AMT A162: AIRFRAME ASSEMBLY & RIGGING, PNEUMATICS & ENVIRONMENTAL CONTROL SYSTEMS - FAA

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	095010 - Aviation Airframe Mechanics
Units	3 Total Units
Hours	117 Total Hours (Lecture Hours 36; Lab Hours 81)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

Fundamental theory of assembly, cabin control systems, and rigging. Practical experience in rigging, assembly, disassembly, repair, overhaul, testing, inspection, and operation of component parts. ADVISORY: AMT A153. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Rig aircraft flight controls on fixed wing and helicopters, balance controls surfaces, jack airplanes and assemble flight control components.
2. Inspect, check, troubleshoot, service and repair heating, cooling, air-conditioning and pressurization systems.
3. Inspect and check pneumatic power system components.

Course Objectives

- 1. Identify, and label the three axes of the aircraft.
- 2. Illustrate the displacement or motion of an airplane about each of the three axes.
- 3. Describe the aerodynamics forces action upon an airplane in flight.
- 4. Describe the design features which contribute to the stability of the airplane.
- 5. Illustrate the relationship between center of pressure and center of gravity at three different angles of attack. With the aileron and flap in various displaced positions, the student will illustrate the movement of the center of pressure of the airfoil.
- 6. Identify and select the required hardware (bolts, nut, screws, etc.) from an assortment or supply room. They will install, torque and safety these fasteners on the mock-up panel or in the assembly.
- 7. Recognize and explain the cause and effect of blade stall when helicopters are operating at high speed.
- 8. Recognize and explain the cause of vertical vibrations.
- 9. Recognize and explain the methods of tracking main rotor blades.
- 10. Recognize and explain the preparation required prior to rigging a rotorcraft.
- 11. Interpret information and make the measurements necessary to verify the alignment of landing gear, wings and fixed tail surfaces.
- 12. Install a nicopress sleeve and thimble at one end of the cable and a swaged fitting at the other end.
- 13. Install an elevator, rudder, or aileron cable, use a tensiometer to establish correct cable tension, safety all turnbuckles and attaching devices in accordance with the service manual.
- 14. Inspect the control systems of the airplane for cable wear, tension, pulley wear and rotation, swaged terminal slippage, turnbuckle safety, corrosion and control surface travel, and record discrepancies on a report form.
- 15. Interpret the manufacturer's instructions, follow procedure and use equipment to check the unbalance of the control surface.
- 16. Inspect the bellcranks, push-pull tubes, rod ends, guides, adjust the travel of the movable control surfaces and safety the control systems in accordance with the service manual for that particular make and model of aircraft.
- 17. Accomplish a 100 hour or annual inspection of the airplane and evaluate conditions disclosed as a result of the inspection.
- 18. Solder electrical wires or cables to solder type connectors, sweat-solder lap-joints of brass, tinned steel and stainless steel.
- 19. Identify and select parts which they considers repairable by welding.
- 20. Perform welded bead seams on samples of aluminum alloy and stainless steel sheet.
- 21. Perform welding of the steel parts and normalize them.
- 22. Interpret information and explain the principles of pneumatics and the operation of the specific system.
- 23. Identify and label the major components of a freon vaporcycle cooling system.
- 24. Identify and label the major components of an air cycle cooling system.

Lecture Content

ASSEMBLY AND RIGGING Rig fixed wing aircraft Use correct aircraft nomenclature Interpret theory of flight Rig rotary wing aircraft Use nomenclature applicable to rotary wing aircraft Alignment of structures Verify alignment of structures Assemble aircraft components including flight control surfaces Assemble components Balance rig and inspect movable primary and secondary flight control surfaces Identify aircraft control cable Install swaged terminals Verify correct control response Install and tension a control cable Check static balance of a control surface Inspect and adjust push-pull control systems Jack aircraft Perform gear swing test Perform tire changes Utilize for rigging purposes AIRFRAME INSPECTIONS Perform airframe conformity and airworthiness inspections Perform 100 hr. or annual inspection CABIN ATMOSPHERE CONTROL SYSTEM Inspect, check, troubleshoot, service and repair heating, cooling, air-conditioning and pressurization systems The principles of operation and control of cabin pressurization The functions and principles of operation of aircraft air-conditioning Inspection, checking and troubleshooting of aircraft combustion heaters and exhaust type heat exchangers Checking and troubleshooting of aircraft vapor cycle and air cycle cooling systems Inspect, check, troubleshoot, service

and repair oxygen systems Inspect, check and service oxygen systems Inspect, check, troubleshoot, service and repair heating, cooling, air-conditioning pressurization systems and air cycle machines Identify components of a n aircraft combustion heater, freon cooling system, and air cycle expansion turbine Repair or replacement procedures for air-conditioning and pressurization components Repair or replacement procedures for aircraft oxygen system components. PNEUMATICS CONTROL SYSTEM Repair pneumatic power system components Select and install seals Interpret and describe the operation of a pneumatic power system.

Lab Content

Faculty input required.

Method(s) of Instruction

- Lecture (02)
- Lab (04)

Instructional Techniques

1. Detailed multimedia/lectures of each topic covered. 2. Student feedback during each lecture. 3. Detailed illustrative discussion of textbook examples. 4. Concentration on schematic reading and system operation fault diagnosis. 5 Practical troubleshooting. 6. Laboratory exercises pertaining to subjects discussed during which students work individually or in small groups.

Reading Assignments

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Writing Assignments

Student must show proficiency in writing logbook entries using correct punctuation, sentence structure and readability.

Out-of-class Assignments

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Demonstration of Critical Thinking

Interview, list, multiple choice exams, and short answer.

Required Writing, Problem Solving, Skills Demonstration

Student must show proficiency in writing logbook entries using correct punctuation, sentence structure and readability.

Textbooks Resources

1. Required Jeppesen. AC43.13-1B2A, Acceptable Methods, Techniques, and Practices-Aircraft Inspection and Repair, ed. Superintendent of Documents; U.S. Government Printing Office, 2001 Rationale: - 2. Required Jeppesen. AP Technician ?AIRFRAME? Textbook, ed. Englewood: Jeppesen Sanderson, 2007 3. Required Jeppesen. AP Technician ?GENERAL? Textbook, ed. Englewood: Jeppesen Sanderson, 2000 Rationale: latest 4. Required Kroes, Michael J., et al.. Aircraft Maintenance Repair, 6th ed. New York: Glencoe/McGraw-Hill, 2007