CareerClusters™ PATHWAYS TO COLLEGE & CAREER READINESS
Transportation, Distribution & Logistics

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Colorado CTE Course – Scope and Sequence

Course Name	Aircraft Airframe Technology	Course Details Course = 0.50 Carnegie Unit Credit	Credit=1.0 -2.0 Prerequisite: Introduction to Aircraft Technology CTE Credential: CTE Transportation (Aviation)
Course Description	Aircraft Airframe Technology is designed to teach the theory of operation of aircraft airframes and associated maintenance and repair practices. Airframe maintenance and repair practices include knowledge of the function, diagnosis, and service of airframe structures, systems, and components of aircraft.		
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.		
SCED Identification #	20114	Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.	

All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at https://www.cde.state.co.us/standardsandinstruction/essentialskills

Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Career Development		Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. Identify employment opportunities, including entrepreneurship opportunities, and certification requirements for the field of aircraft maintenance and repair.	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;	Investigate aviation careers, training, and associated opportunities. Describe the difference between aviation disciplines and job functions. Explore career opportunities and list the educational requirements for airframe technicians. Analyze Federal Aviation Regulations (FAR) as related to airframe and powerplant, pilot, schools, flight training centers, aircraft, and aircraft owners. Research the airframe and powerplant technician	Updates to ICAP

			(B) demonstrate the principles of group participation and leadership related to citizenship and career preparation; (C) evaluate employers' expectations and appropriate work habits; (D) discuss the competencies related to resources, information systems, and technology; (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; (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	certificate requirements. Explain how the employment certification requirements relate to FAA requirements.	

			(G) apply reasoning skills to a variety of simulated workplace situations in order to make ethical decisions.		
Safety		Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Transportation sector workplace environment. Understand and apply practices and procedures required to maintain jobsite safety. Understand industry standards and protocols for safe working environments. Identify federal safety and environmental rules and regulations.	Understand and demonstrate lab safety rules and procedures. Student is expected to: (A) Demonstrate general shop safety rules and procedures; (B) Demonstrate knowledge of OSHA and its role in workplace safety; (C) Comply with the required use of personal protective equipment (PPE) during lab/shop activities; (D) Utilize safe procedures for handling of tools and equipment; (E) Operate lab equipment according to safety guidelines; (F) Identify and use proper lifting procedures and proper use of		

			support equipment; (G) Utilize proper ventilation procedures for working within the lab/shop area; (H) Identify marked safety areas; (I) Identify the location and the types of fire extinguishers and other fire safety equipment; (J) demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment; (K) Identify the location and use of eye wash stations; (L) Identify the location of the posted evacuation routes; (M) Identify and wear appropriate clothing for lab/shop activities;		

			(N) Secure hair and jewelry for lab/shop activities; (O) Demonstrate knowledge of the safety aspects of high voltage circuits; (P) Locate and interpret safety data sheets (SDS); (Q) prepare time or job cards, reports or records; (R) Perform housekeeping duties; (S) Follow verbal instructions to complete work assignments; and (T) Follow written instructions to complete work assignments.		
Aviation Maintenance Processes		Explore general aviation maintenance practices.	Understand fundamental practices of aviation maintenance. Student is expected to: (A) Utilize mathematics to solve general aviation maintenance problems; Interpret aircraft drawings and schematics; Identify		

			physics calculations used in aviation maintenance; Calculate aircraft weight, balance, and center of gravity; (B) Classify aircraft materials, processes, and hardware; Explain aircraft cleaning and corrosion control; Explore aviation materials and construction of fluid lines and fittings; (C) Explain aircraft inspection fundamentals Utilize specialty hand tools and measuring devices; and (D) Interpret basic aviation electricity principles.		
Technologies and Equipment		Practice the safe and appropriate use of tools, equipment, and work processes. Demonstrate and use appropriate tools and equipment—such as wrenches, sockets, and pliers—to diagnose, service, repair, and maintain systems and components.	The student knows the function and application of the tools, equipment, technologies, and preventative maintenance used in airframe maintenance and repair. The student is expected to:		

			(A) Demonstrate knowledge and a high degree of skills in safely using hand and power tools and equipment commonly employed in the maintenance and repair of aircraft; (B) Identify standard and metric designation; (C) Demonstrate knowledge of the proper handling and disposal of environmentally hazardous materials used in servicing aircraft; (D) Demonstrate flight line safety, ground operations, and servicing procedures; (E) Interpret and utilize aviation publications, forms, and records; (F) Identify human factors that affect aircraft maintenance; (G) Research and understand the impact of new and emerging aircraft technologies; and (H) Identify and understand the need for preventative		

			maintenance procedures and practices.		
Airframe Repair Processes		Investigate Airframe Repair Procedures.	Understand and apply knowledge of airframe repair and maintenance procedures. Student is expected to: (A) Categorize aircraft structures; (B) Describe aerodynamics, aircraft assembly, and rigging; (C) Discuss aircraft fabric covering; (D) Perform aircraft metal structural repair; (E) Perform aircraft welding techniques; (F) Discuss aircraft wood and structural repair; (G) Identify advanced composite materials; (H) Research aircraft painting and finishing procedures; (I) Identify aircraft instrument systems;		

			(J) Troubleshoot aircraft electrical system malfunctions; (K) Inspect, remove, and install communication and navigation instruments; (L) Illustrate hydraulic and pneumatic power system operation; (M) Demonstrate aircraft landing gear system operation ; (N) Outline aircraft fuel systems; (O) Explain ice and rain protection procedures; (P) Discuss cabin environmental control systems; and (Q) Summarize aircraft fire protection systems.		
Maintenance and Repair		Understand the theory of operation of aircraft airframes and associated maintenance and repair practices. (Airframe maintenance and repair	The student applies the technical knowledge and skills of aircraft airframes to simulated and actual work situations. The student is expected to:		

		practices include knowledge of the function, diagnosis, and service of airframe structures, systems, and components of aircraft.)	(A) accurately calculate aircraft weight and balance; (B) accurately determine airframe component wear by using precision measuring and published specifications to determine if a given component is within wear tolerance and research necessary repairs; (C) research proper repair methods for a simulated repair and write a work order that calls out specific maintenance references and estimates cost of repairs; (D) create an appropriate inspection checklist for a given airframe based on regulated mandatory inspection points for an annual inspection and perform the inspection; (E) construct an airframe system troubleshooting chart showing possible defects and resulting		

			effects on system performance; (F) apply the essential knowledge and skills in aircraft maintenance and repair to work-based learning experiences such as cooperative education, job shadowing, mentoring, and apprenticeship training; (G) indicate and select proper products used in preventative maintenance for a given aircraft from appropriate maintenance publications; and (H) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations.		
Aircraft Services		Demonstrate knowledge of federal regulations and industry practice standards for airframe maintenance and repair.	Apply knowledge of airframe service, maintenance and repair practices. 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, the construction, maintenance, and service of aircraft, and 100-hour and annual inspections; (B) demonstrate knowledge of aircraft categories as used with respect to the certification of aircraft based upon intended use or operating limitations such as transport, normal, utility, acrobatic, limited, restricted, and provisional; (C) apply the principles of basic aerodynamics, theory of flight, and the function of primary and secondary flight controls; (D) demonstrate knowledge of aircraft weight and balance and how repairs, alterations, and loading can adversely		

			affect safe operation of an aircraft; (E) demonstrate knowledge of aircraft finishes and corrosion prevention and removal processes; (F) demonstrate knowledge of airframe construction and detailed repair methods and techniques, including wood structures, metal tubular structures, fabric coverings, sheet metal, and composite structures; (G) demonstrate knowledge of aircraft assembly and rigging procedures such as structure alignment checks, balancing flight control surfaces, removing and installing flight control surfaces, and jacking aircraft; (H) demonstrate knowledge of airframe systems and components, their functions, and detailed operating		

			principles, including landing gear, hydraulic power, cabin atmosphere control systems, aircraft instrument systems, aircraft navigation and electronic communication systems, ice and rain control systems, fire protection systems, and electrical systems; (I) demonstrate knowledge of aircraft common terminology and standard practices required to complete maintenance, modifications, and repairs; and (J) discuss the completion of logbooks and computer applications to maintain required aircraft documents.		
