**I. COURSE TITLE:** Aircraft Turbine Engines I

 **COURSE NUMBER:** 2361 **CATALOG PREFIX:** AVIT

**II. PREREQUISITE(S):**

**III. CREDIT HOURS:** 6 **LECTURE HOURS:** 4

 **LABORATORY HOURS:** 2 (2 contact) **OBSERVATION HOURS:**

**IV. COURSE DESCRIPTION:**

This course will introduce the student to theory, operation, construction, overhaul, repair, and assembly of turbine aircraft engines. The students will learn the different types of turbine engines used in aircraft for flight and auxiliary power. Students will remove and install turbine engines on aircraft. Lab is hands-on where the students will disassemble, inspect, assemble, and troubleshoot axial and centrifugal flow turbine engines.

**V. GRADING**

A= 90-100

 B= 80-89

 C= 70-79

 D= 60-69

 F= 0-59

Grades of 69 and below will not meet the requirements of the FAA for Mechanic

Certificate .

See catalog for description of other possible grades.

**VI. ADOPTED TEXT(S):**

Jeppesen Maintenance

 A&P Technician

Powerplant Textbook

**VII. COURSE OBJECTIVES:**

Students will be able to:

• Overhaul turbine engine (2)

• Inspect, check, service, and repair turbine engines and turbine engine

 installations (3)

• Install, troubleshoot, and remove turbine engines (3)

• Inspect and troubleshoot unducted fan systems and components.

• Inspect, check, service, and troubleshoot turbine-driven auxiliary power

 units (1)

 Objective levels:

Level 1 requires:

Knowledge of general principles, but no practical application.

No development of manipulative skill.

Instruction by lecture, demonstration, and discussion.

Level 2 requires:

Knowledge of general principles, and limited practical application.

Development of sufficient manipulative skill to perform basic operations. Instruction by lecture, demonstration, discussion, and limited practical application.

Level 3 requires:

Knowledge of general principles, and performance of a high degree of practical application.

Development of sufficient manipulative skills to simulate return to service.

Instruction by lecture, demonstration, discussion, and a high degree of practical application.

**VIII. COURSE METHODOLOGY:**

May include but not limited to Lecture and problem solving, independent and group projects, in-class and home assignments, quizzes, and tests. Problem solving will use both graphical and mathematical methods.

Attendance is required.

**IX. COURSE OUTLINE:**

Weeks:

1. History of jet propulsion, jet propulsion today, types of jet propulsion, rocket, ramjet, pulsejet, gas turbine engine.

2. Turbojet engines, turboshaft engines, turbofan engines, unducted fan engines.

3. Engine components, air inlet ducts, engine-mounted inlets, wing-mounted inlets, fuselage-mounted inlets, subsonic inlets, supersonic inlets, bellmouth inlets, foreign object damage, compressor section, centrifugal flow compressors, axial flow compressors.

4. Multiple-spool compressors, compressor stall, combination compressors, compressor air bleeds, diffuser.

Test 1

5. Combustion section, multiple-can type, annular type, can-annular type, flameout.

6. Turbine section, case, turbine stator, shroud, turbine rotor, turbine blades, exhaust section, exhaust cone, exhaust nozzle, tailpipe, afterburners, thrust reversers.

7. Accessory section, noise suppression, engine mounts, bearings, turboprop engines, turboshaft engines, auxiliary power unit.

8. Turbine engine operating principles, energy transformation, producing thrust, thermal efficiency, factors affecting thrust.

Test 2

9. Turbine engine instrumentation, compressor speed, engine pressure ratio, turbine discharge pressure, torquemeter, fuel flow indicator, exhaust gas temperature, EICAS.

10. Ground operations, engine starting, power check, engine performance, turbine engine maintenance.

11. Turbine engine line maintained, engine trimming.

12. Engine removal, preparation for removal, engine hoisting, engine compartment, engine mounts.

Test 3

13. Turbine engine overhaul, disassembly, cleaning, compressor section, combustion section, turbine section, exhaust section, bearings.

14. Structural inspection, dimensional inspection, repairs.

15. Turbine engine balancing, reassembly, engine installation, mounting the engine, engine alignment, engine trimming, engine preservation.

16. Final exam.

**X. OTHER REQUIRED TEXTS, SOFTWARE, AND MATERIALS:**

FAA AC-65-12A

Airframe and Powerplant Mechanics

Powerplant Handbook

 FAA-AC-43.13-1B/2B

Acceptable methods, Techniques, and practices of aircraft inspection and Repair

**XI. EVALUATION:**

Test count – 40% of Final Grade

 Quizzes count – 10% of Final Grade

 Lab Grade counts – 50% of Final Grade

**XII. SPECIFIC MANAGEMENT REQUIREMENTS:**

Class and lab attendance is mandatory. Students are required to be in class and lab to satisfy the time requirement of the FAA. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

**XIII. OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES:** Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431.