Aviation Maintenance Technology II

8729 36 weeks / 280 hours

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Acknowledgments

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Course Description

Suggested Grade Level: 11 or 12
Prerequisites: 8728

Students will explore design features of aircraft through drawings and blueprints. Students will investigate aircraft materials and processes, weight and balance procedures, and fluid lines and fittings. Additionally, students will learn care and maintenance techniques (such as how to identify and correct corrosion), practice lab and tool safety, and apply academic principles while working with aircraft.
As noted in Superintendent's Memo #058-17 (2-28-2017), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

Task Essentials List

- Tasks/competencies designated by plus icons (+) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (⊙) are omitted
- Tasks marked with an asterisk (*) are sensitive.

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<td>+ Determine location and amount of ballast needed to stay within the weight and balance envelope.</td>
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Exploring Aircraft Design and Drawings

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<td>Identify the types and purpose of working drawings.</td>
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<td>Determine the properties and characteristics of ferrous and nonferrous metals and their alloys used in an aircraft's structure.</td>
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<td>Identify the effects of heat treatment on ferrous and nonferrous metals.</td>
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<td>Perform non-destructive testing (NDT) on aircraft materials.</td>
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<td>Perform magnetic particle inspections.</td>
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<td>70</td>
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<td>Demonstrate the dye-penetrant inspection process.</td>
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<td>71</td>
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<td>Inspect acceptability of welds.</td>
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<td>Measure, using precision-measuring tools.</td>
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<td>Identify the functions of standard- and special-use fasteners used in aviation maintenance.</td>
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<td>Install fasteners.</td>
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<td>75</td>
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<td>Explain the process of corrosion and its effect on aviation technology.</td>
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<td>Inspect and correct direct chemical- and electrochemical-attack corrosion.</td>
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<td>Explain where on the aircraft each of the five common types of aircraft corrosion occurs.</td>
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<td>Identify the areas on an aircraft that are most susceptible to corrosion.</td>
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<td>Demonstrate the use of cleaning agents/materials.</td>
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<td>Clean the interior and exterior of an aircraft.</td>
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<tr>
<td>81</td>
<td>Demonstrate maintenance functions that may prevent or inhibit corrosion.</td>
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Exploring Fluid Lines and Fittings

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<td>Explain how Bernoulli's principle applies to liquids in Venturi tubes.</td>
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<td>Fabricate, install, and test flexible fluid lines and fittings.</td>
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<td>Identify situations where damaged or defective metal hydraulic tubing should be replaced or repaired in a hydraulic system.</td>
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Legend: ✗ Essential ☐ Non-essential ✗ Omitted

Curriculum Framework

Following Tool and Equipment Safety and Care Guidelines

Task Number 39

Follow general safety procedures with tools and equipment.

Definition

Following procedures should include

- adhering to professional conduct in the lab, shop, and classroom (being alert, respectful, courteous, and cautious)
- wearing work attire that safeguards against injury
- wearing appropriate personal protective equipment (PPE), including eye-safety and respiratory gear, when necessary
- locating first-aid equipment
- following first-aid procedures
- identifying lab, shop, and classroom layout
- locating emergency exits, fire extinguishers, and other emergency gear and equipment.

**Process/Skill Questions**

- Where are safety procedure(s) located?
- What should a student do if he/she is unsure of a safety procedure?
- How does a student learn from both failures and successes?
- How do safety procedures ensure safety for oneself and others?

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**Task Number 40**

**Identify tools, their care and maintenance needs, their functions, and handling.**

**Definition**

Identification should include

- naming hand tools, power equipment, and additional shop equipment used in aviation maintenance
- selecting the appropriate tool for the job
- following manufacturer's guidelines for cleaning, maintaining, and storing tools
- calibrating tools.

**Process/Skill Questions**

- Why is tool calibration important?
- What are tools common to aviation maintenance?

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**Task Number 41**

**Demonstrate the use of hand tools and precision measuring devices in aircraft maintenance.**
Definition

Demonstration should include

- practicing with the instructor
- selecting and using tools proficiently
- wearing appropriate clothing and PPE, when necessary
- following manufacturer’s guidelines.

Process/Skill Questions

- Why is PPE important when using hand tools?

Task Number 42

Demonstrate electric and materials safety.

Definition

Demonstration should include

- identifying shock hazards, including the condition and location of power cords
- identifying equipment condition
- locating and interpreting data from the safety data sheet (SDS)
- adhering to Occupational Safety and Health Administration (OSHA) guidelines.

Process/Skill Questions

- Why are OSHA guidelines important?
- What shock hazards exist in the lab/shop?

Demonstrating Aircraft Weight and Balance Procedures

Task Number 43

Explain the necessity for aircraft weight and balance procedures.
Definition

Explanation should include the following:

- Aircraft weight and balance are critical to flight safety.
- Procedures rely on understanding how the force of gravity affects an aircraft in various flight conditions.
- The distribution of weight in/on an airplane must be balanced to create stability and allow the aircraft to be controlled in flight.

Process/Skill Questions

- Why is aircraft balance so important?
- How does an airplane’s weight affect its balance?

Task Number 44

Identify terminology associated with aircraft weight and balance.

Definition

Identification of terms should include the following:

- Empty weight—Weight of airframe, engines, propellers, rotors and all installed operating equipment with fixed positions, weight of fixed ballast, unusable fuel, undrainable oil, total engine coolant, and total hydraulic fluid
- Center of gravity (CG)—Point about which an aircraft will balance and at which the total weight of an aircraft is considered concentrated
- Datum line—Imaginary vertical plane from which all horizontal moment arm measurements are taken
- Station—Location in an aircraft identified by a number corresponding to its distance, measured in inches, from the datum line
- Moment—Weight of an item multiplied by its arm
- Arm—Horizontal distance, measured in inches, from the datum line to the CG of a specific item located in an airplane

Process/Skill Questions

- Why is it important to determine the weight of an empty aircraft?
- What is the relationship between empty weight and CG?
Task Number 45

Interpret weight data.

Definition

Interpretation of weight data should include determining

- weighing points
- empty weight
- empty weight CG
- maximum weight
- CG range of aircraft.

Weight data may be located using the manufacturer's manual or weight and balance records of the aircraft.

Process/Skill Questions

- Where are proper loading procedures located?
- How would a technician locate the empty weight and maximum weight of a specific aircraft?

Task Number 46

Calculate an aircraft's CG.

Definition

Calculation should be based on the following equation:

\[
\text{Total moment} \div \text{total weight} = CG
\]

Process/Skill Questions

- Why is it important to calculate the center of gravity?
- What is total moment?
Task Number 47

Determine location and amount of ballast needed to stay within the weight and balance envelope.

Definition

Determination should be made by using the following equation:

\[ \text{Ballast} = \text{Derived weight} \times (\text{Required CG} – \text{Derived CG}) \div \text{Ballast Arm} – \text{Required CG} \]

Process/Skill Questions

- Why would temporary ballast be used on an aircraft?
- What are the effects of improper use of ballast?

Task Number 48

Explain the difference between aircraft weight and empty weight.

Definition

Explanation should include

- aircraft weight is synonymous with scale weight at any given time
- empty weight includes the weight of
  - airframe
  - fixed equipment
  - full operating fluids
  - unusable fuel.

Process/Skill Questions

- What are the components of empty weight? What is not included in empty weight?
- What is the importance of scale weight and empty weight?

Task Number 49
Calculate moment problems with varied arms and weights.

Definition

Calculation should be based on the following equations:

\[ \text{Total moment} \div \text{total weight} = \text{CG} \]

and

\[ \text{Weight} \times \text{Arm} = \text{Moment} \]

Calculation also should include the following concepts:

- Add/subtract all weights to calculate total weight.
- Add/subtract all moments to calculate total moment.

Process/Skill Questions

- How is moment used to calculate center of gravity?
- What units of measurement are used for moments?

Task Number 50

Complete an aircraft weight and balance form, using computational, graph, and table methods.

Definition

Forms could include

- computational—pencil, paper, calculator
- graph—loading graph, standard weights
- table—pencil, paper, calculator, weight table.

Process/Skill Questions

- How are computational, graph, and table methods used to calculate CG?
- What, if any, is the preferred method to use when performing weight and balance calculations?
Task Number 51

Demonstrate use of the weight-shift formula.

Definition

Demonstration should include using the following equations:

\[
\text{Weight Shifted} \div \text{Total Weight} = \frac{\text{Change in CG}}{\text{Distance Weight is Shifted}}
\]

or

\[
\text{Weight Shifted} = \frac{\text{Total Weight} \times \text{CG Change Required}}{\text{Distance Weight is Shifted}}
\]

Process/Skill Questions

- Why is it important to be aware of the shifting of weight on an aircraft?
- How does one determine which formulas should be used to properly load an aircraft?

Task Number 52

Determine the weight of ballast that should be installed on an aircraft.

Definition

Determination should be made using the following equation:

\[
\text{Ballast} = \frac{\text{Aircraft Weight} \times \text{Desired CG Change}}{\text{Arm of Ballast} - \text{Arm of Desired CG}}
\]

Process/Skill Questions

- Why would ballast be used on an aircraft?
- How does one determine how much ballast should be installed on the aircraft?

Task Number 53

Demonstrate aircraft weighing procedures.
Definition

Demonstration should include

- referring to Federal Aviation Administration (FAA) and aircraft manufacturer documents
- cleaning exterior and interior of airframe
- verifying installation of all equipment
- recognizing that empty weight includes the weight of
  - airframe
  - fixed equipment
  - full operating fluids
  - unusable fuel.

Process/Skill Questions

- Where is information about preparing an aircraft for weighing located?
- Why is it important to clean an aircraft before weighing it?

Task Number 54

Determine extreme forward and extreme rearward centers of gravity.

Definition

Determination should be based on the aircraft specifications and should include ensuring that the aircraft is first loaded in accordance with the adverse loading conditions approved by the FAA and the aircraft manufacturer. Once the aircraft is loaded correctly, the CG formula should be applied.

Process/Skill Questions

- What are the effects of an extreme forward or extreme rearward center of gravity?
- What is an adverse-loading check?

Task Number 55

Calculate changes in empty weight and empty weight CG after aircraft modifications.
Definition

Calculation should include the CG formula, accounting for changes to empty weight (e.g., adding, removing, and relocating equipment, radios, fuel tanks, seats, and other components). Changes to empty weight produce changes in total weight and moment of the aircraft, and this will result in a change in the CG. There is a range that is provided by the aircraft manufacturer and the aircraft must stay within this range to function properly and safely.

Process/Skill Questions

- When should CG be recalculated?
- How can shifting weight change the moment and CG of an aircraft?

Exploring Aircraft Design and Drawings

Task Number 56

Identify the types and purpose of working drawings.

Definition

Identification should include that working drawings provide a method of accurately communicating plans and ideas. The types of working drawings should include

- detail
- assembly
- installation
- sectional
- exploded-view
- logic flowchart
- block, electrical wiring, pictorial electrical, and schematic diagrams.

Process/Skill Questions

- What is the purpose of working drawings?
- What is the function of working drawings?

Task Number 57

Distinguish between drawings and diagrams.
Definition

Distinction should include

- comparing drawings and sketches with diagrams used in maintenance manuals (e.g., exploded-view, flowchart, electrical-wiring diagram)
- recognizing that drawings are hand drawn or use computer-aided design (CAD) software, and diagrams are comprised of generated symbols and pictures
- determining that diagrams are a way to conceptualize design, whereas drawings offer specific design instructions.

Process/Skill Questions

- How are drawings and diagrams different?
- What are the benefits of using CAD vs. a hand-drawn diagram?

Task Number 58

Identify shape symbols and material symbols used in aviation drawings.

Definition

Identification should include

- electrical and hydraulic symbols (e.g., ground, power, battery, resistor, diode)
- material symbols (e.g., cast iron, steel, aluminum).

Process/Skill Questions

- What information can be gathered from an aviation drawing?
- How can graphs and charts assist with the performance of maintenance tasks?

Task Number 59

Draw a simple aircraft component.

Definition
Drawing should include four basic steps:

1. Block-in the views required.
2. Add detail to the blocked diagram.
4. Add dimensions and all information required (such as type of material used and fit and finish).

In typical repairs, an orthographic drawing is used.

Process/Skill Questions

- What details must be included in a simple aircraft drawing?
- Why would a maintenance technician need to complete a simple drawing?

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Task Number 60

Describe types of lines used in aviation diagrams, schematics, and working drawings.

Definition

Description should include the following types of lines:

- Visible
- Hidden
- Extension
- Leader
- Center
- Phantom
- Cutting-plane
- Dimension
- Break

Process/Skill Questions

- What is the difference among types of lines?
- Why is it important to know the proper use of lines found on aircraft drawings?

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Task Number 61
Interpret aviation blueprints.

Definition

Interpretation should be based upon identifying the following positions on a blueprint and their significance:

- Title block
- Responsibility column
- Standards column
- Bill of material
- Revisions block
- Application column

Process/Skill Questions

- What important information does a blueprint provide?
- What is the unique feature of blueprints as compared with diagrams and drawings?

Task Number 62

Identify the types and functions of charts and graphs commonly used in aviation maintenance.

Definition

Interpretation should pertain to the following charts and graphs:

- Bar charts
- Pie charts
- Nomograms
- Broken-line graphs
- Pictographs

Process/Skill Questions

- How do charts and graphs save time and reduce the chances for mechanic error?
- How is the information found in charts and graphs interpreted?
Task Number 63

Interpret data from an aircraft performance chart.

Definition

Interpretation should pertain to the continuous line graph that measures engine performance and structural limitations.

Process/Skill Questions

- What is the purpose of an aircraft performance chart?
- How can an aircraft performance chart help an aviation maintenance technician?

Task Number 64

Troubleshoot aviation hydraulic and electrical problems, using logic flowcharts.

Definition

Troubleshooting should include

- identifying the malfunction(s) or symptom(s) within a system
- using the maintenance manual and choosing the appropriate flowchart for the job
- following the flowchart and making decisions
- generating possible causes of the symptoms
- using the process of elimination to narrow potential causes of a problem
- confirming that the chosen solution restores the product or process to a working state.

Process/Skill Questions

- What hydraulic system issues could be identified with a flowchart?
- What are the components of a flowchart?

Exploring Aircraft Materials and Processes

Task Number 65
Explain the uses of rubber, plastic, and wooden materials in an aircraft's structure.

Definition

Explanation should include how each of the following materials is used:

- Rubber—in the form of rubber sheeting (for compressible gaskets) and packings or running seals in units that contain moving parts (e.g., actuating cylinders, pumps, and selector valves)
- Plastics—in the form of thermoplastic (e.g., windshields and side windows) and thermosetting resins, and additives that strengthen other material compounds
- Wood—in the form of a wooden core (balsa) and bonded between two face sheets of fiberglass or metal, used in floors, wall panels, and aircraft skins

Process/Skill Questions

- What are common plastics found in aircraft?
- Where has wood been used, historically, in an aircraft’s structure?

Task Number 66

Determine the properties and characteristics of ferrous and nonferrous metals and their alloys used in an aircraft's structure.

Definition

Determination should be based upon metals common to aircraft construction, including

- ferrous metals
  - iron—used to make steel
  - steel—used with alloys: carbon, sulfur, silicon, phosphorous, nickel, and chromium
- nonferrous metals
  - aluminum—copper, magnesium, manganese, and zinc
  - copper—as an alloy, copper is used as a base to create brass, bronze, and beryllium
  - magnesium—as an alloy, magnesium is combined with zinc, aluminum, thorium, zirconium, and manganese
nickel—combined with copper to form monel and with chromium, iron, and others to form inconel.
- titanium—alpha, alpha-beta, and beta alloys create compounds of various strengths.

Process/Skill Questions

- What are some methods that can be used to determine if a metal is ferrous or nonferrous?
- What is an alloy?

Task Number 67

Identify the effects of heat treatment on ferrous and nonferrous metals.

Definition

Identification of heat-treatment methods that change mechanical properties of metal for specific applications should include

- annealing
- tempering
- normalizing.

Process/Skill Questions

- What are the benefits of heat treatment of metals?
- How can a metal be strengthened? Explain.

Task Number 68

Perform non-destructive testing (NDT) on aircraft materials.

Definition

Performance should include, but is not limited to,

- magnetic particle inspections
- dye or liquid penetrant inspection
• eddy-current testing
• ultrasonic inspection
• radiographic inspection.

Process/Skill Questions

• What is the importance of NDT on aircraft materials?
• How does one determine what type of NDT to use for different applications?

Task Number 69

Perform magnetic particle inspections.

Definition

Procedure should include

• inspecting only the ferromagnetic materials (iron and steel) to detect cracks, splits, voids, pipes, and cold shunts below the surface
• using the fixed or portable magnetic particle unit
• magnetizing part
• covering part with a test medium containing ferromagnetic particles
• using either the immersion, spraying, or pouring method
• inspecting parts for defects on surface or subsurface, such as when
  o north and south poles form across defects
  o magnetic particles collect between poles
  o a pattern forms in the approximate size and shape of the defect
• demagnetizing parts.

Process/Skill Questions

• How does one demagnetize aircraft parts following a magnetic particle inspection?
• What defects can be discovered with magnetic particle inspection?

Task Number 70

Demonstrate the dye-penetrant inspection process.

Definition
Demonstration should include

- determining whether a part needs the dye-penetrant process
- locating small cracks and discontinuities open to the surface
- ensuring the part is accessible to apply penetrant
- applying penetrant to the part to be inspected, ensuring its surface is clean
- removing excess penetrant and applying developer to the surface
- drawing out the penetrant
- checking for lines on the surface, indicating the location of a crack.

Process/Skill Questions

- Why is it important that the aircraft part be accessible for a liquid penetrant inspection?
- What defects can be discovered with dye/liquid particle inspection?

Task Number 71

Inspect acceptability of welds.

Definition

Inspection should include using the visual, dye-penetrant, eddy-current, or radiographic method and checking for

- uniform width
- even ripples, tapered into base metal
- oxide (should not have formed on the base metal at a distance of more than ½” from the weld)
- burns, pits, cracks, or distortion due to overheating (these should not be present)
- blow holes, porosity, or projecting globules (these should not be present)
- depth of penetration (ensures fusion of base metal and filler rod).

The inspected area should be clean and free of oil, grease, and other coatings that could fill or hide defects.

Process/Skill Questions

- Why is it necessary to inspect welds?
- What are the characteristics of a poor weld?
Task Number 72

Measure, using precision-measuring tools.

Definition

Measurement should include the use of tools such as

- Vernier calipers
- dial calipers
- micrometers.

Process/Skill Questions

- Why are precision-measuring tools used instead of other measuring equipment?
- How accurate are precision-measuring tools?

Task Number 73

Identify the functions of standard- and special-use fasteners used in aviation maintenance.

Definition

Identification could include fasteners such as

- CherryBUCK—strong, one-piece, structural fastener
- turnlock fastener—secure inspection plates, doors, cowlings, and other removable panels on aircraft
- DZUS—secure doors that open frequently
- HI-LOK—a turnlock fastener that, once the wrenching device is tightened to the appropriate torque value, shears off, leaving the locking collar
- HI-LITE—a smaller, lighter version of the HI-LOK, offering great strength-to-weight ratio
- HI-TIGUE—preloads the hole it fills, resulting in increased joint strength, exerting radial force
- Jo-Bolt—used in close-tolerance holes
- RIVNUT—threaded rivet, used to create a threaded hole that accepts a machine screw for attaching a deicing boot
- Taper-Lok—the strongest special fastener used in aircraft construction; cork-like
- pins
• roller
• clevis
• cotter
• taper
• washers
  • plain
  • split-lock
  • high-strength
  • shake-proof lock.

Process/Skill Questions

• How would a technician identify and select the appropriate hardware for a specific application?
• What are possible effects of using the incorrect fastener on an aircraft?

Task Number 74

Install fasteners.

Definition

Installation should include selection of fasteners, based on availability. Installation should be based on

• proper torque
• safety/securing methods
• manufacturer's specifications
• instructor's guidelines.

Process/Skill Questions

• How does the technician choose the appropriate fastener for the appropriate aircraft component?
• What is the consequence of installing fasteners incorrectly?

Exploring the Effects of Cleaning and Corrosion

Task Number 75
Explain the process of corrosion and its effect on aviation technology.

**Definition**

Explanation should include that corrosion will cause primary structural members in an aircraft to weaken or fail. If undetected early through inspection and properly treated, corroded structures in an aircraft will require reinforcement or replacement for the aircraft to sustain the loads and stress for which each part is designed.

**Process/Skill Questions**

- How does corrosion affect the integrity of the aircraft?
- What are some methods of preventing corrosion on an aircraft?

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**Task Number 76**

**Inspect and correct direct chemical- and electrochemical-attack corrosion.**

**Definition**

Inspection should include

- identifying, by visual or NDT method, any suspected corroded areas
- eliminating one or more of three basic requirements for electrochemical action
- cleaning frequently
- maintaining a corrosion inspection schedule.

**Process/Skill Questions**

- What are the three basic requirements for electrochemical action?
- Why is it important to maintain a corrosion inspection schedule?

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**Task Number 77**

**Explain where on the aircraft each of the five common types of aircraft corrosion occurs.**
Definition

Explanation should include

- oxidation—on the surface/skin of an aircraft
- oxygen concentration cell corrosion—under lap joints, beneath marking tape, under ferrules on aluminum fluid lines
- metallic ion concentration corrosion—under lap joints
- stress corrosion—on bell cranks with pressed-in bushings, landing gear shock struts with pipe-thread grease fittings, clevis pin joints, shrink fits, overstressed tubing with B-nuts
- fretting corrosion—around skin surface rivets.

Process/Skill Questions

- Why is it important to recognize where each type of corrosion occurs on the aircraft?
- How can a mechanic reduce stress corrosion on an aircraft?

Task Number 78

Identify the areas on an aircraft that are most susceptible to corrosion.

Definition

Identification should include

- spot-welded seams
- movable surfaces connected in recessed areas
- piano hinges
- engine inlet areas and engine exhaust areas
- landing gear areas, nose and main gear wheel wells
- battery compartments and battery vents
- food-preparation area
- lavatories, holding tanks, areas around relief tubes and outlets.

Process/Skill Questions

- Why is it important to recognize where each type of corrosion occurs on the aircraft?
- How can a mechanic reduce stress corrosion on an aircraft?
Task Number 79

Demonstrate the use of cleaning agents/materials.

Definition

Demonstration should include using

- soaps and detergents
- aircraft surface-cleaning compound (MIL-C 5410 type I and II)
- safety solvent—methyl chloroform (1,1,1,-trichloroethane)
- phosphoric/citric acid
- dry-cleaning agents.

Process/Skill Questions

- What are some precautions for using aircraft cleaning agents?
- How does a maintenance technician determine the appropriate cleaning agent and method for a specific cleaning task?

Task Number 80

Clean the interior and exterior of an aircraft.

Definition

Cleaning procedures should include

- using only manufacturer-approved chemicals and cleaning agents on aircraft surfaces
- using chemicals and cleaning agents only for their intended purpose
- complying with the product manufacturer’s instructions for the proper use and disposal of specific chemicals and cleaning agents.

Process/Skill Questions

- Where would an aviation technician find information about aircraft cleaning agents?

Task Number 81
Demonstrate maintenance functions that may prevent or inhibit corrosion.

**Definition**

Demonstration should include

- inspection
- removal of corrosion
- application of protective coatings.

**Process/Skill Questions**

- Where would a technician apply protective coatings to inhibit the growth of corrosion?
- How long after the removal of corrosion should protective coatings be applied?

**Exploring Fluid Lines and Fittings**

**Task Number 82**

**Explain how Bernoulli's principle applies to liquids in Venturi tubes.**

**Definition**

Explanation should include the following:

- Bernoulli's principle—in a moving fluid (air), internal pressure and speed are inversely related
- Venturi tube effect—liquids travel faster at the narrow part of the tube (in the middle) where they become less pressurized

**Process/Skill Questions**

- How does the Venturi effect influence fluid flow?
- What is an everyday example of Bernoulli’s principle?
- How does an understanding of Bernoulli’s principle help complete a successful pressure test?

**Task Number 83**
Fabricate, install, and test rigid fluid lines and fittings.

Definition

Fabrication, installation, and testing of rigid fluid lines and fittings should include

- selecting correct tubing required for application, based on pressure and temperature
- selecting correct fittings for tubes
- flaring bead and clamp tubes, as needed for application
- proofing test tubing at applicable pressure.

Process/Skill Questions

- Why is it important to select the correct tubing for an application?
- How does temperature and pressure affect fluid line selection?

Task Number 84

Fabricate, install, and test flexible fluid lines and fittings.

Definition

Fabrication, installation, and testing should include

- selecting the correct hose required for application, based on fluid, pressure, and temperature
- selecting the correct fittings for the hose
- installing fittings for the application
- proofing the test hose at applicable pressure.

Process/Skill Questions

- Why is it important to select the correct hose for an application?
- How does temperature and pressure affect fluid line hose selection?

Task Number 85

Identify defects in metal hydraulic tubing.
Definition

Identification of defects should include

- dents
- cracks
- wiping
- ironing.

Process/Skill Questions

- What is ironing?
- What are some examples of defects found in metal hydraulic tubing?

Task Number 86

Identify situations where damaged or defective metal hydraulic tubing should be replaced or repaired in a hydraulic system.

Definition

Identification should include describing

- appropriate method for removing a line, based on the maintenance manual
- describing the bullet method of repairing dents
- describing the repair of wiping and ironing defects by measuring outside or inside diameter to determine if a tube is serviceable.

Process/Skill Questions

- Why is it important to select the proper size of line for replacement or repair?
- Where would the aviation maintenance technician find the appropriate method for removing a line?

SOL Correlation by Task
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<th>Task</th>
<th>Subject(s)</th>
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<td>Follow general safety procedures with tools and equipment.</td>
<td>English: 11.5, 12.5, GOVT.1, GOVT.16, VUS.1</td>
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<td>Science: CH.1</td>
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<tr>
<td>40</td>
<td>Identify tools, their care and maintenance needs, their functions,</td>
<td>English: 11.5, 12.5</td>
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<td>and handling.</td>
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<td>41</td>
<td>Demonstrate the use of hand tools and precision measuring devices</td>
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<td>42</td>
<td>Demonstrate electric and materials safety.</td>
<td>English: 11.5, 12.5</td>
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<td>43</td>
<td>Explain the necessity for aircraft weight and balance procedures.</td>
<td>English: 11.5, 12.5</td>
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<td>44</td>
<td>Identify terminology associated with aircraft weight and balance.</td>
<td>English: 11.5, 12.5</td>
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<td>45</td>
<td>Interpret weight data.</td>
<td>English: 11.5, 12.5</td>
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<td>46</td>
<td>Calculate an aircraft's CG.</td>
<td>Mathematics: A.1, A.4</td>
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<td>47</td>
<td>Determine location and amount of ballast needed to stay within the</td>
<td>Mathematics: A.1, A.4</td>
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<tr>
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<td>weight and balance envelope.</td>
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<tr>
<td>48</td>
<td>Explain the difference between aircraft weight and empty weight.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>49</td>
<td>Calculate moment problems with varied arms and weights.</td>
<td>Mathematics: A.1, A.4</td>
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<tr>
<td>50</td>
<td>Complete an aircraft weight and balance form, using computational,</td>
<td>English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7</td>
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<tr>
<td></td>
<td>graph, and table methods.</td>
<td>Mathematics: A.1, A.4</td>
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<td>51</td>
<td>Demonstrate use of the weight-shift formula.</td>
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<td>52</td>
<td>Determine the weight of ballast that should be installed on an</td>
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<td>53</td>
<td>Demonstrate aircraft weighing procedures.</td>
<td>English: 11.5, 12.5</td>
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<td>54</td>
<td>Determine extreme forward and extreme rearward centers of gravity.</td>
<td>English: 11.5, 12.5</td>
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<td>55</td>
<td>Calculate changes in empty weight and empty weight CG after</td>
<td>Mathematics: A.1, A.4</td>
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<td>aircraft modifications.</td>
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<td>56</td>
<td>Identify the types and purpose of working drawings.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>57</td>
<td>Distinguish between drawings and diagrams.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>58</td>
<td>Identify shape symbols and material symbols used in aviation</td>
<td>English: 11.5, 12.5</td>
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<tr>
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<td>drawings.</td>
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<td></td>
<td>Draw a simple aircraft component.</td>
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<tr>
<td>60</td>
<td>Describe types of lines used in aviation diagrams, schematics, and working drawings.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>61</td>
<td>Interpret aviation blueprints.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>62</td>
<td>Identify the types and functions of charts and graphs commonly used in aviation maintenance.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td></td>
<td>Interpret data from an aircraft performance chart.</td>
<td>English: 11.5, 12.5</td>
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<td>63</td>
<td>Troubleshoot aviation hydraulic and electrical problems, using logic flowcharts.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>64</td>
<td>Explain the uses of rubber, plastic, and wooden materials in an aircraft's structure.</td>
<td>English: 11.5, 12.5</td>
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<tr>
<td>65</td>
<td>Determine the properties and characteristics of ferrous and nonferrous metals and their alloys used in an aircraft's structure.</td>
<td>English: 11.5, 12.5</td>
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<td>66</td>
<td>Identify the effects of heat treatment on ferrous and nonferrous metals.</td>
<td>English: 11.5, 12.5</td>
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<td>67</td>
<td>Perform non-destructive testing (NDT) on aircraft materials.</td>
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<td>68</td>
<td>Perform magnetic particle inspections.</td>
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<td>69</td>
<td>Demonstrate the dye-penetrant inspection process.</td>
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<td>70</td>
<td>Inspect acceptability of welds.</td>
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<td>71</td>
<td>Measure, using precision-measuring tools.</td>
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<tr>
<td>72</td>
<td>Identify the functions of standard- and special-use fasteners used in aviation maintenance.</td>
<td>English: 11.5, 12.5</td>
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<td>Install fasteners.</td>
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Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.” Teachers can find the infusion/unit in the course listing.
Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- College and Work Readiness Assessment (CWRA+)
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- National Career Readiness Certificate Assessment
- Professional Communications Certification Examination
- Small Unmanned Aircraft System (UAS) Safety Certification Examination
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.

- Aviation Maintenance Technology I (8728/36 weeks, 280 hours)

Career Cluster: Transportation, Distribution and Logistics

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