# Scope & Sequence

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| Course Name: Introduction to Aircraft Technology **TSDS PEIMS Code:** 13039350 | | | **Course Credit:** 1.0  **Course Requirements:** Grade Placement: 9 – 12.  **Prerequisites:** None. |
| **Course Description:** Introduction to Aircraft Technology is designed to teach the theory of operation of aircraft airframes, powerplants, and associated maintenance and repair practices. Maintenance and repair practices include knowledge of the function, diagnosis, and service of general curriculum subjects, airframe structures, airframe systems and components, powerplant theory and maintenance, and powerplant systems and components of aircraft. Industry recognized professional licensures, certifications, and registrations are available for students who meet the requirements set forth by the accrediting organization. | | | |
| **NOTE:** This is a suggested scope and sequence for the course content. This content will work with any textbook or instructional materials. If locally adapted, make sure all TEKS are covered. | | | |
| **Total Number of Periods**  **Total Number of Minutes**  **Total Number of Hours** | 175 Periods  7875 Minutes  131.25 Hours\* | \*Schedule calculations based on 175/180 calendar days. For 0.5 credit courses, schedule is calculated out of 88/90 days. Scope and sequence allows additional time for guest speakers, student presentations, field trips, remediation, extended learning activities, etc. | |
| **Unit Number, Title, and Brief Description** | **# of Class Periods\***  (assumes 45-minute periods)  Total minutes per unit | **TEKS Covered**  **130.452. (c) Knowledge and skills** | |
| **Unit 1: Career Exploration**  Students will expand their knowledge base and interest in careers and entrepreneurship opportunities in the field of aircraft maintenance and repair. Students will explore and discuss employment opportunities and industry certifications and requirements in small groups and as a class as they develop individualized career preparation plans. Students will discover and use resources available through CTSO or other extracurricular organization(s) to further develop leadership and employability skills. Students will discuss and demonstrate appropriate and proper etiquette and behavior as well as effective listening and speaking skills in this and in all units as they further develop their personal and career goals and increase their interpersonal skills. | 10 periods  450 minutes | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) identify employment opportunities, including entrepreneurship opportunities, and certification requirements for the field of aircraft maintenance and repair;  (B) demonstrate the principles of group participation and leadership related to citizenship and career preparation; and  (D) discuss the competencies related to resources, information, systems, and technology.  (2) The student relates academic skills to the requirements of aircraft maintenance and repair. The student is expected to:  (A) demonstrate effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;  (6) The student demonstrates appropriate interpersonal and communication skills. The student is expected to:  (B) demonstrate proper etiquette and behavior;  (D) practice written and oral communication skills; and  (E) employ effective listening skills.  (7) The student demonstrates knowledge of and how to develop an occupational experience program as it relates to the aircraft industry. The student is expected to:  (B) participate in youth leadership opportunities to create a well-rounded occupational experience. | |
| **Unit 2: Occupational and Leadership Experience Project**  Students will create an actual or simulated industry-based occupational experience, which will include a work plan, a budget, and a demonstration of proper record-keeping skills. As part of this project students will include a plan for and/or information about available industry recognized professional licensure, certifications, and/or registrations as well as their requirements. Students will display effective communication skills when they discuss their occupational experience projects in small groups or in other classroom activities. Students will also produce a program of activities and/or participate in other leadership opportunities in a CTSO or other extracurricular organization(s) to further develop and demonstrate their leadership and employability skills. | 17 periods  765 minutes | 1. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:   (D) discuss the competencies related to resources, information, systems, and technology.  (2) The student relates academic skills to the requirements of aircraft maintenance and repair. The student is expected to:  (A) demonstrate effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers.  (7) The student demonstrates knowledge of and how to develop an occupational experience program as it relates to the aircraft industry. The student is expected to:  (A) demonstrate knowledge of proper record-keeping skills as related to industry-based occupational experiences;  (B) participate in youth leadership opportunities to create a well-rounded occupational experience;  (C) produce a program of activities for a career and technical student organization or other leadership opportunity; and  (D) develop a work plan and budget. | |
| **Unit 3: Health and Safety**  Students will discuss, describe, and demonstrate employers’ expectations regarding safe and appropriate work habits, ethical conduct, and legal responsibilities in the workplace. Students will participate as a class and/or in small groups in activities to model, present, and demonstrate technical knowledge and health and safety scenarios, regulations, and equipment in the workplace as well as an understanding of personal responsibility. Multiple opportunities for students to learn and demonstrate their knowledge of aviation regulations and the function, application, and safe use of tools and equipment will begin in this unit. | 16 periods  720 minutes | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (C) demonstrate employers' expectations and appropriate work habits;  (E) demonstrate awareness of the technical knowledge and skills related to human factors in health and safety in the workplace, as specified by appropriate governmental regulations and an understanding of personal responsibility in this area;  (3) The student understands the technical knowledge and skills for aircraft maintenance and repair. The student is expected to:  (A) demonstrate knowledge of aviation regulations prescribed by the Code of Federal Regulations, Title 14, Volumes I-III, that govern mechanic privileges and the construction, maintenance, and service of aircraft;  (4) The student understands the function and application of the tools, equipment, technologies, and preventative maintenance used in aircraft maintenance and repair. The student is expected to:  (A) demonstrate knowledge and basic skills in safely using hand and power tools and equipment commonly employed in the maintenance and repair of aircraft;  (6) The student demonstrates appropriate interpersonal and communication skills. The student is expected to:  (A) describe and apply ethical and legal responsibilities appropriate to the workplace. | |
| **Unit 4: Mathematics in Aircraft Technology**  Students will be given multiple opportunities to demonstrate and apply relevant problem-solving and mathematical skills in-context as they read and interpret documents, manuals, regulations, charts, graphs, and other information related to the field. Students will also further develop their critical thinking skills as they perform various precision measurements and use specifications to diagnose component wear and tolerance. After these activities, students will discuss and predict what other mathematical skills may be necessary for a successful career in aircraft maintenance and repair. | 20 periods  900 minutes | (2) The student relates academic skills to the requirements of aircraft maintenance and repair. The student is expected to:  (A) demonstrate effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;  (C) locate, read, understand the function of, and interpret documents, including schematics, charts, graphs, drawings, blueprints, wiring diagrams, service-repair manuals and service bulletins, type certificate data sheets, supplemental type certificates, airworthiness directives, and federal aviation regulations and advisory information;  (D) demonstrate an understanding of metric and U.S. customary standard measurement systems;  (E) perform precision measurements, including the use of engineering scales, dial calipers, and Vernier micrometers, and use specifications to diagnose component wear and determine if the component is within tolerance of the specifications; and  (F) develop critical-thinking skills and problem-solving skills to solve problems and make decisions. | |
| **Unit 5: Tools, Equipment, and Materials**  Students will discuss the rules for proper handling and disposal of hazardous materials used in the aircraft maintenance and repair industry. Students will be given multiple opportunities for “hands-on” presentations, discussions, and demonstrations of the proper ways to identify and safely use the tools, materials, and equipment commonly used in the aircraft maintenance and repair industry. Students will continue to learn and demonstrate their knowledge of relevant aviation regulations in-context with their unit activities. | 20 periods  900 minutes | (3) The student understands the technical knowledge and skills for aircraft maintenance and repair. The student is expected to:  (A) demonstrate knowledge of aviation regulations prescribed by the Code of Federal Regulations, Title 14, Volumes I-III, that govern mechanic privileges and the construction, maintenance, and service of aircraft;  (4) The student understands the function and application of the tools, equipment, technologies, and preventative maintenance used in aircraft maintenance and repair. The student is expected to:  (A) demonstrate knowledge and basic skills in safely using hand and power tools and equipment commonly employed in the maintenance and repair of aircraft;  (B) demonstrate knowledge of the proper handling and disposal of environmentally hazardous materials used in servicing aircraft; | |
| **Unit 6: Aircraft Principles, Structures and Systems**  Students will be given multiple opportunities to demonstrate their technical knowledge and skills in the field of aircraft maintenance and repair with “hands-on” activities, presentations, discussions, and inspections in simulated or actual aircraft maintenance and repair work situations. Students will also learn and use the appropriate terminology as well as standard practices as they participate in maintenance, modification, and repair activities. Students will demonstrate their understanding of the principles of simple machines, aerodynamics, aircraft structures, aircraft categories, and the theory of flight in classroom, actual, and/or simulated activities. | 20 periods  900 minutes | (3) The student understands the technical knowledge and skills for aircraft maintenance and repair. The student is expected to:  (B) apply and understand the principles of simple machines, basic aerodynamics, aircraft structures, and theory of flight;  (C) demonstrate knowledge of aircraft categories as used with respect to the certification, ratings, privileges, and limitations of airmen, including airplane, rotorcraft, glider, and lighter-than-air;  (D) demonstrate knowledge of airframe construction and basic repair methods and techniques, including wood structures, metal tubular structures, fabric coverings, sheet metal, and composite structures;  (E) demonstrate knowledge of airframe systems and components, their functions, and basic operating principles, including landing gear, hydraulic power, cabin atmosphere control systems, and electrical systems;  (F) demonstrate knowledge of aircraft reciprocating and turbine engines, their operating theory, functions, and basic repair methods and techniques;  (G) demonstrate knowledge of powerplant systems and components, their functions, and basic operating principles, including engine instruments, electrical systems, lubrication systems, ignition and starting systems, cooling systems, exhaust systems, and propellers; and  (H) demonstrate knowledge of aircraft common terminology and standard practices required to complete maintenance, modifications, and repairs. | |
| **Unit 7: Aircraft Categories and Emerging Technologies**  Students will be given multiple opportunities to research, understand, and explain new and emerging aircraft technologies. Students will also draw views of various aircraft categories, and share their drawings and research in small groups and/or other classroom activities. Students will demonstrate effective communication skills as they continue to learn, discuss, and demonstrate their knowledge of relevant aviation regulations in-context with their unit activities. | 15 periods  675 minutes | (2) The student relates academic skills to the requirements of aircraft maintenance and repair. The student is expected to:  (A) demonstrate effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;  (3) The student understands the technical knowledge and skills for aircraft maintenance and repair. The student is expected to:  (A) demonstrate knowledge of aviation regulations prescribed by the Code of Federal Regulations, Title 14, Volumes I-III, that govern mechanic privileges and the construction, maintenance, and service of aircraft;  (4) The student understands the function and application of the tools, equipment, technologies, and preventative maintenance used in aircraft maintenance and repair. The student is expected to:  (C) research and understand the impact of new and emerging aircraft technologies; and  (5) The student applies the technical knowledge and skills of the trade to simulated situations. The student is expected to:  (C) draw top, side, and front views of various aircraft categories, including airplane, rotorcraft, glider, and lighter-than-air;  (6) The student demonstrates appropriate interpersonal and communication skills. The student is expected to:  (D) practice written and oral communication skills; and  (E) employ effective listening skills. | |
| **Unit 8: Preventative Maintenance**  Students will be given multiple opportunities to discuss, identify, and demonstrate an understanding of audits, inspections, and compliance with airworthiness, safety, health, and environmental regulations, as well as preventative maintenance practices and procedures. In simulated and/or actual situations, students will safely start and ground operate an aircraft, perform basic airframe and engine inspections, and discuss preventative maintenance plans and systems.  Students will construct engine trouble-shooting charts that show simple defects and discuss the resulting effects on engine performance in small groups and/or as part of a classroom activity. | 20 periods  900 minutes | (3) The student understands the technical knowledge and skills for aircraft maintenance and repair. The student is expected to:  (J) demonstrate an understanding of the regular audits and inspections to maintain compliance with airworthiness, safety, health, and environmental regulations.  (4) The student understands the function and application of the tools, equipment, technologies, and preventative maintenance used in aircraft maintenance and repair. The student is expected to:  (D) identify and understand the need for preventative maintenance procedures and practices.  (5) The student applies the technical knowledge and skills of the trade to simulated situations. The student is expected to:  (A) start and ground operate an aircraft or simulated aircraft using a high fidelity flight simulator with a physical yoke and pedal device;  (D) perform basic airframe and engine inspections;  (E) construct an engine troubleshooting chart showing simple defects and resulting effects on engine performance; and  (F) discuss preventative maintenance plans and systems to keep aircraft systems in operation. | |
| **Unit 9: People and Paperwork**  Students will be given multiple opportunities to learn and demonstrate the procedures for documenting work orders and related paperwork for aircraft maintenance and repairs in simulated and/or actual work situations. Students will also identify and apply the technical knowledge, mathematical skills, and other academic skills necessary to complete logbooks, audit and inspection documentation, and other paperwork associated with aircraft maintenance and repair services. Students will recognize and discuss the importance of personal responsibility, skills, and attitudes for a safe, successful, and profitable workplace. | 20 periods  900 minutes | 1. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:   (F) demonstrate awareness of the technical knowledge, skills, and attitudes related to human factors in a successful and profitable workplace, and the role of the employee in creating that success, including personal responsibility; and  (G) apply reasoning skills to a variety of simulated workplace situations in order to make ethical decisions.  (2) The student relates academic skills to the requirements of aircraft maintenance and repair. The student is expected to:  (A) demonstrate effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;  (B) identify requirements of work orders and related paperwork for repairs.  (3) The student understands the technical knowledge and skills for aircraft maintenance and repair. The student is expected to:  (I) discuss the completion of logbooks and computer applications to maintain required aircraft documents; and  (J) demonstrate an understanding of the regular audits and inspections to maintain compliance with airworthiness, safety, health, and environmental regulations.  (5) The student applies the technical knowledge and skills of the trade to simulated situations. The student is expected to:  (B) research and locate appropriate documentation to perform a function in a written work order and complete the required logbook entry. | |
| **Unit 10: Aircraft Maintenance and Repair Project and Employability Skills**  Students will participate in a course culmination activity which includes a demonstration of knowledge of aviation regulations associated with mechanic privileges and the construction, maintenance, and service of aircraft.  Students will participate in mock interviews both as job applicants and as potential employers, as well as create and/or participate in various workplace scenarios that demonstrate appropriate workplace conduct, employer expectations, and personal application of ethical and legal responsibilities. As part of these mock interviews and workplace scenarios, students will demonstrate appropriate personal appearance, group participation, teamwork, and effective communication skills. | 17 periods  765 minutes | (3) The student understands the technical knowledge and skills for aircraft maintenance and repair. The student is expected to:  (A) demonstrate knowledge of aviation regulations prescribed by the Code of Federal Regulations, Title 14, Volumes I-III, that govern mechanic privileges and the construction, maintenance, and service of aircraft.  (6) The student demonstrates appropriate interpersonal and communication skills. The student is expected to:  (A) describe and apply ethical and legal responsibilities appropriate to the workplace;  (B) demonstrate proper etiquette and behavior;  (C) identify benefits of personal appearance and health habits;  (D) practice written and oral communication skills; and  (E) employ effective listening skills | |