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

 **COURSE NUMBER:** 2231 **CATALOG PREFIX:** AVIT

**II. PREREQUISITE(S):**

**III. CREDIT HOURS:** 5 **LECTURE HOURS:** 3

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

**IV. COURSE DESCRIPTION:**

This course will introduce the student to aircraft fabrics, woods, composites, acrylics, and painting. The students will perform hands-on wet-layup and vacuum bagging on composite structures used in aircraft. Students will inspect, test, fabricate, and repair fiberglass, bonded honeycomb, and fabric panels. Students will learn how to apply paint, trim and letters to aircraft finishes.

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

Jeppesen Maintenance

 A&P Technician

Airframe Textbook

**VI. COURSE OBJECTIVES:**

Students will be able to:

• Service and repair wood structures (1)

• Identify wood defects (1)

• Inspect wood structures (1)

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

• Inspect bonded structures (2)

• Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and

 laminated primary and secondary structures (2)

• Inspect, check, service, and repair windows, doors, and interior

 furnishings (2)

• Apply trim, letters, and touchup paint (1)

• Identify and select aircraft finishing materials (2)

• Apply finishing materials (2)

• Inspect finishes and identify defects (2)

• Select and apply fabric and fiberglass covering materials (1)

• Inspect, test, and repair fabric and fiberglass (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. Aircraft wood, plywood, laminated wood, wood assessment, acceptable woods defects, non-acceptable wood defects, aircraft glues and adhesives.

2. The wood bonding process, inspection of wood structures, wood structure repair, plywood skin repairs.

3. Composite components used in aircraft, reinforcing fibers, composite fiber science.

4. Fabric styles, matrix systems, thermoplastic resins, thermosetting resins, thermosetting resins, gore materials.

Test 1

5. Types of fiber-reinforced composites, working with resins and catalysts, composite safety considerations, compression molding, vacuum bagging, wet lay-up, electrical bonding.

6. Composite inspection, visual inspection, tap test, ultrasonic inspection, radiography, thermography, acoustic emission testing, cutting composites, drilling composites, sanding composites.

7. Composite repair, methods of curing repairs, vacuum-bagging repairs, potted repairs, laminate structure repair, sandwich structure repairs.

8. Types of transparent plastics, forming plastics, drilling plastics, cementing plastics, temporary plastic repairs, permanent plastic repairs, polishing and finishing plastic, windshield installation.

Test 2

9. Aircraft covering, cellulose nitrate dope, cellulose acetate butyrate dope, fabric STC’s, fabric orientation.

10. Organic fabric materials, inorganic fabric materials, reinforcing tape, surface tape, rib lacing cord, sewing threads, drainage grommets, inspection rings, finishing dope, fungicidal paste, aluminum paste, rejuvenator.

11. Determining fabric strength, Seyboth tester, Maule test instrument, fabric-covering removal, structural inspections on fabric aircraft, installing the fabric, attaching the fabric.

12. Preparing the fabric for finishing, dope coats, synthetic fabric installation, glass cloth systems, inspection and repair of fabric covering.

Test 3

13. Rejuvenation of dope finish, dope finishes, polyurethane finishes, stripping aircraft finishes, corrosion removal and prevention, primers, synthetic enamels, acrylic lacquer, polyurethane, acrylic urethanes.

14. High-visibility finishes, wrinkle finish, wing walk compound, fuel tank sealer, high temperature finishes, spar varnish, retarders.

15. Paint room, air supply, HVLP, electrostatic systems, powder coating systems, spray guns, respirators and masks, mixing and viscosity, applying the finish, masking and applying the trim, laying out registration numbers.

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.