



COURSE OUTLINE: ASR126 - ADVANCED COMPOSITES

Prepared: Devin York

Approved: Corey Meunier, Chair, Technology and Skilled Trades

Course Code: Title	ASR126: ADVANCED COMPOSITES
Program Number: Name	4067: AIRCRAFT STRUCT TECH
Department:	AIRCRAFT STRUCTURAL REPAIR
Semesters/Terms:	19W
Course Description:	This course is comprised of 128 hours of theory/practical work related to the manufacturing and repair of aircraft composite parts. Advanced composite materials, manufacturing techniques and repair methods will be used by the student to build and repair aircraft structural components. All practical work will take place in the composite lab.
Total Credits:	8
Hours/Week:	8
Total Hours:	128
Prerequisites:	ASR115
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: Please refer to program web page for a complete listing of program outcomes where applicable.	4067 - AIRCRAFT STRUCT TECH VLO 1 Safely use the tools, equipment and identify materials needed to carry out various sheet metal repairs. VLO 2 Demonstrate a working knowledge of the principles of aircraft design by applying theory and shop practice. VLO 3 Identify and order airframe parts with the use of Maintenance and Parts Manuals to complete necessary repairs. VLO 4 Read and follow blueprint, shop drawings and manufacturer's manuals necessary in all manufacturing and overhaul facilities. VLO 5 Organize work safely, economically and efficiently. VLO 6 Carry out any repair according to specifications, stated job procedures and the requirements of the Department of Transport Regulations. VLO 8 Demonstrate a sense of responsibility and appreciation of the high cost of the equipment and materials used to train the practical portion of this program. VLO 10 Recognize basic hand tools and demonstrate their use for specific maintenance on floats, fuselage structures and control systems. VLO 16 Demonstrate honesty and integrity to match the requirements of the aircraft industry.
Essential Employability Skills (EES) addressed in this course:	EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.



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	EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.								
Course Evaluation:	Passing Grade: 70%, B								
Other Course Evaluation & Assessment Requirements:	- Rewrite exams may be granted by the course instructor at the end of the semester. The rewrite exam may be a theory exam if the student fails only that portion of the course or a practical project if the student fails that portion of the course. -If the student fails both portions of the course he will have to rewrite a theory exam to cover the theory portion of the course and complete a practical project to complete the practical portion of the course. -The final theory exam is evaluated separately from the practical project. Each portion of the evaluation must attain a passing mark of 70%. The final grade will equate to a B grade.								
Books and Required Resources:	COMPOSITE BASICS by MARSHALL ISBN: 9780977489664								
Course Outcomes and Learning Objectives:	<table border="1"> <thead> <tr> <th>Course Outcome 1</th><th>Learning Objectives for Course Outcome 1</th></tr> </thead> <tbody> <tr> <td>(1.) Understand the advanced composite theory that supports aircraft structural manufacturing and repair work.</td><td> 1.1 Safety, handling and environment issues specific to composites 1.2 Fiber reinforcement materials, terminology, fabric types and weaves 1.3 Matrix materials, types of matrix and adhesive resins 1.4 Core materials, types of honeycomb, foam, wood and syntactic cores, potting compound 1.5 pre-preg materials (B-stage cure) 1.6 using a warp clock for manufacturing and repair lay-up 1.7 damage assessment and evaluation methods 1.8 specific manufacturing and repair methods 1.9 duplicate plaster and plastic mould construction methods 1.10 typical composite processes, vacuum bagging, curing, machining, lay-up and orientation </td></tr> <tr> <th>Course Outcome 2</th><th>Learning Objectives for Course Outcome 2</th></tr> <tr> <td>(2.) Manufacture and repair composite parts using the modern, advanced methods that are specific to aircraft maintenance work.</td><td> 2.1 Understand the necessary health and safety precautions 2.2 Safe handling and disposal of composite materials, resins and solvents 2.3 Manufacturing and repair of laminates 2.4 Manufacturing of sandwich panels using manufacturers specific lay-up details 2.5 repair of sandwich panels using manufacturer`s specific repair methods  2.6 core replacement repairs with honeycomb and foam core sandwich panels  2.7 damage evaluation using the given manufacturer`s repair limits 2.8 typical composite processes, removal of paint , removal of damage, water removal and cleaning the repair area, lay-up and ply orientation, core orientation, vacuum bagging and hot </td></tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	(1.) Understand the advanced composite theory that supports aircraft structural manufacturing and repair work.	1.1 Safety, handling and environment issues specific to composites 1.2 Fiber reinforcement materials, terminology, fabric types and weaves 1.3 Matrix materials, types of matrix and adhesive resins 1.4 Core materials, types of honeycomb, foam, wood and syntactic cores, potting compound 1.5 pre-preg materials (B-stage cure) 1.6 using a warp clock for manufacturing and repair lay-up 1.7 damage assessment and evaluation methods 1.8 specific manufacturing and repair methods 1.9 duplicate plaster and plastic mould construction methods 1.10 typical composite processes, vacuum bagging, curing, machining, lay-up and orientation	Course Outcome 2	Learning Objectives for Course Outcome 2	(2.) Manufacture and repair composite parts using the modern, advanced methods that are specific to aircraft maintenance work.	2.1 Understand the necessary health and safety precautions 2.2 Safe handling and disposal of composite materials, resins and solvents 2.3 Manufacturing and repair of laminates 2.4 Manufacturing of sandwich panels using manufacturers specific lay-up details 2.5 repair of sandwich panels using manufacturer`s specific repair methods 2.6 core replacement repairs with honeycomb and foam core sandwich panels 2.7 damage evaluation using the given manufacturer`s repair limits 2.8 typical composite processes, removal of paint , removal of damage, water removal and cleaning the repair area, lay-up and ply orientation, core orientation, vacuum bagging and hot
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	bonding, edge trimming and final inspection 2.9 fabricate a duplicate plaster mold from an original manufacturing tool (mold) 2.10 installation of Click Bond fasteners		
Evaluation Process and Grading System:	Evaluation Type	Evaluation Weight	Course Outcome Assessed
	PRACTICAL PROJECTS 1 - 9	50%	ALL
	Test 29A	25%	1,2
	Test 29B	25%	1,2
Date:	August 28, 2018		
	Please refer to the course outline addendum on the Learning Management System for further information.		