

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE:	ADVANCED COMPOSITES		
CODE NO. :	ASR116	SEMESTER:	2
PROGRAM:	AIRCRAFT STRUCTURAL REPAIR		
AUTHOR:	LARRY CANDURO		
DATE:	Jan. 2004	PREVIOUS OUTLINE DATED:	Jan. 2003
APPROVED:			
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	DEAN		DATE
TOTAL CREDITS:	3		
PREREQUISITE(S):			
HOURS/WEEK:	3		

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For additional information, please contact Colin, Kirkwood, Dean

School of Technology, Skilled Trades & Natural Resources

(705) 759-2554, Ext. 688

COURSE DESCRIPTION:**I.**

This course is comprised of 54 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.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Understand the advanced composite theory that supports aircraft structural manufacturing and repair work.

Potential Elements of the Performance:

1. safety, handling and environment issues specific to composites
 2. fiber reinforcement materials, terminology, fabric types and weaves
 3. matrix materials; types of matrix and adhesive resins
 4. core materials; types of honeycomb, foam, wood and syntactic cores, potting compound
 5. pre-preg materials (B-stage cure)
 6. using a warp clock for manufacturing and repair lay-up
 7. damage assessment and evaluation methods
 8. specific manufacturing and repair methods
 9. duplicate plaster and plastic mould construction methods
 10. typical composite processes; vacuum bagging, curing, machining, lay-up and orientation
2. Manufacture and repair composite parts using the modern, advanced methods that are specific to aircraft maintenance work.

Potential Elements of the Performance:

1. the necessary health and safety precautions
2. safe handling and disposal of composite materials, resins and solvents
3. manufacturing and repair of laminates
4. manufacturing of sandwich panels using manufacturer's specific lay-up details
5. repair of sandwich panels using manufacturer's specific repair methods
6. core replacement repairs with honeycomb and foam core sandwich panels
7. damage evaluation using the given manufacturer's repair limits

8. typical composite processes; removal of paint and Tedlar, removal of damage, water removal and cleaning the repair area, lay-up and ply orientation, core orientation, vacuum bagging and hot bonding, edge trimming and final inspection
9. fabricate a duplicate plaster mould from an original manufacturing tool (mould)
10. installation of Click Bond fasteners

III. TOPICS:

1. Safety, Handling and Environment
2. Fiber Reinforcement Materials
3. Matrix Materials
4. Core Materials
5. Working With Composites (Manufacturing and Repair)
6. Typical Composite Repairs

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Aircraft Bonded Structure (EA-NMR)
Advanced Composites (Cindy Foreman)

V. EVALUATION PROCESS/GRADING SYSTEM:

One multiple choice test:

Test #30 Advanced Composites (50 % of the final grade)

Practical work:

Work projects (Average mark for all projects is worth 50 % of the final grade.)

Note: Students in the Aircraft Structural Repair Program require a minimum of seventy (70) percent in a course to obtain a passing grade. This equates to a "B" grade.

The following semester grades will be assigned to students in postsecondary courses:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00

D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

COURSE NOTE: All assignments must be completed. Failure to complete assignments will result in removal of 10% from the test associated with the assignment.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.