# 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:** Aircraft Structures

**BRCC Course Rubric:** AMTA 1216

**Previous Course Rubric**:

**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:** 47.0607

**Course Description:** Introduces students to Metallic and Non-Metallic Structures, Flight Controls, and Rotorcraft Fundamentals. This course covers Airframe Curriculum Subjects from Federal Aviation Administration’s 2021 Airman Certification Standards. This course requires a lab fee.

**Prerequisites:**  AMTG 1016 and AMTG 1026

**Co-requisites:** AMTA 1224

**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 Metallic Structures, Airframe Curriculum Subject A in the Federal Aviation Administration’s 2021 Airman Certification Standards.

2. Demonstrate required knowledge, risk management, and skills competencies for Non-Metallic Structures, Airframe Curriculum Subject B in the Federal Aviation Administration’s 2021 Airman Certification Standards.

3. Demonstrate required knowledge, risk management, and skills competencies for Flight Controls, Airframe Curriculum Subject C in the Federal Aviation Administration’s 2021 Airman Certification Standards.

4. Demonstrate required knowledge, risk management, and skills competencies for Rotorcraft Fundamentals, Airframe Curriculum Subject N 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. Metallic Structures

A. Knowledge

AM.II.A.K1, Inspection/testing of metal structures.

AM.II.A.K2, Types of sheet metal defects.

AM.II.A.K3, Selection of sheet metal repair materials.

AM.II.A.K4, Layout, forming, and drilling of sheet metal components.

AM.II.A.K5, Selection of rivets, hardware, and fasterners for sheet metal repair.

AM.II.A.K6, Heat treatment processes for aluminum.

AM.II.A.K7, Rivet layout.

AM.II.A.K8, Rivet removal and installation methods.

AM.II.A.K9, Maintenance safety practices/precautions for sheet metal repairs or fabrications.

AM.II.A.K10, Flame welding gasses.

AM.II.A.K11, Storage/handling of welding gasses.

AM.II.A.K12, Flame welding practices and techniques.

AM.II.A.K13, Inert-gas welding practices and techniques.

AM.II.A.K14, Purpose and types of shielding gasses.

AM.II.A.K15, Types of steel tubing welding repairs.

AM.II.A.K16, Procedures for weld repairs.

AM.II.A.K17, Types of structures and their characteristics.

B. Risk Management

AM.II.A.R1, Selection of repair materials.

AM.II.A.R2, Utilizing maintenance safety practices/precautions for sheet metal structures.

AM.II.A.R3, Use of PPE when working with sheet metal structures.

AM.II.A.R4, Handling, storage, and use of compressed gas bottles.

AM.II.A.R5, Use of electric welding equipment.

C. Skills

AM.II.A.S1, Install and remove solid rivets.

AM.II.A.S2, Install and remove a blind rivet.

AM.II.A.S3. Determine applicability of sheet metal for a repair in a specific application.

AM.II.A.S4, Select and install special purpose fasteners.

AM.II.A.S5, Design a repair using a Manufacturer’s Structural Repair Manual.

AM.II.A.S6, Prepare and install a patch to repair an aircraft or component.

AM.II.A.S7, Make a drawing of a repair including the number of rivets and size of sheet metal required.

AM.II.A.S8, Remove a repair that was installed with rivets.

AM.II.A.S9, Trim and form a piece of sheet metal to fit a prepared area.

AM.II.A.S10, Fabricate an aluminum part in accordance with a drawing.

AM.II.A.S11, Determine a rivet pattern for a specific repair.

AM.II.A.S12, Countersink rivet holes in sheet metal.

AM.II.A.S13, Perform a repair on a damaged aluminum sheet.

AM.II.A.S14, Determine extent of damage and decide if metallic structure is repairable.

II. Non-Metallic Structures

A. Knowledge

AM.II.B.K1, Wood structures inspection techniques, tools, and practices for wood structures.

AM.II.B.K2, Effects of moisture/humidity on wood and fabric coverings.

AM.II.B.K3, Types and general characteristics of wood used in aircraft structures.

AM.II.B.K4, Permissible substitutes and other materials used in the construction and repair of wood structures.

AM.II.B.K5, Acceptable and unacceptable wood defects.

AM.II.B.K6, Wood repair techniques and practices.

AM.II.B.K7, Factors used in determining the proper type covering material.

AM.II.B.K8, Types of approved aircraft covering material.

AM.II.B.K9, Seams commonly used with aircraft covering.

AM.II.B.K10, Covering textile terms.

AM.II.B.K11, Structure surface preparation.

AM.II.B.K12, Covering methods commonly used.

AM.II.B.K13, Covering means of attachment.

AM.II.B.K14, Areas on aircraft covering most susceptible to deterioration.

AM.II.B.K15, Aircraft covering preservation/restoration.

AM.II.B.K16, Inspection of aircraft covering.

AM.II.B.K17, Covering repair techniques and practices.

AM.II.B.K18, Inspection/testing of composite structures.

AM.II.B.K19, Types of composite structure defects.

AM.II.B.K20, Composite structure fiber, core, and matrix materials.

AM.II.B.K21, Composite materials storage practices and shelf life.

AM.II.B.K22, Composite repair methods, techniques, fasteners, and practices.

AM.II.B.K23, Thermoplastic material inspection/types of defects.

AM.II.B.K24, Thermoplastic material storage and handling.

AM.II.B.K25, Thermoplastic material installation procedures.

AM.II.B.K26, Care and maintenance of windows.

AM.II.B.K27, Window temporary and permanent repairs.

AM.II.B.K28, Maintenance safety practices/precautions for composite materials/structures, and windows.

AM.II.B.K29, Inspecting restraints and upholstery.

B. Risk Management

AM.II.B.R1, Selection of glue (adhesive) or fasteners for aircraft structure.

AM.II.B.R2, Composite structure repairs.

AM.II.B.R3, Exposure to materials used in composite repair.

AM.II.B.R4, Storage of composite materials.

AM.II.B.R5, Measuring and mixing of materials associated with composite construction.

AM.II.B.R6, Use of materials that are not part of an approved repair system.

AM.II.B.R7, Material shelf-life.

C. Skills

AM.II.B.S1, Identify appropriate fasteners on composite structures.

AM.II.B.S2, Inspect and repair fiberglass.

AM.II.B.S3, Inspect composite, plastic, or glass-laminated structures.

AM.II.B.S4, Clean and inspect acrylic type windshields.

AM.II.B.S5, Locate and explain procedures for a temporary repair to a side window.

AM.II.B.S6, Locate and explain the procedures for tying a modified seine knot.

AM.II.B.S7, Prepare composite surface for painting.

AM.II.B.S8, Perform a tap test on composite material.

AM.II.B.S9, Locate and explain repair standard dimensions.

AM.II.B.S10, Locate and explain repair procedures for elongated bolt holes.

AM.II.B.S11, Determine extent of damage and decide if nonmetallic structure is repairable.

AM.II.B.S12, Perform lay up for a repair to a composite panel, including preparation for vacuum bagging, using a Manufacturer’s Repair Manual.

III. Flight Controls

A. Knowledge

AM.II.C.K1, Control cables.

AM.II.C.K2, Control cable maintenance.

AM.II.C.K3, Cable connectors.

AM.II.C.K4, Cable guides.

AM.II.C.K5, Control stops.

AM.II.C.K6, Push-pull tubes.

AM.II.C.K7, Torque tubes.

AM.II.C.K8, Bellcranks.

AM.II.C.K9, Flutter and flight control balance.

AM.II.C.K10, Rigging of aircraft flight controls.

AM.II.C.K11, Aircraft flight controls and stabilizer systems.

AM.II.C.K12, Other aerodynamic wing features.

AM.II.C.K13, Secondary and auxiliary control surfaces.

B. Risk Management

AM.II.C.R1, Use and interpretation of a cable tension chart.

AM.II.C.R2, Rigging aircraft flight controls.

AM.II.C.R3, Selection and use of lifting equipment used to move aircraft components into place for assembly.

AM.II.C.R4, Maintaining a calibration schedule for cable tension meters and other rigging equipment.

AM.II.C.R5, Use and misinterpretation of cable tensiometers.

C. Skills

AM.II.C.S1, Identify fixed-wing aircraft rigging adjustment locations.

AM.II.C.S2, Identify control surfaces that provide movement about an aircraft’s axes.

AM.II.C.S3, Inspect a primary and secondary flight control surface.

AM.II.C.S4, Remove and reinstall a primary flight control surface.

AM.II.C.S5, Inspect primary control cables.

AM.II.C.S6, Adjust and secure a primary flight control cable.

AM.II.C.S7, Adjust push-pull flight control systems.

AM.II.C.S8, Check the balance of a flight control surface.

AM.II.C.S9, Determine allowable axial play limits for a flight control bearing.

AM.II.C.S10, Inspect a trim tab for freeplay, travel, and operation.

AM.II.C.S11, Balance a control surface.

AM.II.C.S12, Fabricate a primary flight control cable.

IV. Rotorcraft Fundamentals

A. Knowledge

AM.II.N.K1, Rotorcraft aerodynamics.

AM.II.N.K2, Flight controls.

AM.II.N.K3, Transmissions.

AM.II.N.K4, Rigging requirements for rotary wing aircraft.

AM.II.N.K5, Design, type, and operation of rotor systems.

AM.II.N.K6, Helicopter skid shoe and tube inspection.

AM.II.N.K7, Rotor blade functions and construction.

AM.II.N.K8, Rotor vibrations, track, and balance.

AM.II.N.K9, Drive system vibrations and inspection.

B. Risk Management

AM.II.N.R1, Working around helicopter blades during ground operations.

AM.II.N.R2, Ground-handling procedures.

AM.II.N.R3, Ground operations and functional tests.

AM.II.N.R4, Maintenance and inspection of rotorcraft systems and components.

C. Skills

AM.II.N.S1, Locate components of a helicopter rotor system.

AM.II.N.S2, Locate helicopter rotor blade track and balance procedures.

AM.II.N.S3, Locate and explain procedures needed to rig helicopter controls.

AM.II.N.S4, Locate and explain procedures to track and balance a rotor system.