1. **COURSE TITLE\*: Turbine Engine I**
2. **CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*: AVIT 2403**
3. **PREREQUISITE(S)\*: COREQUISITE(S)\*:**
4. **COURSE TIME/LOCATION/MODALITY: (*Course Syllabus – Individual Instructor Specific*)**
5. **CREDIT HOURS\*: 3 LECTURE HOURS\*: 2**

 **LABORATORY HOURS\*:1 (1.5 contact hrs) OBSERVATION HOURS\*:0**

1. **FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***
2. **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 learn Turbine engine Electrical, Lubrication, Air, and exhaust systems. Students will remove and install turbine engines on aircraft. Lab is hands-on where the students will inspect, and troubleshoot axial and centrifugal flow turbine engines. Lab will consist of troubleshooting and identifying different Turbine Engine Systems such as Electrical, air, lubrication, air and exhaust

1. **LEARNING OUTCOMES\*:**

Students will gain knowledge of the following:

1. Turbine engine operating principles/theory of operation.
2. Types of turbine engines.
3. Turbine engine construction and internal components.
4. Turbine engine performance and monitoring
5. Turbine engine troubleshooting, maintenance, and inspection procedures
6. Procedures required after the installation of a turbine engine.
7. Causes for turbine engine performance loss.
8. Bleed air systems
9. Storage and preservation.
10. Auxiliary power unit(s)
11. Turbine engine adjustment and testing.
12. Starter generators.
13. DC generation systems
14. AC generation systems.
15. The purpose and procedure for paralleling a dual-generator electrical system.
16. CSD and IDG systems and components.
17. Lubrication system operation and components.
18. Wet-sump system.
19. Dry-sump system.
20. Chip detectors
21. Lubrication system maintenance, inspection, servicing, and analysis.
22. Excessive aircraft engine oil consumption.
23. Air cooling system theory, components, and operation.
24. Turbine engine internal cooling.
25. Turbine engine induction system theory, components, and operation.
26. Turbine engine bleed air system theory, components, and operation.
27. Turbine engine anti-ice system
28. Turbine engine exhaust system theory, components, operation, and inspection.
29. Noise suppression theory, components, and operation
30. Thrust reverser theory, components, and operation.
31. **ADOPTED TEXT(S)\*:**

FAA-H-8083-32 (Powerplant V0l 1&2)

 Aviation Maintenance Technician Handbook AC 43.13-1B/2B

<https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/FAA-H-8083-32-AMT-Powerplant-Vol-1.pdf>

<https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/FAA-H-8083-32-AMT-Powerplant-Vol-2.pdf>

<https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_43.13-1B_w-chg1.pdf>

<https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2043.13-2B.pdf>

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

1. **OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***
2. **GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog. The scale is as follows:

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.

1. **GRADING PROCEDURES OR ASSESSMENTS: (*Course Syllabus – Individual Instructor Specific)***

Test count – 40% of Final Grade

 Quizzes count – 10% of Final Grade

 Lab Grade counts – 50% of Final Grade

Class and lab attendance will be graded, two points will be deducted from the grade for each day missed. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

1. **COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

May included but not limited to lecture and problems solving, group and lab projects, in-class and home assignments, quizzes and tests. Lab project will be individual and group. Attendance to class and lab is required.

**14. COURSE OUTLINE: *(Course Syllabus – Individual Instructor Specific)***

***(Insert sample course outline with learning outcomes tied to assignments / topics.)***

**Below is an example of how you might fill-in the course outline of classwork, assignments, tests, et al…**

|  |  |  |
| --- | --- | --- |
| **WEEK** | **DESCRIPTION** | **LEARNING OUTCOMES #** |
| WEEK 1 | History of jet propulsion, jet propulsion today, types of jet propulsion, rocket, ramjet, pulsejet, gas turbine engine. | 1 |
| WEEK 2 | Turbojet engines, turboshaft engines, turbofan engines, unducted fan engines. | 2 |
| WEEK 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. | 3 |
| WEEK 4 | Multiple-spool compressors, compressor stall, combination compressors, compressor air bleeds, diffuser. | 8, 24 |
| WEEK 5 | Quiz 1Combustion section, multiple-can type, annular type, can-annular type, flameout. | 4, 5, 6, 7 |
| WEEK 6 | Turbine section, case, turbine stator, shroud, turbine rotor, turbine blades, exhaust section, exhaust cone, exhaust nozzle, tailpipe, afterburners, thrust reversers | 12, 13, 14 |
| WEEK 7 | Accessory section, noise suppression, engine mounts, bearings, turboprop engines, turboshaft engines, auxiliary power unit. | 29 |
| WEEK 8 | Turbine engine operating principles, energy transformation, producing thrust, thermal efficiency, factors affecting thrust. | 25, 26 |
| WEEK 9 | Turbine engine instrumentation, compressor speed, engine pressure ratio, turbine discharge pressure, torquemeter, fuel flow indicator, exhaust gas temperature, EICAS. | 15, 16 |
| WEEK 10 | Ground operations, engine starting, power check, engine performance, turbine engine maintenance. | 27, 28 |
| WEEK 11 | Turbine engine line maintained, engine trimming. | 4, 5, 20 |
| WEEK 12 | Engine removal, preparation for removal, engine hoisting, engine compartment, engine mounts. | 9, 10 11 |
| WEEK 13 | Turbine engine overhaul, disassembly, cleaning, compressor section, combustion section, turbine section, exhaust section, bearings. | 17, 18, 19 |
| WEEK 14 | Structural inspection, dimensional inspection, repairs. | 21, 22 23 |
| WEEK 15 | Turbine engine balancing, reassembly, engine installation, mounting the engine, engine alignment, engine trimming, engine preservation. | 4, 5, 30 |
| WEEK 16 | Final Exam |  |

* History of jet propulsion, jet propulsion today, types of jet propulsion, rocket, ramjet, pulsejet, gas turbine engine.
* Turbojet engines, turboshaft engines, turbofan engines, unducted fan engines.
* 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.
* Multiple-spool compressors, compressor stall, combination compressors, compressor air bleeds, diffuser.
	+ Quiz 1
* Combustion section, multiple-can type, annular type, can-annular type, flameout.
* Turbine section, case, turbine stator, shroud, turbine rotor, turbine blades, exhaust section, exhaust cone, exhaust nozzle, tailpipe, afterburners, thrust reversers.
* Accessory section, noise suppression, engine mounts, bearings, turboprop engines, turboshaft engines, auxiliary power unit.
* Turbine engine operating principles, energy transformation, producing thrust, thermal efficiency, factors affecting thrust.
	+ Test 1
* Turbine engine instrumentation, compressor speed, engine pressure ratio, turbine discharge pressure, torquemeter, fuel flow indicator, exhaust gas temperature, EICAS.
* Ground operations, engine starting, power check, engine performance, turbine engine maintenance.
* Turbine engine line maintained, engine trimming.
* Engine removal, preparation for removal, engine hoisting, engine compartment, engine mounts.
* Turbine engine overhaul, disassembly, cleaning, compressor section, combustion section, turbine section, exhaust section, bearings.
* Structural inspection, dimensional inspection, repairs.
* Turbine engine balancing, reassembly, engine installation, mounting the engine, engine alignment, engine trimming, engine preservation.
	+ Final exam.

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

Class and lab attendance will be graded. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

**16. FERPA:\***

Students need to understand that their 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.

**17. ACCOMMODATIONS: \***

Students requesting accommodations may contact Ryan Hall, Accessibility Coordinator at rhall21@sscc.edu or 937-393-3431, X 2604.

Students seeking a religious accommodation for absences permitted under Ohio’s Testing Your Faith Act must provide the instructor and the Academic Affairs office with written notice of the specific dates for which the student requires an accommodation and must do so no later than fourteen (14) days after the first day of instruction or fourteen (14) days before the dates of absence, whichever comes first. For more information about Religious Accommodations, contact Ryan Hall, Accessibility Coordinator at rhall21@sscc.edu or 937-393-3431 X 2604.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

**\*\*\*** Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.