the impact of early innovations of the Space Program
3. Demonstrating the historical use of rockets as weapons of war
4. Discussing the contributions of early 20th-century pioneers (e.g., Robert Goddard) to the Space Program
5. Summarizing the history of the US Space Program, both manned and unmanned
6. Describing the history of private spaceflight

Competency 2: The student will illustrate the principles of rocketry and orbital mechanics by:

1. Illustrating the use of Newton's Laws
2. Illustrating the use of solid rocket and liquid rocket motors
3. Illustrating the use of inertial guidance systems
4. Explaining orbital velocity and altitude requirements
5. Explaining the various orbit types and the points within the orbit
6. Explaining a launch window
7. Pointing out the purpose of a Collision Avoidance Analysis (COLA)

Competency 3: The student will outline the launch facilities and processes by:

1. Detailing the processing sequences for the primary vehicles launched at Kennedy Space Center (KSC), Cape Canaveral Air Force Station (CCAFS), and most prominent private launch facilities
2. Demonstrating the utilization of the key facilities that support the launch procedures
3. Demonstrating the use of the essential ground support equipment that aids the launch processing sequence
4. Describing clean work areas and clean rooms, including measures for contamination control, as well as practices, procedures, and regulations for clean rooms
5. Classifying the support functions available at KSC/CCAFS/private launch facilities, such as acoustic testing, environmental qualification, design evaluations, dynamic testing, fluid component testing, fluid systems hydrodynamics and aerodynamics, thermal science, and hardware development

Competency 4: The student will examine the processes and conditions of living and working in space by:

1. Describing the physiology of weightlessness, including the effects on fluid shifts, bone and muscle health, space motion sickness, and the hematologic and immunologic systems
2. Summarizing the sources and impacts of space radiation

Competency 5: The student will evaluate the processes and conditions of working at KSC/CCAFS/private launch facilities by:

1. Defining space-related terms and acronyms
2. Contrasting the roles of various workforce members in the space industry, such as scientists, engineers, and technicians
3. Describing the purposes and uses of Life Support Services, including the types and functionalities of SCAPE suits
4. Explaining the function and operation of Ground Support Equipment used in life support
5. Explaining the necessity, purposes, and typical contents of operating procedures (OMI), including

"Emergency Instructions"

6. Detailing the process of entering operational or hazardous areas, including badge exchange, tape and tethering methods, and appropriate dress codes
7. Summarizing the Foreign Object Debris (FOD) control policies and procedures
8. Describing the common weather conditions that can impact a launch and the hazards it can impose
9. Outlining appropriate responses to weather warnings involving electrical storms
10. Discussing aviation safety and security concerns including, Safety Management Systems (SMS), aircraft accident prevention, National Transportation Safety Board (NTSB) regulations on accident reporting, and the regulations, policies, and procedures of the Transportation Security Agency
11. Explaining the framework of National and International Laws and Regulations that regulate the aviation industry

Competency 6: The student will identify methods for troubleshooting, problem-solving, and repairing by:

1. Classifying the various approaches to troubleshooting and problem-solving
2. Outlining the initial steps involved in troubleshooting and problem-solving
3. Identifying aviation reliability and maintainability issues and comparing typical maintenance cycles
4. Explaining the aerodynamic considerations and performance capabilities of aircraft and discussing the importance of environmental factors affecting aircraft performance

Competency 7: The student will identify career pathways and professional roles by:

1. Outlining the role of the technician versus engineers, safety, and quality inspection personnel
2. Determining the responsibilities of operators, pilots, mechanics, managers, and owners regarding human factors and team resource management
3. Outlining the certification requirements for the National Aerospace Technician
4. Comparing the purposes and functions of Quality Assurance, Quality Inspection, and Quality Engineering

Competency 8: The student will exhibit ethical behavior in the workplace by:

1. Defining ethical behavior in the workplace
2. Identifying ethical issues that may be faced in the workplace and analyzing rationalizations for unethical behavior
3. Explaining the Decision-Making Model for Ethical Behavior (e.g., engage in discussion with others, choose the right course of action)
4. Integrating corporate ethics and best practices into a personal value system
5. Understanding the importance of fostering good working relationships with team members and stakeholders

Competency 9: The student will outline aeronautical aspects by:

1. Describing the qualifications, privileges and limitations of all classes of certification to include pilot, maintenance, avionics, dispatch, and air traffic control
2. Outlining the basic structure of the national airspace system, comparing the air traffic control systems for enroute, terminal, tower, and flight service functions, and describing the equipment and capacity limits. Additionally, students will evaluate the impact of the FAA's National Airspace System Plan (NASP) on these current air traffic control systems
3. Describing the operating characteristics of aircraft propulsion, control, electrical, environmental, and hydraulic systems

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information