AMT A163: AIRFRAME HYDRAULICS AND LANDING GEAR - FAA

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	095010 - Aviation Airframe Mechanics
Units	4.5 Total Units
Hours	162 Total Hours (Lecture Hours 36; Lab Hours 126)
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 hydraulic, pneumatic, and landing gear systems. Practical experience in disassembly, repair, overhaul, test, inspection, and operation of component parts. ADVISORY: AMT A150 and AMT A152. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Identify and select hydraulic fluids, repair hydraulic system components and troubleshoot and repair hydraulic and pneumatic power systems.
2. Inspect, check, service, and repair landing gear systems and components.

Course Objectives

- 1. Distinguish between the sample fluids by color, order and specification number.
- 2. Interpret information that will assist in identifying and selecting seals for use in ester, petroleum and vegetable-base hydraulic fluids.
- 3. Identify, remove and install a pressure regulator in the hydraulic system.
- 4. Interpret information and explain the principles of pneumatics and the operation of the specific system.
- 5. Interpret the reference information and diagram a basic hydraulic system.
- 6. Identify each type of system and compare the components of the constant pressure and the open center types and the means of system pressure regulation.
- 7. Inspect and service the reservoir with fluid and check the filter for contamination.
- 8. Identify and describe the operation of a constant and variable displacement type hydraulic power pump.
- 9. Remove and inspect the pump drive shaft. He will install a pump on the accessory drive pad and check operation of the system following pump installation.
- 10. Troubleshoot the hydraulic system after the instructor has introduced air into the pump. The student will prime the pump and purge air from the system.
- 11. Remove, inspect and install an accumulator in the system. He will charge the accumulator with air or nitrogen and check the operation of the system.
- 12. Interpret information from the reference material or service publications and describe the probable cause for the observed malfunction. He will make necessary adjustments to restore the system to operating tolerances.
- 13. Inspect, check and service the flap system.
- 14. Describe the procedure to follow when storing tires and other rubber aircraft products.
- 15. describe the procedure to clean an aircraft tire, removing oils and other deteriorating materials.
- 16. Inspect the tires, tube and wheel assembly, determine the necessary repairs, make one repair to a tube, reinstall the tire and tube and inflate to correct pressures.
- 17. Describe the reasons for rejecting wheel components and describe the repairs that may be accomplished.
- 18. Disassemble, identify the components, describe the operation and reassemble servo, expander-tube, single and multiple disc types brake assemblies.
- 19. Perform a functional test of the system following the replacement of the cylinder.
- 20. Inspect the brake assembly, adjust the clearance of each brake, as necessary, and reinstall the wheel.
- 21. Disassemble a brake master cylinder, inspect the components, replace seals (as required), reassemble and check the operation of the master cylinder.
- 22. Identify the components of the hydraulic system and label the diagram or drawing.
- 23. Describe the probable cause for the malfunctions of brake fading, excessive pedal travel, grabbing brakes, spongy brake action and dragging and locked brakes
- 24. Measure and record the caster, camber, toe-in and toe-out of the landing gear.
- 25. Inspect, adjust and service both nose and tail wheel steering and damping mechanisms.

Lecture Content

HYDRAULIC POWER SYSTEMS Identify and select hydraulic fluids Identify and select hydraulic fluids Repair hydraulic power system components Select and install seals Identify, remove and install a hydraulic selector valve Remove and install pressure regulators Inspect, check, service, troubleshoot and repair hydraulic power systems Solve problems involving force, area and pressure with applied theory Interpret reference information pertaining to operation of a basic hydraulic system Compare constant pressure and open center types of hydraulic systems Inspect and service hydraulic reservoirs Identify and describe the operation of instant and variable displacement hydraulic pump Check, inspect, remove and install hydraulic power pump Troubleshoot hydraulic pump Remove, install, inspect, service and check a hydraulic accumulator Troubleshoot and determine the cause of low, high or fluctuating system hydraulic pressure Inspect, check and service a hydraulically operated flap system LANDING GEAR SYSTEMS Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires and

steering systems Clean and store tires Inspect, demount, determine repairs needed and reinstall tires on wheels Remove, inspect, service and reinstall a wheel assembly on the axle Disassemble, identify components and reassemble mechanical hydraulic type brake assemblies Replace a brake-actuating cylinder Adjust clearance on a shoe, multiple disc, and single disc brake Inspect, repair and operationally check a master cylinder Inspect, service and describe the operation of power brake and emergency brake system Recognize probable cause of brake malfunction Bleed air from hydraulic brake system Service, repair and troubleshoot landing gear oleo struts Describe the operation of an oleo shock strut Operate, inspect and adjust a retractable landing gear Check landing gear alignment Inspect, adjust and service nose and tail wheel steering and damping mechanisms

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: latest 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