

## COURSE OUTLINE

**COURSE:** Structural Repairs on Composites, Wood, Fabric and Metal

**PROGRAM:** 280.C0 Aircraft Maintenance Technology

**DISCIPLINE:** 280 Aeronautics

**WEIGHTING:** Theory: 2                      Practical Work: 4                      Personal Study: 1

<b>Teacher(s)</b>	<b>Office</b>	<b>☎ extension</b>	<b>✉ email or web site</b>
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### OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					
Other					

<b>Coordinator(s)</b>	<b>Office</b>	<b>☎ extension</b>	<b>✉ e-mail</b>
Éric Goudreault	C-160	4691	<a href="mailto:eric.goudreault@cegepmontpetit.ca">eric.goudreault@cegepmontpetit.ca</a>
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## **CONTEXT OF THIS COURSE IN THE PROGRAM**

This course is offered during the sixth session of the Aircraft Maintenance Program.

By the end of this course, students will have developed:

- Dexterity with tools.
- Research skills in technical manuals
- Knowledge of materials and hardware.
- Ability to repair laminated or sandwich-type composites.
- Ability to carry out repairs using moulds.
- Ability to carry out repairs using wood and fabric.
- Ability to install and remove different types of fasteners.
- Ability to provide a preliminary report of a major repair that complies with the applicable manufacturer's standards.

**Students must keep this course outline for the duration of their studies as it will be useful for the comprehensive assessment at the end of the program.**

**Transport Canada:** This course outline meets the requirements of Training Organisation Certification Manual (MCF) of Transport Canada. The Department applies Transport Canada standard which allows a maximum absence of 5% for the course (theory and laboratory). The department compiles absences of all students enrolled in Aircraft Maintenance (280.C0) and Avionics (280.D0) according to Transport Canada requirements. The application of Transport Canada policies regarding absences is available on the college website and in the student agenda under the heading « Privilèges accordés par Transports Canada ».

## **COMPETENCE OF THE EXIT PROFILE**

Maintain aircraft structures.

## **MINISTERIAL OBJECTIVES OR COMPETENCIES**

**0261** Maintain the metal structures and structural components of an aircraft.

**0262** Maintain aircraft structures and structural components made of composite materials, wood and fabric.

## **TERMINAL OBJECTIVE OF THE COURSE**

At the end of this course, the student will be able to perform the appropriate structural repair.

## **TEACHING AND LEARNING STRATEGIES**

### THEORY

Synchronously at distance, the theoretical part of the Structural Repairs on Composites is organized into various themes :

- Composite materials
- Hardware
- Aircraft constraints and structures
- Repair procedures
- Preliminary report
- Techniques for working with wood and fabric

Exercises and class discussions will be used as a strategy to develop the necessary skills for routine aircraft maintenance. Directed research in technical manuals and multimedia elements will complement learning.

### PRACTICAL WORK

In the laboratory, the teacher will use hands-on demonstrations to guide students regarding the use of various measuring instruments. The practical assignments will allow students to acquire manual dexterity and the necessary competence for aircraft maintenance technicians. The repair projects carried out during the session are designed to provide students with practical experience using various repair methods on the materials being studied according to aeronautical standards. All of this complies with the health and safety work procedures applicable to the aviation industry.

## **COURSE PLAN – THEORETICAL PART**

### **LEARNING OBJECTIVE**

1. Become familiar with the objectives and requirements
2. Inspect the damaged parts
3. Plan the work to be carried out
4. Perform the preliminary work required to repair the damaged parts.
7. Repair an element made of composite material
8. Tidy and clean the work area + CNESST precaution

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<b>WEEK</b>	<b># OBJECTIVE</b>	<b>CONTENT</b>	<b>MODE OF INSTRUCTION AND LEARNING ACTIVITIES</b>	<b>TECHNOLOGICAL TOOLS AND RESOURCES (URL address)</b>
1	1	Introduction to Composites	TEAM : the presentation Distance, synchronous.	LEA for class notes
2	1	Fibers (glass, carbon, aramid)	TEAM : the presentation Distance, synchronous.	LEA for class notes
3	1	Resins (thermoplastic,thermosetting)	TEAM : the presentation Distance, synchronous.	LEA for class notes
4	1	Pre-impregnated, cores (honeycomb, foams)	TEAM : the presentation Distance, synchronous.	LEA for class notes
5	1	Composite Construction methods	TEAM : the presentation Distance, synchronous.	LEA for class notes, TEAM : the presentation
6	1	Health and safety, bagging	TEAM : the presentation Distance, synchronous.	LEA for class notes
7	1	Exam 1	<b>In school</b>	
8	1	Curing and assembly	TEAM : the presentation Distance, synchronous.	LEA for class notes
9	1,2,3,4	SRM, inspection and repair of a structure	TEAM : the presentation Distance, synchronous.	LEA for class notes
10	1,2,3	Composites repair	TEAM : the presentation Distance, synchronous.	LEA for class notes
11	1,2,3,4	Flight domain, constraint and tubular structure	TEAM : the presentation Distance, synchronous.	LEA for class notes
12	1,2,3,4	Wooden structures	TEAM : the presentation Distance, synchronous.	LEA for class notes
13	1,2,3,4	Canvas covering	TEAM : the presentation Distance, synchronous.	LEA for class notes
14	1,2,3,4	Exam #2	<b>In school</b>	

**COURSE PLAN – PRACTICAL PART**

<b>Week</b>	<b>Duration</b>	<b>Practical work content</b>	<b>Objective</b>
1	4	Presentation & making a carbon airplane	<b>1,3</b>
2	4	Fabrication of a laminated plate	<b>1,3,4</b>
3	4	Fiberglass laminated plate and testing	<b>1,2,3,4,7</b>
4	4	Fiberglass laminated plate testing and pre-preg floor fabrication	<b>1,2,3,4,7</b>
5	4	Exam 1	<b>1,2,3,4,7</b>

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6	4	Honeycomb repair with GMI	1,2,3,7
7	4	Honey comb repair and mini-wing fabrication	1,2,3,7
8	4	Mini-wing interlining	1,3
9	4	Mini-wing repair and inspection panel	1,2,3,7
10	4	Inspection panel	1,2,3,4,7,8
11	4	Honeycomb repair & inspection panel	1,2,3,4,7,8
12	4	Honeycomb repair	1,2,3,4,7,8
13	4	Honeycomb repair	1,2,3,4,7,8
14	4	Exam 2	1,2,3,4,7,8

**SYNTHESIS OF SUMMATIVE EVALUATION METHODS - THEORY**

Description of Evaluation Activity	Context	Learning Objective(s)	Évaluation criterias	Due Date (date assignment is due or exam period)	Weighting (%)
Exam 1	Individual, open questions	1	Correct terminology and understanding of technology	7 <sup>th</sup>	20
Exam 2 (final)	Individual, Open questions	1,2,3,4	Correct terminology and understanding of technology	14 <sup>th</sup>	20

**Sub-total: 40%**

**SYNTHESIS OF SUMMATIVE EVALUATION METHODS – PRACTICAL PART**

Description of Evaluation Activity	Context	Learning Objective(s)	Évaluation criterias	Due Date (date assignment is due or exam period)	Weighting (%)
Exam 1	Individual	1,2,3,4,7	Correct therminology, accuracy of the mix, precision of the repair	5 <sup>th</sup>	20
Exam 2 (final) Repair a sandwich and complete the associated documentation	Individual	All	❶	14 <sup>th</sup>	40

**Sub-total: 60%**  
**TOTAL: 100%**

① Relevance of observations, accuracy of dimensions, tolerances, compliance with standards in repair steps, rigorous recording, choice of tools and equipment, proper use of tools, precise calculations, careful removal and installation and overall work done with the proper health and safety hazard applicable.

## **REQUIRED MATERIAL**

In the laboratory, safety glasses, safety shoes or boots and coveralls are mandatory.

## **MEDIAGRAPHY**

ACCEPTABLE METHODS, TECHNIQUES AND PRACTICES; V. 1: AIRCRAFT INSPECTION AND REPAIR, AC 4313-1A, V. 2: AIRCRAFT ALTERATIONS, AC 4313-2A, , Department of Transportation. Federal Aviation Administration. Washington D.C., U.S. Government Printing Office, 1977, 2 volumes.

CARE AND REPAIR OF ADVANCED COMPOSITES, Keith B. Armstrong ,SAE International, 2005, 664 pages.

AIRCRAFT STRUCTURAL TECHNICIAN, Dale Hurst , Avotek Publishing, Harrisonburg, Virginia, 2001, 272 pages.

STANDARD AIRCRAFT HANDBOOK, Leavell, Stuart et Stanley BUNGAY., 3d ed., Fallbrook, Calif., Aero, 1980, 159 pages.

UNDERSTANDING AIRCRAFT STRUCTURE, John Cutler, Granada publishing Ltd, Frogmore (England), 1981, 170 pages.

CELLULES ET SYSTÈMES D`AÉRONEFS, Didier Féminier, Modulo Éditeur, Mont-Royal, 1982, 315 pages. Chapitres 1 à 4, page 1 à 69.

ADVANCED COMPOSITE MATERIAL CHAPTER 7 AMT AIRFRAME HANDBOOK  
VOLUME 1 FAA-H8083-31

[HTTP://WWW.FAA.GOV/REGULATIONS\\_POLICIES/HANDBOOKS\\_MANUALS/AIRCRAFT/AMT\\_AIRFRAME\\_HANDBOOK/MEDIA/AMA\\_CH07.PDF](http://www.faa.gov/regulations_policies/handbooks_manuals/aircraft/amt_airframe_handbook/media/ama_ch07.pdf)

## **REQUIREMENTS TO PASS THE COURSE**

### **(1) Passing Mark**

The passing mark for this course is 60% (PIEA, article 5.1m).

### **(2) Attendance for Summative Evaluations**

Attendance is mandatory for summative evaluations (PIEA, article 5.2.5.1).

### **(3) Submitting Assignments**

All assignments must be submitted by the date, time and place designated by the teacher. Any class or homework assignment handed in late will be penalized. The **penalties** associated with delays are set **according to the departmental rules** (PIEA, article 5.2.5.2).

In case of delay the penalties are:

- See the section "Department rules" at the following address:  
<http://guideena.cegepmontpetit.ca/regles-des-departements/>

### **(4) Presentation of Written Work**

Students must follow the standards adopted by the Cégep for written work (« *Normes de présentation matérielle des travaux écrits* »). These can be found in the documentation centre on the Cégep web site [www.cegepmontpetit.ca/normes](http://www.cegepmontpetit.ca/normes), under the heading **Liens éclair, Bibliothèques, « Méthodologie »** (des centres de documentation du Cégep).

The **departmental penalties** concerning non-compliance with the standards for assignment presentation (PIEA, article 5.3.2) are:

<http://guideena.cegepmontpetit.ca/regles-des-departements/>.

## **METHODS OF COURSE PARTICIPATION**

### **SAFETY RULES IN THE HANGAR**

1. No running
2. Take precautions with loose clothing when using rotary tools. (For example: tie, sleeves, long hair must be tied back).
3. Workshop and hand tools may be used only after demonstration.
4. No work in workshops without the supervision of a teacher.
5. Small pieces of metal to drill (manual or column) must be held in place with a clamp
6. All hazardous products (e.g. M.E.K.) must be used in a room with adequate ventilation (paint room).

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7. Do not sit on the equipment tables in the workshop.
8. Everyone must follow instructions according to the visual and aural signals in case of fire.
9. All accidents must be reported to authorized personnel; notify security if first aid measures do not suffice.

### SAFETY RULES FOR WORKSHOP EQUIPMENT

1. Clean the workshop after each course (tables, workbenches, floor,...).
2. Clean workshop tools after each use (drill, sander, grinder ...).
3. No aluminum or non-ferrous material on the grinding wheels.
4. Respect material indications on the band saws.
5. Return workshop equipment to the appropriate place after use.
6. Report any defective equipment or tools.

#### **For online classes (theory) :**

By attending online classes through videoconference technology, the student understands that his image and voice may be captured on video in the context of his courses and agrees to this. Videos are only visible during live classes and by the teacher and other participants exclusively.

For pedagogical reasons, some courses may be recorded. It is the teacher's responsibility to clearly inform students beforehand when their images and voices are to be captured on video . Any student opposed to his image and/or voice being recorded may turn off his camera and microphone but will be required to participate in writing through means established by the teacher. Otherwise, students who activate their cameras or their microphones are deemed to have agreed to their images and voices being taped. These recordings of courses will be available for the express and sole use of those students registered in the courses for the duration of the semester. It is strictly forbidden to broadcast these recordings in any public manner or to use them other than for pedagogical purposes.

No student may record an online course without prior consent from the teacher. Students whose personal information (voices and images) is captured on video may exercise such remedies as provided by the right to access records and the right of rectification per the Act respecting access to documents held by public bodies and the protection of personal information through the Cegep's Secretary General's Office.

### **OTHER DEPARTMENTAL REGULATIONS**

Students are encouraged to consult the website for health and safety regulations :

<http://guideena.cegmontpetit.ca/sante-et-securite/>

Students are encouraged to consult the website for specific regulations related to this course:

<http://guideena.cegmontpetit.ca/regles-des-departements/>

**NOTE:** This Course Outline is a translation of the *Plan de cours* for 280-616-EM: *Réparation de structures en composite, bois, toile et métal*. If there is a discrepancy, then the original French version will be considered the official version for legal purposes.

## **INSTITUTIONAL POLICIES AND REGULATIONS**

All students enrolled at cégep Édouard-Montpetit must become familiar with and comply with the institutional policies and regulations. In particular, these policies address learning evaluations, maintaining admission status, French language policies, maintaining a violence-free and harassment-free environment, and procedures regarding student complaints. The French titles for the policies are: *Politique institutionnelle d'évaluation des apprentissages, les conditions d'admission et cheminement scolaire, la Politique relative à l'usage, à la qualité et à la valorisation de la langue française, la Politique pour un milieu d'études et de travail exempt de harcèlement et de violence, les procédures et règles concernant le traitement des plaintes étudiantes*.

The full text of these policies and regulations is accessible on the College web site at the following address: <http://ena.cegepmontpetit.ca/l-ecole/reglements-et-politiques>. If there is a disparity between shortened versions of the text and the full text, the full text will be applied and will be considered the official version for legal purposes.

## **STUDENT ACCESSIBILITY CENTER - FOR STUDENTS WITH DISABILITIES**

Students having received a professional diagnosis of impairment (motor skills, neurological, organic, sensory, learning difficulties, mental health, autism spectrum disorder or other) or suffering from a temporary medical condition may request special accommodations.

Students seeking these accommodations must forward their diagnosis to the CSA by either MIO to « Service, CSA-ENA » or email to « [servicesadaptesena@cegepmontpetit.ca](mailto:servicesadaptesena@cegepmontpetit.ca) ».

Students already registered with the CSA must communicate with their teachers at the beginning of the semester to discuss those accommodations they have been awarded by the CSA.

## **ANNEX**

None