

# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



## COURSE OUTLINE

|                  |                                   |                         |                   |
|------------------|-----------------------------------|-------------------------|-------------------|
| COURSE TITLE:    | <b>ADVANCED COMPOSITES</b>        |                         |                   |
| CODE NO. :       | <b>ASR126</b>                     | SEMESTER:               | <b>2</b>          |
| PROGRAM:         | <b>AIRCRAFT STRUCTURAL REPAIR</b> |                         |                   |
| AUTHOR:          | <b>Devin York</b>                 |                         |                   |
| DATE:            | <b>Jan. 2014</b>                  | PREVIOUS OUTLINE DATED: | <b>Sept. 2013</b> |
| APPROVED:        | <b>"C.Kirkwood"</b>               |                         |                   |
|                  | _____<br>DEAN                     |                         | _____<br>DATE     |
| TOTAL CREDITS:   | <b>8</b>                          |                         |                   |
| PREREQUISITE(S): | <b>ASR 115</b>                    |                         |                   |
| HOURS: (Total)   | <b>128</b>                        |                         |                   |

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*For additional information, please contact Colin Kirkwood, Dean,*  
*Environment/Technology/Business, extension 2688.*

**COURSE DESCRIPTION:****I.**

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.

**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 , 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 mold from an original manufacturing tool (mold)
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:**

Advanced Composites (Cindy Foreman)  
Teacher Handouts  
D2L

**V. EVALUATION PROCESS/GRADING SYSTEM:****Two multiple choice tests:**

Test #29 A and B Advanced Composites (50 % of the final grade)

Test #29A 50%

#29B 50%

**Practical work:**

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

**Notes:**

- 1/ 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.**
- 2/ Course attendance is mandatory. If a student is absent, he/she must have a valid reason – documentation is required.  
If a student is absent for all of the in-class theory or shop demonstrations for which a test/project is assigned, he/she will not be granted permission to complete the test/project.**
- 3/ If a student misses a test, he/she must have a valid reason – documentation is required.  
In addition, the instructor must be notified prior to the test, or the student will receive a mark of zero, with no make-up option.**
- 4/ All assignments must be completed. Failure to complete assignments will result in removal of 10% from the test associated with the assignment.**
- 5/ Re-writes for tests, and Repeats for shop projects will not be granted.**

**Valid reasons for being absent:**

- **Illness – supported by doctor’s note**
- **Family death or serious illness – supported by applicable documents**

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

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

### 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.

**NOTE:** Prerequisite for 126 is ASR 115.

**NOTE:** Successful completion in ASR 126 with a grade { B } – 70% in both practical and theory is a requirement { INDIVIDUALLY }.

### 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.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

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

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. 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

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. *<Optional: It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.>*

Tuition Default:

Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of *<choose November, March, or June>* will be removed from placement and clinical activities. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.

**CELL PHONES MUST NOT BE USED IN THE SHOP OR  
CLASSROOM**