# 11/26/2022

# brcc keystone logo

Baton Rouge Community College

*Academic Affairs Master Syllabus*

Date Approved: 2 February 2023

Term and Year of Implementation: Spring 2023

**Course Title:** General Maintenance Processes

**BRCC Course Rubric:** AMTG 1026

**Previous Course Rubric**: AMTG 102

**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 basic electricity and electronics, weight and balance, ground operations and servicing, cleaning and corrosion control, regulations, maintenance forms, publications, inspection concepts and techniques, and human factors. This course covers General Curriculum Subjects from the Federal Aviation Administration’s 2021 Airman Certification Standards. This course requires a lab fee.

**Prerequisites:**  None

**Co-requisites:** AMTG 1016

**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 in Electricity and Electronics, General Curriculum Subject A of the Federal Aviation Administration’s 2021 Airman Certification Standards.

2. Demonstrate required knowledge, risk management, and skills competencies in Weight and Balance, General Curriculum Subject C of the Federal Aviation Administration’s 2021 Airman Certification Standards.

3. Demonstrate required knowledge, risk management, and skills competencies in Ground Operations and Servicing, General Curriculum Subject F of the Federal Aviation Administration’s 2021 Airman Certification Standards.

4. Demonstrate required knowledge, risk management, and skills competencies in Cleaning and Corrosion Control, General Curriculum Subject G of the Federal Aviation Administration’s 2021 Airman Certification Standards.

5. Demonstrate required knowledge, risk management, and skills competencies in Regulations, Maintenance Forms, and Publications, General Curriculum Subject I, Inspection Concepts and Techniques, General Curriculum Subject K, and Human Factors, General Curriculum Subject L of 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 graded on a 10-point scale.

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. Electricity and Electronics

A. Knowledge

AM.I.A.K1, Electron theory (conventional flow vs. electron flow)

AM.I.A.K2, Magnetism

AM.I.A.K3, Capacitance in a circuit

AM.I.A.K4, Inductance in a circuit

AM.I.A.K5, Alternating current (AC) electrical circuits

AM.I.A.K6, Direct current (DC) electrical circuits

AM.I.A.K7, Electrical laws and theory

AM.I.A.K7a a, Ohm's Law

AM.I.A.K7b b, Kirchhoff's Laws

AM.I.A.K7c c, Watt's Law

AM.I.A.K7d d, Faraday's Law

AM.I.A.K7e e, Lenz's Law

AM.I.A.K7f f, Right-hand motor rule

AM.I.A.K8, Electrical measurement tools, principles, and procedures

AM.I.A.K9, Voltage

AM.I.A.K9a a, Regulation

AM.I.A.K10, Current

AM.I.A.K11, Resistance

AM.I.A.K11a a, Impedance

AM.I.A.K11b b, Resistance in series

AM.I.A.K11c c, Resistance in parallel

AM.I.A.K11d d, Total resistance

AM.I.A.K12, Power

AM.I.A.K13, Series circuits

AM.I.A.K14, Parallel circuits

AM.I.A.K15, Aircraft batteries

AM.I.A.K16, Transformers

AM.I.A.K17, Circuit continuity

AM.I.A.K18, Controlling devices, including switches and relays

AM.I.A.K19, Protective devices, including fuses, circuit breakers, and current limiters

AM.I.A.K20, Resistor types and color coding

AM.I.A.K21, Semiconductors, including diodes, transistors, and integrated circuits

AM.I.A.K22, Digital logic, including RAM, ROM, NVRAM, logic gates, inverter, rectifier, and flip flop

AM.I.A.K23, Binary numbers

AM.I.A.K24, Electrostatic discharge

AM.I.A.K25, Electrical circuit drawings

AM.I.A.K26, Complex/combined circuits

AM.I.A.K27, AC and DC motors

B. Risk Management

AM.I.A.R1, Taking voltage, current, resistance, and capacitance measurements

AM.I.A.R2, Handling, storage, and inspection of different types of batteries (i.e., lead acid, NiCad, lithium ion, gel cell)

AM.I.A.R3, High-voltage circuits (e.g., strobe lighting)

AM.I.A.R4, Working around batteries

C. Skills

AM.I.A.S1, Perform circuit continuity test

AM.I.A.S2, Measure voltage

AM.I.A.S3, Measure current

AM.I.A.S4, Measure resistance

AM.I.A.S5, Test a switch or relay

AM.I.A.S6, Test a fuse or circuit breaker

AM.I.A.S7, Read and interpret aircraft electrical circuit diagrams, and symbols, including solid state devices and logic functions

AM.I.A.S8, Troubleshoot a circuit

AM.I.A.S9, Identify symbols used in electrical and electronic schematic diagrams (e.g., grounds, shields, resistors, capacitors, fuses, circuit breakers, batteries, diodes, transistors, and integrated circuits)

AM.I.A.S10, Demonstrate how to test for short-circuit and open-circuit conditions

AM.I.A.S11, Measure voltage drop across a resistor

AM.I.A.S12, Determine or measure for open electrical circuits

AM.I.A.S13, Inspect an aircraft battery. AM.I.A.S14 Service an aircraft battery

II. Weight and Balance

A. Knowledge

AM.I.C.K1, Weight and balance terminology

AM.I.C.K2, Purpose for weighing an aircraft

AM.I.C.K3, Weighing procedures, including the general preparations for weighing, with emphasis on aircraft weighing area considerations

AM.I.C.K4, Procedures for calculation of the following: arm, positive or negative moment, center of gravity (CG), or moment index

AM.I.C.K5, Purpose and application of weight and CG limits

AM.I.C.K6, Purpose of determining CG

AM.I.C.K7, Adverse loading considerations and how to calculate if adverse loading causes an out-of-limit condition

AM.I.C.K8, Determine proper empty weight configuration

AM.I.C.K9, Proper ballast placement

AM.I.C.K10, Jacking an aircraft

B. Risk Management

AM.I.C.R1, Situations and conditions when jacking an aircraft

AM.I.C.R2, Aircraft weighing procedures

AM.I.C.R3, Use of scales

AM.I.C.R4, Aerodynamic effect of CG that is forward or aft of CG limits

AM.I.C.R5, Aerodynamic and performance effects of weight in excess of limits

C. Skills

AM.I.C.S1, Research and explain the procedures for weighing an aircraft

AM.I.C.S2, Perform weight and balance calculations

AM.I.C.S3, Calculate ballast weight shift and required weight location

AM.I.C.S4, Check aircraft weighing scales for calibration

AM.I.C.S5, Calculate weight and balance for an aircraft after an equipment change

AM.I.C.S6, Compute forward and aft loaded CG limit

AM.I.C.S7, Create a maintenance record for a weight and balance change

AM.I.C.S8, Compute the empty weight and empty weight CG of an aircraft

AM.I.C.S9, Calculate the moment of an item of equipment

AM.I.C.S10, Identify tare items

AM.I.C.S11, Locate weight and balance information

AM.I.C.S12, Locate datum

AM.I.C.S13, Locate weight and balance placarding and limitation requirements for an aircraft

AM.I.C.S14, Revise an aircraft equipment list after equipment change

AM.I.C.S15, Calculate the change needed to correct an out of balance condition.

AM.I.C.S16, Determine an aircraft’s CG range using aircraft specifications, Type Certificate Data Sheets (TCDSs), and aircraft listings.

AM.I.C.S17, Calculate a weight change and complete required records

III. Ground Operations and Servicing

A. Knowledge

AM.I.F.K1, Aircraft towing procedures

AM.I.F.K2, Aircraft securing procedures

AM.I.F.K3, Aviation fueling/defueling procedures

AM.I.F.K4, Airport operation area procedures and ATC communications, including runway incursion prevention

AM.I.F.K5, Engine starting, ground operation, and aircraft taxiing procedures

AM.I.F.K6, Types/classes of fire extinguishers and procedures

AM.I.F.K7, Aircraft oil, hydraulic and pneumatic, and deicing servicing procedures

AM.I.F.K8, Oxygen system servicing procedures

AM.I.F.K9, Characteristics of aviation gasoline and turbine fuels, including basic types and means of identification

AM.I.F.K10, Fuel additives commonly used in the field

AM.I.F.K11, Use of approved grades/types of fuel in aircraft engines

AM.I.F.K12, Tool and hardware use and accountability

AM.I.F.K13, Material handling

AM.I.F.K14, Parts protections

AM.I.F.K15, Hazardous materials, Safety Data Sheets (SDS), and PPE

AM.I.F.K16, Foreign object damage effects

B. Risk Management

AM.I.F.R1, Preparing to tow an aircraft

AM.I.F.R2, Connecting external power equipment to an aircraft

AM.I.F.R3, Fueling/defueling ungrounded aircraft or using improper equipment

AM.I.F.R4, Misfueling and using incorrect or contaminated fuel

AM.I.F.R5, Oxygen system servicing

AM.I.F.R6, Engine start/run-up without using a checklist

AM.I.F.R7, Engine starting and ground operations

AM.I.F.R8, Engine starting and operation while troubleshooting or adjusting engine controls

AM.I.F.R9, Ground operation of an aircraft engine with cowling removed contrary to manufacturer instructions

AM.I.F.R10, Ground operation of aircraft in the vicinity of other aircraft or ground support equipment

C. Skills

AM.I.F.S1, Perform a foreign object damage control procedure

AM.I.F.S2, Connect external power to an aircraft

AM.I.F.S3, Prepare an aircraft for towing

AM.I.F.S4, Use appropriate hand signals for the movement of aircraft

AM.I.F.S5, Inspect an aircraft fuel system for water and foreign object debris (FOD) contamination

AM.I.F.S6, Identify different grades of aviation fuel

AM.I.F.S7, Select an approved fuel for an aircraft

AM.I.F.S8, Prepare an aircraft for fueling

AM.I.F.S9, Follow a checklist to start up or shut down an aircraft reciprocating or turbine engine

AM.I.F.S10, Identify procedures for extinguishing fires in an engine induction system

AM.I.F.S11, Secure an aircraft

AM.I.F.S12, Locate and explain procedures for securing a turbine-powered aircraft after engine shutdown

IV. Cleaning and Corrosion Control

A. Knowledge

AM.I.G.K1, Aircraft cleaning procedures

AM.I.G.K2, Corrosion theory and causation

AM.I.G.K3, Types and effects of corrosion.

AM.I.G.K4, Corrosion-prone areas in aircraft

AM.I.G.K5, Corrosion preventive maintenance procedures

AM.I.G.K6, Corrosion identification and inspection

AM.I.G.K7, Corrosion removal and treatment procedures

AM.I.G.K8, Corrosion preventive compounds (CPC) (e.g., waxy sealants, thin-film dielectrics)

AM.I.G.K9, Selection of optimal CPC and frequency of treatment

AM.I.G.K10, Use of high-pressure application equipment

AM.I.G.K11, Improper use of cleaners on aluminum or composite materials

AM.I.G.K12, Dissimilar metals causing accelerated corrosion and role of protective barriers to mitigate this risk

AM.I.G.K13, Conversion coatings

AM.I.G.K14, Materials used for protection of airframe structures

AM.I.G.K15, Primer materials

AM.I.G.K16, Topcoat materials

AM.I.G.K17, Surface preparation for a desired finishing material

AM.I.G.K18, Effects of ambient conditions on finishing materials

AM.I.G.K19, Effects of improper surface preparation on finishing materials

AM.I.G.K20, Regulatory requirements for replacing identification, registration markings, and placards

AM.I.G.K21, Inspection of aircraft finishes

AM.I.G.K22, Safety practices/precautions when using finishing materials (e.g., PPE, fire prevention)

AM.I.G.K23, Finishing materials application techniques and practices

AM.I.G.K24, Control surface balance considerations after refinishing

B. Risk Management

AM.I.G.R1, Health concerns when using paints, solvents, finishing materials, and processes.

AM.I.G.R2, Ventilation.

AM.I.G.R3, Identification of materials and processes to be used for cleaning or corrosion treatment on a given part or structure to prevent further damage

AM.I.G.R4, SDS PPE instructions for products during removal and treatment of corrosion

AM.I.G.R5, Working with flammable chemicals

AM.I.G.R6, Disposal of chemicals and waste materials

AM.I.G.R7, Use of PPE when working with paints and solvents

AM.I.G.R8, Application of finishing materials

C. Skills

AM.I.G.S1, Perform a portion of an aircraft corrosion inspection

AM.I.G.S2, Identify, select, and use aircraft corrosion prevention/cleaning materials

AM.I.G.S3, Apply corrosion prevention/coating materials

AM.I.G.S4, Inspect finishes and identify defects

AM.I.G.S5, Inspect an aircraft compartment for corrosion

AM.I.G.S6, Identify procedures to clean and protect plastics

AM.I.G.S7, Determine location and size requirements for aircraft registration numbers

AM.I.G.S8, Prepare composite surface for painting

AM.I.G.S9, Identify finishing materials and appropriate thinners

AM.I.G.S10, Layout and mask a surface in preparation for painting

AM.I.G.S11, Prepare metal surface for painting

AM.I.G.S12, Determine what paint system can be used on a given aircraft

AM.I.G.S13, Apply etch solution and conversion coating

AM.I.G.S14, Identify types of protective finishes

V. Regulations, Maintenance Forms, and Publications

A. Knowledge

AM.I.I.K1, Privileges and limitations of a mechanic certificate

AM.I.I.K2, Recent experience requirements and how to re-establish once lost

AM.I.I.K3, Maintenance record entry for approval for return to service after maintenance and alterations

AM.I.I.K4, Maintenance record entry for approval for return to service after inspection

AM.I.I.K5, The purpose and use of FAA forms (e.g., FAA Forms 337, 8010-4, 8100-2, 8130-3)

AM.I.I.K6, Maintenance terminology as defined in 14 CFR part 1 (e.g., time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, minor repair)

AM.I.I.K7, Criteria and responsibility for determining whether a repair or alteration is major or minor

AM.I.I.K8, The regulatory framework, including general subject matter of the parts of 14 CFR relevant to aircraft maintenance and mechanics

AM.I.I.K9, Agency publications and guidance materials, including aircraft specifications, TCDSs, advisory circulars (AC), and airworthiness directives (AD)

AM.I.I.K10, Alternative Method of Compliance (AMOC) for an AD

AM.I.I.K11, Manufacturer publications, including maintenance manuals, service bulletins, maintenance alerts, and master minimum equipment lists

AM.I.I.K12, FAA databases and resources available, including TCDSs and supplemental type certificates

AM.I.I.K13, Compliance requirements for manufacturer-specified methods, techniques, and practices

AM.I.I.K14, Compliance requirements for manufacturer-specified maintenance and inspection intervals

AM.I.I.K15, FAA-approved maintenance data, including maintenance manuals and other methods, techniques, and practices acceptable by the administrator

AM.I.I.K16, Difference between approved data and acceptable data, and when each is required

AM.I.I.K17, FAA-approved airworthiness limitations

AM.I.I.K18, Alert, caution, and warning indications; and the basic definition of warnings, cautions, and notes that are used in maintenance and operating manuals

AM.I.I.K19, Inoperative equipment

AM.I.I.K20, Discrepancy records or placards

AM.I.I.K21, Usable on (effectivity) codes in parts manuals

AM.I.I.K22, Methods used to establish the serial number effectivity of an item

AM.I.I.K23, Mechanic address change notification procedures.

B. Risk Management

AM.I.I.R1, Completeness or accuracy of documentation

AM.I.I.R2, Use of SDS

AM.I.I.R3, Complacency during documentation phase of maintenance procedures

AM.I.I.R4, Adherence to warnings, cautions, or notes in maintenance and operational manuals

AM.I.I.R5, Determination of component applicability to a given aircraft

C. Skills

AM.I.I.S1, Complete an FAA Form 337 for a major repair or alteration

AM.I.I.S2, Examine an FAA Form 337 for accuracy

AM.I.I.S3, Determine an aircraft's inspection status by reviewing the aircraft's maintenance records

AM.I.I.S4, Complete an aircraft maintenance record entry for the compliance of a reoccurring AD for a specific airframe, aircraft engine, appliance, or propeller

AM.I.I.S5, Compare an equipment list for an aircraft to equipment installed

AM.I.I.S6, Locate applicable FAA aircraft specifications and FAA TCDS for an aircraft or component

AM.I.I.S7, Complete an aircraft maintenance record entry for return to service

AM.I.I.S8, Determine applicability of an AD

AM.I.I.S9, Check a Technical Standard Order (TSO) or part manufacturing authorization for the proper markings

AM.I.I.S10, Use a manufacturer’s illustrated parts catalog to locate a specific part number and applicability

AM.I.I.S11, Locate supplemental type certificates applicable to a specific aircraft

AM.I.I.S12, Determine the conformity of aircraft instrument range markings and placarding

AM.I.I.S13, Determine approved replacement parts for installation on a given aircraft

AM.I.I.S14, Determine maximum allowable weight of a specific aircraft

AM.I.I.S15, Determine whether a given repair or alteration is major or minor

AM.I.I.S16, Determine applicability of approved data for a major repair

AM.I.I.S17, Explain the difference between “approved data” (required for major repair/alteration) and “acceptable data” (required for minor repair/alteration)

AM.I.I.S18, Complete a 100-hour inspection aircraft maintenance record entry

VI. Inspection Concepts and Techniques

A. Knowledge

AM.I.K.K1, Measuring tools, including calipers, micrometers, and gauges

AM.I.K.K2, Calibration and tool accuracy requirements

AM.I.K.K3, Nondestructive Testing (NDT) procedures and methods

AM.I.K.K4, Aircraft inspection programs (e.g., progressive, 100-hour, annual, and other FAA-approved inspections)

AM.I.K.K5, Aircraft inspection methods and tools for materials, hardware, and processes

B. Risk Management

AM.I.K.R1, Demagnetizing a component following a magnetic particle inspection

AM.I.K.R2, Using precision measuring instruments

AM.I.K.R3 Calibration of precision measuring equipment

AM.I.K.R4, Selection of inspection techniques

AM.I.K.R5, Damage prevention to aircraft components and test equipment when using an ohmmeter

C. Skills

AM.I.K.S1, Use Vernier calipers

AM.I.K.S2, Use micrometers

AM.I.K.S3, Use measurement gauges

AM.I.K.S4, Perform a visual inspection

AM.I.K.S5, Perform a dye penetrant inspection

AM.I.K.S6, Inspect aircraft for compliance with an AD

AM.I.K.S7, Identify NDT methods for composite, surface metal, and subsurface metal defects

AM.I.K.S8, Perform a tap test on a composite component

VII. Human Factors

A. Knowledge

AM.I.L.K1, Safety culture and organizational factors

AM.I.L.K2, Human error principles

AM.I.L.K3, Event investigation

AM.I.L.K4, Human performance and limitations

AM.I.L.K5, Physical and social environment

AM.I.L.K6, Communication/reporting of hazards

AM.I.L.K7, Teamwork and leadership

AM.I.L.K8, Professionalism and integrity

AM.I.L.K9, Shift and task turnover

AM.I.L.K10, Conditions/preconditions for unsafe acts

AM.I.L.K11, Types of human errors

B. Risk Management

AM.I.L.R1, Selective reporting of hazards

AM.I.L.R2, Fatigue management and fitness for duty

AM.I.L.R3, Non-invasive, condition-monitoring technologies

C. Skills

AM.I.L.S1, File a Malfunction or Defect Report

AM.I.L.S2, Brief a shift turnover for continuity of work

AM.I.L.S3, Locate information regarding human factors errors