AMT A173: POWERPLANT GAS TURBINE ENGINES - FAA

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	095020 - Aviation Powerplant Mechanics
Units	6 Total Units
Hours	243 Total Hours (Lecture Hours 63; Lab Hours 180)
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 and overhaul of turbine engines, starting systems, and system components. Practical experience in disassembly, repair, overhaul, inspection, and testing of turbine engines and components. ADVISORY: AMT A150 and AMT A153. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate the ability to overhaul, inspect, repair, install, run, and troubleshoot aircraft gas turbine engines.

Course Objectives

- 1. Recognize and explain the major sections and subsection of turbojet, turbofan, turboprop, and turbo shaft engines.
- 2. Be able to explain technical terms associated with gas turbine engines.
- 3. Identify, inspect and reassemble turbine engine gearbox assembly.
- 4. Explain procedures and perform tasks using appropriate reference material, for turbine engine disassembly and assembly.
- 5. Interpret appropriate reference material for turbine engine overhaul and inspection and blade inspections and repair.
- 6. Explain airflow path through turbojet, turbofan, turboprop and turbo shaft engines.
- 7. Apply principles of Newton?s laws and Brayton cycle to gas turbine engines.
- 8. Explain relationship of RPM and thrust in gas turbine engines.
- 9. Identify accessory components on gas turbine engines and be able to explain the operation of each system.
- 10. Explain the procedures for adjusting (trimming) and installing fuel metering systems, Electronic Engine Controls (EEC) and Full Authority Electronic Digital Controls (FADEC).
- 11. Explain and identify the use of gas turbine engine thrust reverser sytems.
- 12. Explain the use and operation of engine pneumatic systems and subsystems.
- 13. Apply principle in engine inspection utilizing borescope equipment.
- 14. Analyze, explain and diagnose run-up and troubleshooting of gas turbine engines.
- 15. Recognize and identify components of auxiliary power units.
- 16. Analyze, explain and diagnose run-up and troubleshooting of auxiliary power units.
- 17. Identify, service, and troubleshoot turbine engine electrical and pneumatic starting systems.
- 18. Explain the basic principles in spark plugs and turbine engine igniters;
- 19. Apply principles in inspecting, cleaning, testing, and identification of aviation spark plugs and turbine engine igniter plugs.
- 20. Compare and describe the difference between piston engine and turbine engine ignition systems
- 21. Recognize, explain and illustrate the different types of turbine engine ignition systems.

Lecture Content

TURBINE ENGINES Overhaul turbine engines Illustrate Newton's laws and the Brayton cycle Explain relationship of RPM and thrust in a turbine engine Identify and explain the characteristic of different turbine compressors Identify major components and explain airflow in fan or by-pass turbine engines Identify pressure changes in a turbine engine Identify airflow in diffusers Identify types and characteristics of combustion chambers Identify impulse and reaction blades and thrust reversers Compare characteristics of turbo prop and reciprocating engines Overhaul turbine engines Describe modular overhaul Inspect, check, service and repair turbine engines and turbine engine installations Remove and install a combustion case and liner Disassemble and reassemble compressor section of a turbine engine Remove and reinstall a fuel nozzle in a turbine engine Remove and reinstall a fuel control on a turbine engine Remove, inspect, check, service, and reinstall a turbine section of a turbine engine Remove and reinstall a main gearbox accessory drive assembly Remove and install an exhaust system Remove and install the inlet section on a turbine engine Remove, inspect, check, service, and reinstall lubrication system components and installation Remove and install a thrust reverser section of a turbine engine Install, troubleshoot and remove turbine engines Identify damaged turbine blades Recognize and identify combustion chamber hot spots Troubleshoot and adjust turbine engine fuel metering systems, ignition system and electronic engine fuel controls Recognize the effects of exhaust nozzle area Identify compressor surge Identify causes of performa nce loss Compare and describe the difference between piston engine and turbine engine ignition systems Removal, installation and inspection of a turbine engine Inspect, check, service, troubleshoot and repair turbine engine electrical starting systems Inspect, service and troubleshoot turbine engine pneumatic starting systems Inspect, check, service and troubleshoot turbine driven auxiliary power units Inspect and troubleshoot unducted fan systems and components

Lab Content

Faculty input required.

Method(s) of Instruction

- Lecture (02)
- Lab (04)

Instructional Techniques

Instruction methodologies will include, but not necessarily be restricted to the following: 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 Jeppensen. AP Technician ?POWERPLANT? Textbook, ed. Englewood: Jeppesen Sanderson, 1998 Rationale: latest 3. Required Kroes, Michael J and Thomas Wild. Aircraft Powerplant, 7th ed. New York: Glencoe/McGraw-Hill, 1994 Rationale: latest 4. Required Otis, Charles E. . Aircraft Gas Turbine Powerplants, ed. Englewood: Jeppesen Sanderson, 2001 Rationale: latest 5. Required Treager, Irwin E. . Gas Turbine Engine Technology, 3rd ed. New York: Glencoe/McGraw-Hill, 1995 Rationale: latest