# 9/19/2022

# brcc keystone logo

Baton Rouge Community College

*Academic Affairs Master Syllabus*

Date Approved: 6 October 2022

Term and Year of Implementation: Fall 2022

**Course Title:** Reciprocating Engine Overhaul

**BRCC Course Rubric:** AMTP 1134

**Previous Course Rubric**: AMTP 103

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 1-9-4

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 15-135-150

**Louisiana Common Course Number:**

**CIP Code:** 47.0608

**Course Description:** Introduces students to Reciprocating Engines, Reciprocating Engine Induction and Cooling Systems, and Engine Exhaust and Reverser Systems. This course covers Powerplant Curriculum Subjects from the Federal Aviation Administration’s 2021 Airman Certification Standards. This course requires a lab fee.

**Prerequisites:**  AMTP 1116 and AMTP 1126

**Co-requisites:** AMTP 1144

**Suggested Enrollment Cap:** 25

**Learning Outcomes.** *Upon successful completion of this course, the students will be able to:*

1. Demonstrate required knowledge, risk management, and skills competencies for Reciprocating Engines, Powerplant Curriculum Subject A in the Federal Aviation Administration’s 2021 Airman Certification Standards.

2. Demonstrate required knowledge, risk management, and skills competencies for Reciprocating Engine Induction and Cooling Systems, Powerplant Curriculum Subject J in the Federal Aviation Administration’s 2021 Airman Certification Standards.

3. Demonstrate required knowledge, risk management, and skills competencies for Engine Exhaust and Reverser Systems, Powerplant Curriculum Subject L in the Federal Aviation Administration’s 2021 Airman Certification Standards.

**Assessment Measures.** Assessment of all learning outcomes will be measured using the following methods:

1. Department-designed quizzes and tests.

2. Projects that must be completed with a grade of 70% or better.

3. Students must complete a minimum of 150 contact hours

**Information to be included on the Instructor’s Course Syllabi:**

* ***Disability Statement*:** Baton Rouge Community College seeks to meet the needs of its students in many ways. See the Office of Disability Services to receive suggestions for disability statements that should be included in each syllabus.
* ***Grading:*** The College grading policy should be included in the course syllabus. Any special practices should also go here. This should include the instructor’s and/or the department’s policy for make-up work. For example in a speech course, “Speeches not given on due date will receive no grade higher than a sixty” or “Make-up work will not be accepted after the last day of class”.
* ***Attendance Policy*:** Include the overall attendance policy of the college. Instructors may want to add additional information in individual syllabi to meet the needs of their courses.
* ***General Policies*:** Instructors’ policy on the use of things such as beepers and cell phones and/or hand held programmable calculators should be covered in this section.
* ***Cheating and Plagiarism*:** This must be included in all syllabi and should include the penalties for incidents in a given class. Students should have a clear idea of what constitutes cheating in a given course.
* ***Safety Concerns:*** In some courses, this may be a major issue. For example, “No student will be allowed in the lab without safety glasses”. General statements such as, “Items that may be harmful to one’s self or others should not be brought to class”.
* ***Library/ Learning Resources:*** Since the development of the total person is part of our mission, assignments in the library and/or the Learning Resources Center should be included to assist students in enhancing skills and in using resources. Students should be encouraged to use the library for reading enjoyment as part of lifelong learning.

**Expanded Course Outline:**

I. Reciprocating Engines

A. Knowledge

AM.III.A.K1, Types of reciprocating engines.

AM.III.A.K2, Reciprocating engine operating principles/theory of operation.

AM.III.A.K3, Internal combustion engine operating principles/theory of operation.

AM.III.A.K4, Horizontally-opposed engine construction and internal components.

AM.III.A.K5, Radial engine construction and internal components.

AM.III.A.K6, Storage and preservation.

AM.III.A.K7, Reciprocating engine performance (e.g., PLANK, SFC).

AM.III.A.K8, Reciprocating engine maintenance and inspection.

AM.III.A.K9, Reciprocating engine ground operations.

AM.III.A.K10, Diesel engine operating principles/theory of operation.

B. Risk Management

AM.III.A.R1, Maintenance that requires moving the propeller.

AM.III.A.R2, Preparation for and ground operation of a reciprocating engine.

AM.III.A.R3, Actions in the event of a reciprocating engine fire.

AM.III.A.R4, Use of other than the manufacturer’s procedures during maintenance.

C. Skills

AM.III.A.S1, Perform a cylinder assembly inspection.

AM.III.A.S2, Operate and troubleshoot reciprocating engine.

AM.III.A.S3, Install piston and knuckle/wrist pin(s).

AM.III.A.S4, Identify the parts of a cylinder.

AM.III.A.S5, Identify the parts of a crankshaft.

AM.III.A.S6, Identify and inspect various types of bearings.

AM.III.A.S7, Inspect and rig cable and push-pull engine controls.

AM.III.A.S8, Locate top dead-center position of number one cylinder.

AM.III.A.S9, Install a cylinder on a horizontally-opposed engine.

II. Reciprocating Engine Induction and Cooling Systems

A. Knowledge

AM.III.J.K1, Reciprocating engine induction and cooling system theory, components, and operation.

AM.III.J.K2, Causes and effects of induction system icing.

AM.III.J.K3, Superchargers and controls.

AM.III.J.K4, Turbochargers, intercoolers, and controls.

AM.III.J.K5, Augmenter cooling system.

AM.III.J.K6, Induction system filtering.

AM.III.J.K7, Carburetor heaters.

AM.III.J.K8, Pressure cowling air flow and control.

AM.III.J.K9, Reciprocating engine baffle and seal installation.

AM.III.J.K10, Liquid cooling system theory, components, and operation.

B. Risk Management

AM.III.J.R1, Maintenance on turbochargers.

AM.III.J.R2, Ground operation of aircraft engines.

AM.III.J.R3, Maintenance-related FOD.

AM.III.J.R4, Chemicals uses in liquid cooling systems.

C. Skills

AM.III.J.S1, Inspect a carburetor heat system.

AM.III.J.S2, Inspect an alternate air valve for proper operation.

AM.III.J.S3, Inspect an induction system drain for proper operation.

AM.III.J.S4, Inspect engine exhaust augmenter cooling system.

AM.III.J.S5, Service an induction air filter.

AM.III.J.S6, Inspect a turbocharger for leaks and security.

AM.III.J.S7, Inspect and service a turbocharger waste gate.

AM.III.J.S8, Inspect an induction system for obstruction.

AM.III.J.S9, Inspect an air intake manifold for leaks.

AM.III.J.S10, Locate the proper specifications for coolant used in a liquid-cooled engine.

AM.III.J.S11, Inspect reciprocating engine cooling ducting (rigid or flexible) or baffle seals.

AM.III.J.S12, Identify components of a turbocharger induction system.

AM.III.J.S13, Identify exhaust augmenter-cooled engine components.

AM.III.J.S14, Inspect an air inlet duct for security.

AM.III.J.S15, Perform an induction and cooling system inspection.

AM.III.J.S16, Repair a cylinder baffle.

AM.III.J.S17, Inspect cylinder baffling.

AM.III.J.S18, Inspect cowl flap system for normal operation.

AM.III.J.S19, Inspect cylinder cooling fins.

III. Engine Exhaust and Reverser Systems

A. Knowledge

AM.III.L.K1, Reciprocating engine exhaust system theory, components, operation, and inspection.

AM.III.L.K2, Turbine engine exhaust system theory, components, operation, and inspection.

AM.III.L.K3, Noise suppression theory, components, and operation (e.g., mufflers, hush kits, augmenter tubes).

AM.III.L.K4, Thrust reverser theory, components, and operation.

B. Risk Management

AM.III.L.R1, Maintenance and inspection of exhaust system components.

AM.III.L.R2, Operation of turbine engine reversing systems.

AM.III.L.R3, Operation of reciprocating engines with exhaust systems leaks.

AM.III.L.R4, Exhaust system failures.

AM.III.L.R5, Ground operation of aircraft engines.

C. Skills

AM.III.L.S1, Identify the type of exhaust system on a particular aircraft.

AM.III.L.S2, Inspect a turbine engine exhaust system component.

AM.III.L.S3, Inspect a reciprocating engine exhaust system.

AM.III.L.S4, Inspect exhaust system internal baffles or diffusers.

AM.III.L.S5, Inspect exhaust heat exchanger.

AM.III.L.S6, Locate procedures for testing and troubleshooting a turbine thrust reverser system.

AM.III.L.S7, Perform a pressure leak check of a reciprocating engine exhaust system.