

Course outline

COURSE:	Inspection and Minor Repairs of Aircraft		
PROGRAM:	280.C0 Aircraft Maintenance		
DISCIPLINE:	280 Aeronautics		
WEIGHTING:	Theory: 2	Practical work: 3	Personal study: 2

Instructor(s)	Office	☎ Extension	✉ E-mail or web site
Mora, Joaquin	C-186	4220	joaquin.mora@cegepmontpetit.ca

OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

Coordinator(s)	Office	☎ Extension	✉ Email or Website
Serge Rancourt	B-125	4664	serge.rancourt@cegepmontpetit.ca
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CONTEXT OF THIS COURSE IN THE PROGRAM

This course is offered during the second session of the program.

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

- dexterity with tools and equipment;
- research skills using technical manuals;
- familiarity with materials and hardware;
- ability to make minor repairs;
- ability to install and remove solid rivets.

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 standards, 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 ».

MINISTERIAL OBJECTIVE(S) AND COMPETENCIES

- 025X** To clean, inspect and protect aircraft materials.
025Z To prepare and assemble sheet metal.

TEACHING AND LEARNING STRATEGIES

Theory

The theoretical part of the course Inspection and Minor Repairs is organized into four themes:

- use of technical manuals;
- inspection and classification of damage;
- prevention and elimination of corrosion;
- minor repairs and riveting.

Exercises and discussions in class will be used as a strategy to allow students to develop the necessary skills to service an aircraft. Research assignments in technical manuals and the use of multimedia tools will reinforce the learning process.

Practical work

During the laboratory periods, the instructor will guide students with practical demonstrations of different tools and measuring instruments. Students will acquire manual dexterity and the competence necessary to be aircraft maintenance technicians through a variety of practical exercises that involve evaluating damage, treating corrosion and other observed defects. The different minor repair projects during the session, will be assembled by riveting according to aeronautical standards. All activities will comply with the health and safety procedures applicable to the aeronautical industry.

COURSE PLAN – THEORY

025Z To prepare and assemble sheet metal

Activity Period: Weeks 1 to 3

THEME: Rivets

Learning Objective	Content	Personal Study Activities
1.1 To differentiate and identify the different types of rivets used in aeronautical assemblies.	- Types of rivets - Solid rivets - Blind rivets - Special rivets	Read course outline and rules. Read course documents Review personal notes
1.2 To be able to select correct type and size of rivet for an assembly.	Rivet selection	Read course documents Review personal notes
1.3 Apply the standards for positioning aeronautical fasteners.	Layout and spacing of rivets	
1.4 Apply the standards for preparing sheet metal to receive aeronautical fasteners.	Drilling of sheet metal. Hole preparation for flush head rivets. Assembly of sheet metal parts.	
1.5 To identify and describe tools used for rivet installation.	Hand riveting tools. Compression riveting tools. Rivet gun. Rivet set (Snaps). Bucking bars.	
1.6 Describe rivet installation, inspection and removal procedure.	Rivet installation procedure Rivet inspection Rivet removal procedure	

Activity Period: Week 4

THEME: Technical documentation and aeronautical materials

Learning Objective	Content	Personal Study Activities
2.1 Distinguish and identify technical documentation available to the AME.	ATA classification standards. Manufacturer's maintenance or service manual. AC43-13 and AC 43-4A	Read course documents Review personal notes
2.2 Differentiate materials used in aeronautical assemblies	Aluminum, plastics,	

Activity Period: Week 5 Exam 1

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)
Written exam	Individual	Rivets and riveting ATA 100, Technical documentation and Materials.	Weeks 1 to 4	10%

Activity Period: Weeks 6 to 9

THEME: Identification, prevention and elimination of corrosion

Learning Objective	Content	Personal Study Activities
3.1 Distinguish and identify different types of corrosion.	Forms of corrosion Propitious areas for corrosion formation.	Read course documents Review personal notes
3.2 Distinguish techniques and methods of prevention and elimination of corrosion.	Identifying techniques and methods commonly used to prevent corrosion. Identifying techniques and methods commonly used to eliminate corrosion. Structural repair manual: treating according to damage.	

Activity Period: Week 10 Exam 2

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)
Written exam	Individual	Corrosion	Weeks 6 to 9	15%

025X To clean, inspect and protect aircraft materials

Activity Period: Weeks 10 to 14

THEME: Inspection of aeronautical material – Abrasives and scellants

Learning Objective	Content	Personal Study Activities
4.1 Distinguish and identify different types of damage	Impact damage Damage due to aging and environment conditions - Fatigue - Corrosion	Read course documents Review personal notes
4.2 Classify types of damages	Identification and localisation of damage	
4.3 Identify the type of structure	Primary, secondary, tertiary structure	
4.4 Determine acceptable damage limits	Authorized vs unauthorized damage.	
4.5 Evaluate the damage	Evaluating damage regarding tolerances, standards and specifications.	
4.6 Select various abrasive and sealing products.	Distinguishing different types of abrasives and usage. Choosing scellant according to the area where it will be used.	

Course outline 280-2B5-EM: Inspection and Minor Repairs of Aircraft

Activity Period: Week 15 Exam 3 (Final exam)

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)
Written exam	Individual	Rivets and riveting ATA 100, technical documentation, materials., corrosion, inspection methods, abrasives and sealants	Weeks 1 to 4, 6 to 9 and 11 to 14	15%

COURSE OUTLINE – PRACTICAL WORK (LABORATORY)

Activity Period: Weeks 1 and 8

THEME: To prepare and assemble sheet metal

Learning Objective	Content	Personal Study Activities
1.1 Choose tools according to work to be done.	Characteristics and standards related to using tools for measuring, cutting, plying, riveting and finishing. Procedures for using tools and equipment. Planning and organizing the workplace.	4.3. Choose tools according to the repair to be done.
1.2 Prepare material to fabricate part according to engineering drawing	Material selection and preparation - Cutting to size and deburring - Bending	
1.3 Apply standards for installing aeronautical fasteners.	Pitch, edge distance, spacing. Riveting.	
1.4 Layout of fasteners according to specifications on engineering drawing	Size and number of rivets Pitch, edge distance and spacing	
1.5 Explain the use, the installation and the removal of aeronautical fasteners.	Hardware. Solid and blind rivets.	
1.6 Recognize health and safety risks.	Safe handling of tooling	
1.7 Drilling and hole preparation for rivet installation	Using appropriate and safe methods.	
1.8 Installation of rivets	Using appropriate and safe methods.	
1.9 Inspection of rivets	Describe tolerances for type and size of rivet Identify and mark rivets that are not within tolerances	
1.10 Replacement of rivets that do not meet tolerances	Removal of rivets using appropriate method. Install new rivet and inspect	

Activity Period: Week 9

THEME: Inspection and Classification of Damage

Learning Objective	Content	Personal Study Activities
2.1 Locate areas on an aircraft likely to develop corrosion and defects.	<ul style="list-style-type: none"> • Distinguishing different types of corrosion and their causes. • Distinguishing different types of defects and their causes. • Identifying problem areas according to the aircraft and the environment. 	<ul style="list-style-type: none"> ▪ Any activity aimed at improving manual dexterity.
2.2 Distinguish and identify materials to be subjected to an inspection or a nondestructive test.	<ul style="list-style-type: none"> • Identifying different materials used in aeronautics and their interrelation. 	
2.3 Select and carry out inspections and tests according to standards and specifications.	<ul style="list-style-type: none"> • Distinguishing between inspection categories and tests generally used in the aeronautical industry. • Choosing applicable inspections and tests according to the material and the standards and specifications related to technical documents. 	

Course outline 280-2B5-EM: Inspection and Minor Repairs of Aircraft

2.4 Apply inspection and testing procedures.	<ul style="list-style-type: none"> Respecting established procedures. Methods used.
2.5 Locate signs of corrosion and defects.	<ul style="list-style-type: none"> Identifying types of corrosion and signs of fatigue and defects (e.g. small and large cracks, wear, etc.).
2.6 Determine tolerances for damage caused by defects.	<ul style="list-style-type: none"> Consulting AC 43-4A for general tolerances. Distinguishing different tolerances according to the type of damage and the area that was damaged. Consulting the manufacturer's structural repair manual to check whether the damage is minor.
2.7 Measure the damage.	<ul style="list-style-type: none"> Appropriate use of measuring tools. Evaluating damage regarding tolerances, standards and specifications.
2.8 Record the results.	<ul style="list-style-type: none"> Formulating entries in the inspection and follow-up reports. Using appropriate technical vocabulary.

Activity Period: Weeks 10 to 14

THEME : Preventing and Eliminating Corrosion

Learning Objective	Content	Personal Study Activities
3.1 Select appropriate techniques and methods.	<ul style="list-style-type: none"> Make a choice according to: <ul style="list-style-type: none"> the characteristics of the materials and damage; standards and specifications; the nature of the operations to be carried out. 	<ul style="list-style-type: none"> King Air Maintenance Manual. Any activity aimed at improving manual dexterity.
3.2 Apply workplace health and safety regulations as well as environmental standards.	<ul style="list-style-type: none"> Respect for the regulations and instructions, implementation of the methods of individual protection. Respect for the environmental standards according to the workplace. 	
3.3 Cover the areas to be protected.	<ul style="list-style-type: none"> Appropriate use of masking tape and specific protection covers. Protection of the environmental surfaces for the treated area. 	
3.4 Apply the corrosion process of elimination.	<ul style="list-style-type: none"> Using cleaning/scouring/scrubbing/pickling process. Using mechanical and chemical processes to eliminate corrosion. Polishing/buffing process Respecting processes. 	
3.5 Adapt operations according to the equipment and material.	<ul style="list-style-type: none"> Appropriately using tools and equipment according to their characteristics and the nature of the corroded material. 	
3.6 Prepare the material and the surface to treat to prevent corrosion.	<ul style="list-style-type: none"> Preparing the surface to be treated. Making a choice of the material according to the treatment to be carried out. 	
3.7 Apply treatment procedures.	<ul style="list-style-type: none"> Following directives and operating instructions according to the products being used. Respecting procedures. Methods to be used. 	
3.8 Inspect results and compliance.	<ul style="list-style-type: none"> Checking the quality of the work. Checking complete shrinkage from masking to protect environmental surfaces. 	

SYNTHESIS OF SUMMATIVE EVALUATION METHODS

Theory

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)
Written exam	Individual	Rivets	Weeks 1 to 4	10%
Written exam	Individual	Corrosion	Weeks 6 to 9	15%
Written exam	Individual	Rivets, corrosion, Inspection methods, Abrasives and scellants	Weeks 1 to 14	15%

Sub-total: 40%

Laboratory

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)	
Practical exam with a series of parts to fabricate.	Individual	Metal preparation and assembly	Week 9	20%	
Treatment of a corroded plate in three stages.	Individual	Corrosion treatment	Week 11	15%	
Final Exam	Various tasks and riveting aluminum sheets.	Individual	Minor repairs and riveting	Week 14	20%
	Riveting to make minor repairs.	Individual	Repairing by patching	Week 15	5%

Sub-total: 60%

TOTAL : 100%

REQUIREMENTS TO PASS THE COURSE

(1) Passing Mark

The passing mark for this course is 60%.

(2) Attendance for Summative Evaluations

Students must be present for summative evaluations.

(3) Submitting Assignments

All assignments must be submitted by the date, hour and location designated by the instructor(s). Late assignments will be penalized 10% per day that they are late and will receive a mark of zero (0) after one week.

(4) Presentation of Written Work

Students must follow the standards adopted by the College for written work (« *Normes de présentation matérielle des travaux écrits* »). These can be found in the documentation center on the College web site <http://www.cegepmontpetit.ca/biblio> under the heading « **Aide** ».

RULES OF COURSE PARTICIPATION

SAFETY REGULATIONS FOR WORKSHOP PERSONNEL

1. Running is prohibited.
2. Loose clothing and hair must be pulled back, tightened or tucked in when using rotational equipment (e.g. ties, sleeves, long hair).
3. Hand tools and workshop equipment are to be used only after a demonstration.
4. No work may be done in the workshop without the supervision of an instructor.
5. Small metal parts to be drilled (manually or with a drill press) must be held in place with clamps.
6. All dangerous products must be used in a appropriate and well ventilated room (paint room).
7. Sitting on the workbenches or machines is prohibited.
8. Visual and auditory instructions in case of a fire must be followed by everyone.
9. Any accident must be reported to authorized staff; the guard must be notified if first aid is not sufficient.

SAFETY REGULATIONS FOR WORKSHOP EQUIPMENT

1. Clean the workshop after each course (tables, workbenches, floor, etc.).
2. Clean workshop equipment after each use (drill press, sandblaster, grinder, etc.).
3. No aluminum material or non-ferrous material may be used on the grinders.
4. Respect directives regarding materials when using the band saw.
5. Return all workshop equipment to its appropriate place after use.
6. Report any defective or damaged equipment or tools.
7. Correctly maintain the classification of rivets or bolts.

REQUIRED MATERIAL

In the lab, safety glasses, safety boots/shoes and overalls (or approved ÉNA work clothes) are mandatory.

MEDIAGRAPHY

CORROSION CONTROL FOR AIRCRAFT, AC 43-4A, Department of Transportation. Federal Aviation Administration. Washington D.C., U.S. Government Printing Office, 1991, 224 pages.

AIRCRAFT STRUCTURAL TECHNICIAN, Dale Hurst, AVOTEK, T-AST-1, Harrisburg VA. 2001, 272 pages, chapitres 5 et 9.

A & P TECHNICIAN AIRFRAME TEXTBOOK, Jeppesen, JS312692, Englewood, Colorado, 2003, 876 pages, chapitres 2, 3, 6 et 8.

A & P TECHNICIAN GENERAL TEXTBOOK, Jeppesen, JS312690, Englewood, Colorado, 2003, 568 pages, chapitres 11 et 12.

A & P TECHNICIAN GENERAL TEXTBOOK and **A & P TECHNICIAN AIRFRAME TEXTBOOK** are recommended for the Inspection and minor repairs (280-2B5).

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 particulières concernant le maintien de l'admission d'un étudiant, la Politique de 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://www.cegepmontpetit.ca/campus-de-longueuil/le-college/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.

OTHER DEPARTMENTAL REGULATIONS

Students are encouraged to consult the website for specific regulations related to this course:
<http://ena.cegepmontpetit.ca/>
<http://ena.cegepmontpetit.ca/etudiants-actuels/programmes-d-etudes/departements-d-enseignement#a2>