



## MASTER COURSE OUTLINE

Prepared By: Dan Moore

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## COURSE TITLE

Powerplant Mechanics II

## GENERAL COURSE INFORMATION

Dept.: AMT

Course Num: 252

(Formerly: )

CIP Code: 47.0608

Intent Code: 21

Program Code: 718

Credits: 4-14

Total Contact Hrs Per Qtr.: 66-242

Lecture Hrs: 22-66

Lab Hrs:44-176

Other Hrs:

Distribution Designation: General Elective (GE)

## COURSE DESCRIPTION (as it will appear in the catalog)

As required by the Federal Aviation Administration, the Powerplant program is a minimum of 750 hr. of instruction with approximately 25% of the instruction in a class room environment and 75% of the instruction in a lab environment. There is approximately 30 hours of extra time at the end of the Powerplant program, which is to be used for make-up time or for further competency enhancement. This course is FAA approved under 14 CFR Part 147.

This course will cover two areas:

- 1) Powerplant theory and maintenance, including the inspection, repair, overhaul, service, troubleshooting, removal, and installation of aircraft reciprocating and turbine engines.
- 2) Powerplant systems and components, including the inspection, repair, overhaul, service, troubleshooting, removal, and installation of aircraft reciprocating and turbine engine instrument, fire protection, electrical, lubrication, ignition, starting, fuel metering, induction, airflow, cooling, exhaust, propellers, unducted fans, and auxiliary power unit systems.

## PREREQUISITES

Instructor Approval

## TEXTBOOK GUIDELINES

BBCC AMT LAP Workbook

AC 43-13-1 & 2 Acceptable Methods and Practices

FAR Handbook For Aviation Maintenance Technicians

Appropriate powerplant textbook as chosen by Aviation Maintenance Faculty (Example: Aircraft Powerplants, by Kroes/Wild)

## COURSE LEARNING OUTCOMES

*Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:*

1. Inspect and repair a radial engine.
2. Overhaul reciprocating engines.
3. Inspect, check, service, and repair reciprocating engines and engine installations.

4. Install, troubleshoot, and remove reciprocating engines
5. Overhaul turbine engine.
6. Inspect, check, service and repair turbine engines and engine installations.
7. Install, troubleshoot and remove turbine engines.
8. Perform Powerplant conformity and airworthiness inspections
9. Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.
10. Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure and r.p.m indicating systems.
11. Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems
12. Repair engine electrical system components.
13. Install, check, and service electrical wiring, controls, switches, indicators, and protective devices
14. Identify and select lubricants.
15. Repair engine lubrication system components.
16. Inspect, check, service, troubleshoot, and repair engine lubrication systems.
17. Overhaul magneto and ignition harness.
18. Inspect service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.
19. Inspect service, troubleshoot, and repair turbine electrical and pneumatic starting systems.
20. Troubleshoot and adjust turbine engine fuel metering systems and electronic engine controls
21. Overhaul carburetor
22. Repair engine fuel metering system components.
23. Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.
24. Repair engine fuel system components.
25. Inspect, check, service, and repair engine fuel systems
26. Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.
27. Inspect, check, troubleshoot, service, and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.
28. Inspect, check, service, and repair carburetor air intake and induction manifolds.
29. Repair engine cooling system components.
30. Inspect, check, troubleshoot, service, and repair engine cooling systems.
31. Repair engine exhaust system components.
32. Inspect, check, troubleshoot, service, and repair engine exhaust systems.
33. Troubleshoot and repair engine thrust reverser systems and related components.
34. Inspect, check, service, and repair propeller synchronizing and ice control systems.
35. Identify and select propeller lubricants.
36. Balance propellers.
37. Repair propeller control system components.
38. Inspect, check, service and repair fixed pitch, constant-speed, and feathering propellers, and propeller governing systems.
39. Install, troubleshoot, and remove propellers.
40. Repair aluminum alloy propeller blades.
41. Inspect and troubleshoot unducted fan systems and components
42. Inspect, check, service, and troubleshoot turbine-driven auxiliary power units

## **INSTITUTIONAL OUTCOMES**

- IO1 **Communication:** Students will be able to identify and explain a variety of airframe and/or powerplant systems and components as evaluated by the completion of the FAA written, oral and practical exams
- IO3 **Human Relations/Workplace Skills:** Students will be able to demonstrate teamwork, ethics, appropriate safety awareness and/or workplace specific skills

## **COURSE CONTENT OUTLINE**

1. Powerplant Theory and Maintenance
  - a. Reciprocating Engines

- b. Turbine Engines
  - c. Engine Inspection
2. Powerplant Systems and Components
- a. Engine Instrument Systems
  - b. Engine Fire Protection Systems
  - c. Engine Electrical Systems.
  - d. Lubrication Systems
  - e. Ignition and Starting Systems
  - f. Fuel Metering Systems.
  - g. Engine Fuel Systems
  - h. Induction and Engine Airflow Systems.
  - i. Engine Cooling Systems
  - j. Engine Exhaust and Reverser Systems
  - k. Propellers
  - l. Unducted Fans
  - m. Auxiliary Power Plants

**DEPARTMENTAL GUIDELINES (optional)**

Student grades are based on the following items:

- |                                  |     |
|----------------------------------|-----|
| 1. Classroom/lecture assignments | 50% |
| a. Written assignments           | 25% |
| b. Tests                         | 25% |
| c. Final exam                    | 50% |

Examinations will be given to ensure the understanding and/or retention of the subject material. An appropriate exam will be given to each student who completes each subject area. A quarter final review exam will be given during the last three days of each quarter. Any other testing or quizzes may be given at the instructor’s discretion. Each student is given only 3 attempts at passing an exam. The first exam attempt must be passed with a 70% or better, 75% or better for the second and 80% on the third attempt. If the student fails to pass any exam with an acceptable score after three attempts the student will be required to surrender all credits, hours, lab projects, and classroom theory for the subject or subjects failed. The final recorded score will be that of the first attempted exam. Missed or failed exams will be given only with prior arrangements with the instructor.

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|--|-----|
| 2. Performance completing lab/shop assignments | 50% |
| a. Quality of work                             | 50% |
| b. Work habits                                 | 50% |
| i. Follows instructions.                       |     |
| ii. Follow safety rules                        |     |
| iii. Completes assignments in a timely manner. |     |
| iv. Stays productive.                          |     |

Laboratory performance will be graded at the completion of each practical assignment by observation, oral examination, or written examination. Practical projects must be completed in a timely manner. A minimum passing grade of 80% must be obtained by each student in order to receive a final Letter of Completion from this course.

| <b>Letter Grade</b> | <b>%</b> | <b>Numeric Grade</b> |
|---------------------|----------|----------------------|
| A                   | 97-100   | 3.8-4.0              |
| A-                  | 93-96    | 3.5-3.7              |
| B+                  | 89-92    | 3.2-3.4              |
| B                   | 85-88    | 2.9-3.1              |
| B-                  | 81-84    | 2.5-2.8              |
| C+                  | 77-80    | 2.2-2.4              |

|    |       |         |
|----|-------|---------|
| C  | 73-76 | 1.9-2.1 |
| C- | 69-72 | 1.5-1.8 |
| D+ | 65-68 | 1.2-1.4 |
| D  | 61-64 | .9-1.1  |
| D- | 58-60 | .7-.8   |
| F  | 0-57  | 0.0     |

**ATTENDANCE:**

The AMT courses are offered as scheduled below.

07:30 to 16:00 Monday through Thursday.

A minimum of 400 hours of attendance is mandatory for the completion of the AMT General program at BBCC. Upon successful completion of 1150 hours of instruction (which includes 400 hours of General and 750 hours of Airframe/Powerplant), a certificate of completion is granted and the student is eligible to take the FAA written exams for the Airframe/Powerplant Mechanic certificate.

The Instructor will monitor absenteeism by use of the student time cards. A student enrolled in the AMT program at BBCC will be allowed to miss a maximum of twenty-four (24) hours of class time per quarter. Those students who miss more than 24 hours of class time may be required to reduce their credits for that quarter.

**MAKE-UP PROVISIONS**

Make-up time must be arranged with the appropriate instructor and will be completed by the student on his/her own time under the instructor's supervision at the end of the quarter. Make-up hours will be documented through the use of time cards, using time clock procedures, and must be signed by the appropriate instructor. Make-up time and projects will be related directly to those areas of instruction missed by the students.

If time missed is due to school closure caused by weather, power outages, or other unforeseen events, the missed time must be made up during scheduled make-up days at the end of the quarter.

When a student is dropped from a class due to excessive absenteeism, failing grades, or not making up missed time in accordance with the above policies, all recorded attendance hours will be forfeited from the class and considered non-transferable if the student repeats the class.

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**DIVISION CHAIR APPROVAL**

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**DATE**