# 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:** Powerplant Accesories

**BRCC Course Rubric:** AMTP 1116

**Previous Course Rubric**: AMTP 101

**Lecture Hours per week-Lab Hours per week-Credit Hours**: 4-6-6

**Per semester: Lecture Hours-Lab Hours-Instructional Contact Hours**: 60-90-150

**Louisiana Common Course Number:**

**CIP Code:** 47.0608

**Course Description:** Introduces students to Engine Instrument Systems, Engine Fire Protection Systems, Engine Electrical Systems, and Ignition and Starting Systems. This course covers Powerplant Curriculum Subjects from the Federal Aviation Administration’s 2021 Airman Certification Standards. This course requires a lab fee.

**Prerequisites:**  AMTG 1016 and AMTG 1026

**Co-requisites:** AMTP 1126

**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 Engine Instrument Systems, Powerplant Curriculum Subject D in the Federal Aviation Administration’s 2021 Airman Certification Standards.

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

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

4. Demonstrate required knowledge, risk management, and skills competencies for Ignition and Starting Systems, Powerplant Curriculum Subject H 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. Engine Instrument Systems

A. Knowledge

AM.III.D.K1, Fuel flow.

AM.III.D.K2, Temperature (e.g. exhaust gas, oil, oil cylinder head, turbine inlet).

AM.III.D.K3, Engine speed indicating systems.

AM.III.D.K4, Pressure (e.g., air, fuel, manifold, oil).

AM.III.D.K5, Annunciator indicating systems (e.g., warning, caution, and advisory lights).

AM.III.D.K6, Torquemeters.

AM.III.D.K7, Engine pressure ratio (EPR).

AM.III.D.K8, Engine indicating and crew alerting (EICAS).

AM.III.D.K9, Digital engine control module (e.g., Full Authority Digital Engine Controls (FADEC)).

AM.III.D.K10, Electronic centralized aircraft monitor (ECAM).

AM.III.D.K11, Engine instrument range markings and instrument conditions.

B. Risk Management

AM.III.D.R1, Maintenance damage to the instrument or indicating system.

AM.III.D.R2, Engine instrument calibration or instrument error.

C. Skills

AM.III.D.S1, Troubleshoot an engine oil temperature/pressure instrument system.

AM.III.D.S2, Troubleshoot a low fuel pressure indicating system.

AM.III.D.S3, Remove, inspect, and/or install a fuel-flow transmitter.

AM.III.D.S4, Remove, inspect, and/or install fuel flow gauge.

AM.III.D.S5, Identify components of an electric tachometer system.

AM.III.D.S6, Check fuel-flow transmitter power supply.

AM.III.D.S7, Inspect tachometer markings for accuracy.

AM.III.D.S8, Perform resistance measurements of thermocouple indication system.

AM.III.D.S9, Remove, inspect, and install turbine engine exhaust gas temperature (EGT) component.

AM.III.D.S10, Locate procedures for troubleshooting a turbine EPR system.

AM.III.D.S11, Troubleshoot a tachometer system.

AM.III.D.S12, Replace a cylinder head temperature thermocouple.

AM.III.D.S13, Inspect EGT probes.

AM.III.D.S14, Locate and inspect engine low fuel pressure warning system components.

AM.III.D.S15, Check aircraft engine manifold pressure gauge for proper operation.

AM.III.D.S16, Inspect a manifold pressure system.

AM.III.D.S17, Repair a low oil pressure warning system.

AM.III.D.S18, Troubleshoot an EGT indicating system.

AM.III.D.S19, Inspect an oil temperature probe.

II. Engine Fire Protection Systems

A. Knowledge

AM.III.E.K1, Types of fires and engine fire zones.

AM.III.E.K2, Fire detection warning system operation.

AM.III.E.K3, Fire detection system maintenance and inspection requirements.

AM.III.E.K4, Fire extinguishing agents, types of systems, and operation.

AM.III.E.K5, Fire extinguishing system maintenance and inspection.

B. Risk Management

AM.III.E.R1, Container discharge cartridges.

AM.III.E.R2, Extinguishing agents.

AM.III.E.R3, Maintenance on circuits associated with electrically-activated container discharge cartridges (squibs).

C. Skills

AM.III.E.S1, Troubleshoot and repair an engine fire detection system.

AM.III.E.S2, Identify fire detection sensing units.

AM.III.E.S3, Inspect fire detection continuous loop system.

AM.III.E.S4, Inspect fire detection thermal switch or thermocouple system.

AM.III.E.S5, Locate troubleshooting procedures for a fire detection system.

AM.III.E.S6, Inspect engine fire extinguisher system blowout plugs.

AM.III.E.S7, Inspect a turbine engine fire extinguisher container.

AM.III.E.S8, Inspect fire extinguisher discharge circuit.

AM.III.E.S9, Troubleshoot and repair a fire extinguishing system.

AM.III.E.S10, Inspect a fire extinguisher container discharge cartridge (squib).

AM.III.E.S11, Inspect fire extinguisher container and determine hydrostatic test requirements.

AM.III.E.S12, Inspect flame detectors for operation.

AM.III.E.S13, Check operation of fire warning press-to-test and troubleshoot faults.

AM.III.E.S14, Identify continuous-loop fire detection system components.

III. Engine Electrical Systems

A. Knowledge

AM.III.F.K1, Generators.

AM.III.F.K2, Alternators.

AM.III.F.K3, Starter generators.

AM.III.F.K4, Voltage regulators and overvoltage and overcurrent protection.

AM.III.F.K5, DC generation systems.

AM.III.F.K6, AC generation systems.

AM.III.F.K7, The procedure for locating the correct electrical cable/wire size needed to fabricate a cable/wire.

AM.III.F.K8, The purpose and procedure for paralleling a dual-generator electrical system.

AM.III.F.K9, CSD and IDG systems and components.

AM.III.F.K10, Engine electrical wiring, switches, and protective devices.

B. Risk Management

AM.III.F.R1, Polarity when performing electrical system maintenance.

AM.III.F.R2, Actions in response to a warning or caution annunciator light.

AM.III.F.R3, Maintenance on energized aircraft circuits/systems.

AM.III.F.R4, Routing and security of wiring near flammable fluid lines.

C. Skills

AM.III.F.S1, Inspect engine electrical wiring, switches, and protective devices.

AM.III.F.S2, Determine suitability of a replacement component by part number.

AM.III.F.S3, Replace an engine-driven generator or alternator.

AM.III.F.S4, Inspect an engine-driven generator or alternator in accordance with manufacturer’s instructions.

AM.III.F.S5, Troubleshoot an aircraft electrical generating system.

AM.III.F.S6, Remove and install an engine direct-drive electric starter.

AM.III.F.S7, Troubleshoot a direct-drive electric starter system.

AM.III.F.S8, Inspect an electrical system cable.

AM.III.F.S9, Determine wire size for engine electrical system.

AM.III.F.S10, Repair a broken engine electrical system wire.

AM.III.F.S11, Replace a wire bundle lacing.

AM.III.F.S12, Troubleshoot an electrical system using a schematic or wiring diagram.

AM.III.F.S13, Fabricate a bonding jumper.

AM.III.F.S14, Inspect a turbine engine starter generator.

AM.III.F.S15, Inspect engine electrical connectors.

IV. Ignition and Starting Systems

A. Knowledge

AM.III.H.K1, Ignition system theory.

AM.III.H.K2, Spark plug theory.

AM.III.H.K3, Shower of sparks and impulse coupling.

AM.III.H.K4, Three electrical circuits of a magneto system.

AM.III.H.K5, Solid-state ignition systems.

AM.III.H.K6, Digital engine control module (e.g., FADEC).

AM.III.H.K7, Engine starters.

AM.III.H.K8, Magneto system components and operation.

AM.III.H.K9, Turbine engine ignition systems.

B. Risk Management

AM.III.H.R1, Advanced and retarded ignition timing (piston engine).

AM.III.H.R2, Maintenance on engines with capacitor discharge ignition systems.

AM.III.H.R3, Working around reciprocating engines with an ungrounded magneto.

C. Skills

AM.III.H.S1, Set magneto internal timing.

AM.III.H.S2, Time magneto to engine.

AM.III.H.S3, Remove, clean, and install spark plug.

AM.III.H.S4, Troubleshoot and repair an ignition system.

AM.III.H.S5, Inspect an electrical starting system.

AM.III.H.S6, Inspect magneto breaker points.

AM.III.H.S7, Inspect an ignition harness.

AM.III.H.S8, Inspect a magneto impulse coupling.

AM.III.H.S9, Troubleshoot an electrical starting system.

AM.III.H.S10, Troubleshoot ignition switch circuit.

AM.III.H.S11, Inspect and check gap of spark plugs.

AM.III.H.S12, Identify the correct spark plugs used for replacement installation.

AM.III.H.S13, Troubleshoot a turbine or reciprocating engine ignition system.

AM.III.H.S14, Identify the correct igniter plug and replace turbine engine igniter plugs.

AM.III.H.S15, Troubleshoot turbine engine igniters.

AM.III.H.S16, Inspect turbine engine ignition system.

AM.III.H.S17, Inspect igniters.