**I. COURSE TITLE:** Aircraft Metallic Structures

 **COURSE NUMBER:** 2221 **CATALOG PREFIX:** AVIT

**II. PREREQUISITE(S):**

**III. CREDIT HOURS:** 6 **LECTURE HOURS:** 3

 **LABORATORY HOURS:** 3 (2 contact) **OBSERVATION HOURS:**

**IV. COURSE DESCRIPTION:**

This course will introduce the student to aircraft structures and structural repair. The student will became familiar with the materials used in all aspects of aircraft construction. This course is a hands-on course in which the student will learn to identify different aircraft materials and their uses. Students will fabricate aircraft structures using aluminum by forming, bending, installing and removing aircraft hardware and fasteners. Students will also investigate welding and inspect welded aircraft structures including soldering, brazing, gas and arc-welding**.**

**V. ADOPTED TEXT(S):**

Jeppesen Maintenance

 A&P Technician

Airframe Textbook

**VI. COURSE OBJECTIVES:**

Students will be able to:

• Select, install, and remove special fasteners for metallic structures (2)

• Inspect and repair sheet-metal structures (3)

• Install conventional rivets (3)

• Form, layout, and bend sheet metal (3)

• Weld magnesium and titanium (1)

• Solder stainless steel (1)

• Fabricate tubular structures (1)

• Solder, braze, gas-weld, and arc-weld steel (2)

• Weld aluminum and stainless steel (1)

 Objective levels:

Level 1 requires:

Knowledge of general principles, but no practical application.

No development of manipulative skill.

Instruction by lecture, demonstration, and discussion.

Level 2 requires:

Knowledge of general principles, and limited practical application.

Development of sufficient manipulative skill to perform basic operations. Instruction by lecture, demonstration, discussion, and limited practical application.

Level 3 requires:

Knowledge of general principles, and performance of a high degree of practical application.

Development of sufficient manipulative skills to simulate return to service.

Instruction by lecture, demonstration, discussion, and a high degree of practical application.

**VII. COURSE METHODOLOGY:**

May included but not limited to lecture and problems solving, group and lab projects, in-class and home assignments, quizzes and tests. Lab project will be individual and group. Attendance to class and lab is required.

**VIII. GRADING**

A= 90-100

 B= 80-89

 C= 70-79

 D= 60-69

 F= 0-59

Grades of 69 and below will not meet the requirements of the FAA for Mechanic

Certificate .

See catalog for description of other possible grades.

**IX. COURSE OUTLINE:**

Weeks:

1. Types of sheet metal structures, structural loads, stresses, rivet joints, aluminum alloys,

2. Sheet metal tools, marking tools, punches, cutting tools, shop tools, drills.

3. Layout and forming, bend radius, bend allowance, computations for layouts, forming bend, compound curves and contours, bumping, flanging, joggling.

4. Installation of solid rivets, rivet layout patterns, rivet hole preparation, rivet hole preparation for flush rivets, rivet installation.

Test 1

5. Evaluating driven rivets, rivet removal, NACA flush riveting, team riveting.

6. Drill bits, forming tools.

7. Clecos, clamping tools, solid rivets.

8. Friction lock rivets, mechanical lock rivets, Cherrymax, high sheer rivets, lock bolts, hi-loks, Cherrybuck rivets, taber-lok, Hi-tigue fasteners, Jo-bolts.

Test 2

9. Dzus fasteners, Airloc, Camlock.

10. Heat treatment, non-heat treatable alloys, magnesium alloys, titanium alloys, stainless steel, aluminum honeycomb, cladding, oxide films, paint finishes.

11. Assessment of damaging sheet metal, inspection of riveted joints, inspection of corrosion, repair of stressed skins, skin panel replacement.

12. Flush patches, stringer repair, specialized repairs, spar repairs, leading edge repairs.

Test 3

13. Oxyacetylene welding, arc welding, gas metal arc welding, tungsten inert gas welding, types of welding joints, evaluating welding joints.

14. Brazing and soldering, torch brazing, soldering of electrical wires and connections, welding of aluminum.

15. Structural welding repairs, landing gear and engine mount repairs, gas welding, oxyacetylene cutting,

16. Final Exam

**X. OTHER REQUIRED TEXTS, SOFTWARE, AND MATERIALS:**

FAA AC-65-15A

Airframe and Powerplant Mechanics

Airframe Handbook

 FAA-AC-43.13-1B/2B

Acceptable methods, Techniques, and practices of aircraft inspection and Repair

**XI. EVALUATION:**

Test count – 40% of Final Grade

 Quizzes count – 10% of Final Grade

 Lab Grade counts – 50% of Final Grade

**XII. SPECIFIC MANAGEMENT REQUIREMENTS:**

Class and lab attendance is mandatory. Students are required to be in class and lab to satisfy the time requirement of the FAA. Quizzes cannot be made up. No test can be taken late without prior approval of the instructor.

**XIII. OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES:** Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431.