

**BREVARD COMMUNITY COLLEGE  
AEROSPACE TECHNOLOGY PROGRAM**

**COURSE:** ETIC 2856 STRUCTURAL FABRICATION II Credits -3; Contact Hours - 64  
Mondays – 9:00 am -1:00 pm  
Location – CCAFS Bldg 60505

**PRE-REQUISITES:** ETIC 1855 - Aerospace Structural Fab 1; Materials and Processes I, II

**INSTRUCTOR:  
CONTACT DATA:**

**TEXTS:** None

**COURSE DESCRIPTION:** A continuation of Aerospace Structural Fabrication I. Knowledge, techniques, and skills are refined and enhanced. Projects are completed using composite materials common to industry.

**COURSE COMPETENCIES:** Upon completion of the course the student will be able to:

1. Fabricate projects per drawings, specifications, and verbal instructions
2. Demonstrate the ability to finish a component per given requirements
3. Complete a repair project per drawings and specifications
4. Inspect finished products for conformity

**COURSE WORK:**

<u>Week</u>	<u>Topic</u>
1	<b>Orientation</b> – Syllabus/PowerPoint handouts, West System book, student responsibilities, security/badging information, use of badge board, grading, instructor contact information, facility walkdown
2	<b>Introduction to Composites:</b> PowerPoint Presentation, Work Area Responsibilities, Laboratory Safety, Laboratory Walkdown, Tool Control; Wet Lay-Up Principles; Lab 1 - Flat Panel Wet Layup Fabrication
3	<b>Structural Fibers and Matrices:</b> PowerPoint Presentation, Lab 1 – Flat Panel Wet Layup Assessment (Porosity, Fiber/Resin Ratio determination for optimum strength-to-weight)
4	<b>Core Materials:</b> Composite sandwich principles and construction; embedded spar concepts; foam, honeycomb, solid core materials, cutting foam; Lab 2 In-Class Fabrication – Composite Sandwich Construction (aileron spar/foam core preparation)
5	<b>Basic Moldless Tools and Techniques:</b> Structural Fillers, Mechanical and Solvent-Cleaned Surfaces, Lab 2 In-Class Fabrication
6	<b>West System Handout – Vacuum Bagging Techniques:</b> Theory, Vacuum Bagging Materials, Special Considerations, Resin Infusion; Lab 3 In-Class Fabrication
7	<b>Project:</b> Lab 3 - In-Class Fabrication
8	<b>Project:</b> In-Class Fabrication, Mid-Term Review
9	<b>Midterm Examination</b> (Written), Project In-Class Fabrication
10	<b>Solid Core Structures:</b> Flat Sandwich Structures, Wet Layup, Vacuum Bagging; Lab 2 Project Introduction: Lab 3 In-Class Fabrication
11	<b>Advanced Composite Fabrication and Structural Repair; Composite Inspection, Damage Identification, and Repair Techniques:</b> Visual, Acoustic, Ultrasonic, Shearography, Thermography, Fabric Damage, Voids, Delamination, Foam Core Disbonds, Foam Core Damage Repair, Scarf Repair Technique, Lab 4 – In-Class Fabrication
12	<b>Project:</b> In-Class Fabrication
13	<b>Project:</b> In-Class Fabrication

<b>14</b>	<b>Project:</b> In-Class Fabrication
<b>15</b>	<b>Project:</b> Composite Project Submittal and Assessment, Final Exam Review
<b>16</b>	<b>Final Exam</b> (Written)

**HANDS-ON PROJECT POLICY:**

Each student is required to complete each assigned project(s) or assigned portion (team project) to receive credit for the class.

The layout procedure for a project may require the use of basic math. Proper layout practices will be discussed prior to beginning each project.

Students will practice with scrap prior to initiating work on their assigned project(s).

ATTENDANCE is mandatory. If you need to miss a class, you must notify the instructor in advance.

**PROJECTS:**

The projects will be:

- 1 – Team construction of a composite component (aileron) using wet layup vacuum bagging technique and supplied blueprints. Aileron will be attached to the existing Structural Fabrication 1 wing project according to the blueprint requirements. The major goal of this project is to assess the team’s ability to perform the necessary composite fabrication using materials and manufacturing methods common to industry.
- 2 – Individual construction of a high performance structural sandwich composite component using wet layup vacuum bagging technique and finishing using shop machine tools and common hand tools. Emphasis will be on fiber orientation and fiber/resin content for lightweight and high strength. The major goal of this project is to assess each student’s ability to perform a composite fabrication using materials and manufacturing methods common to industry.
- 3 – Individual construction of a foam core high performance composite structure of a specified design using wet layup vacuum bagging techniques, a syntactic fill of a simulated foam core damage, and completion of a composite scarf repair technique. Composite nondestructive inspection, damage location, identification, and classification will be discussed. The major goal of this project is to assess each student’s ability to perform the necessary composite fabrication and repair using materials and manufacturing methods common to industry. The project deliverables will be the manufactured components. The project grading will be based on the composite component’s appearance and compliance to specifications.

**GRADING PROCEDURE:**

<b>Classroom Performance</b> (Participation, Attentiveness, Professionalism, Teamwork)	10%
<b>Laboratory Performance</b> (Demonstrate Safety, Maintain Clean Area, Exhibit Tool Control)	20%
<b>Mid-Term Exam</b> (Written Examination)	15%
<b>Projects</b> (Individual & Team Score)	40%
<b>Final Exam</b> (Written Examination)	15%

**EXAMS:** All reviews and exams will be held in class closed book, with the exception of *your personal notes fitted on a 3X5 card.*

**ATTENDANCE POLICY AND WITHDRAWAL POLICY WILL BE IN ACCORDANCE WITH THE STUDENT HANDBOOK AND COLLEGE CATALOG.**