

Course outline

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

Instructor(s)	Office	☎ Extension	✉ E-mail or web site
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OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

Coordinator(s)	Office	☎ Extension	✉ Email or Website
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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 ability in:

- dexterity with tools and equipment;
- research skills using technical manuals;
- choosing proper repair technique, appropriate tools and equipment;
- shape and assemble by riveting sheet metal parts;
- clean and inspect metal parts including non-destructive inspection;
- Measure corrosion damage;
- Choose proper technique to treat corrosion and protect material.

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 ».

COMPETENCIES OF THE EXIT PROFILE (STUDENT SKILL PROFILES)

Maintain aircraft structures.

MINISTERIAL OBJECTIVE(S) AND COMPETENCIES

025X To clean, inspect and protect aircraft materials.

025Z To prepare and assemble sheet metal.

TERMINAL OBJECTIVE OF THE COURSE (FINAL COURSE OBJECTIVE)

By the end of this course, students will be able to inspect aircraft structures and components following industry standards.

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 an assembly by riveting, a corrosion treatment and inspection of structure and components 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. Choose the appropriate tools and materials in accordance with the repair to accomplish.	- Types of rivets - Solid rivets - Blind rivets - Special rivets	Read course outline and rules. Read course documents Review personal notes
	Rivet selection	Read course documents Review personal notes
	Layout and spacing of rivets	
	Drilling of sheet metal. Hole preparation for flush head rivets. Assembly of sheet metal parts.	
	Hand riveting tools. Compression riveting tools. Rivet gun. Rivet set (Snaps). Bucking bars.	
	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 Familiarisation of the structural repair technical documentations 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 assembly and repair.	Aluminum, plastics and elastomers,	

Activity Period: Week 5 Exam 1

025X To clean, inspect and protect aircraft materials

Activity Period: Weeks 6 to 9

THEME: Identification, prevention and elimination of corrosion

Learning	Content	Personal Study
3.Distinguish techniques and methods of prevention and elimination of corrosion.	Forms of corrosion Propitious areas for corrosion formation.	Read course documents Review personal notes
	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

Activity Period: Weeks 10 to 14

THEME: Inspection of aeronautical material – Non-destructive testing

Learning Objective	Content	Personal Study
4.Distinguish methods of Identifying, locating and evaluating different types of damage.	Impact damage Damage due to aging and environment conditions - Fatigue - Corrosion	Read course documents. Review personal notes.
	Identification and localisation of damage	
	Primary, secondary, tertiary structure	
	Inspection methods	
	Authorized vs unauthorized damage.	
	Evaluating damage regarding tolerances, standards and specifications.	
	Distinguishing different types of abrasives and usage. Choosing sealant according to the area where it will be used.	

Activity Period: Week 15 Exam 3 (Final exam)

COURSE OUTLINE – PRACTICAL WORK (LABORATORY)

025Z To prepare and assemble sheet metal

Activity Period: Weeks 1 to 6

THEME: To prepare and assemble sheet metal

Learning Objective	Content	Personal Study Activities
5. Assemble by riveting sheet metal parts in accordance with aeronautical standards.	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.	Improve the assembly project. Any activity aimed at improving manual dexterity.
	Material selection and preparation - Cutting to size and deburring - Bending	
	Pitch, edge distance, spacing. Riveting.	
	Size and number of rivets Pitch, edge distance and spacing	
	Hardware. Solid and blind rivets.	
	Safe handling of tooling	
	Using appropriate and safe methods.	
	Describe tolerances for type and size of rivet Identify and mark rivets that are not within tolerances	
	Removal of rivets using appropriate method. Install new rivet and inspect	

025X To clean, inspect and protect aircraft materials

Activity Period: Weeks 7 to 9

THEME : Preventing and Eliminating Corrosion

Learning Objective	Content	Personal Study Activities
6. Use methods of eliminating corrosion.	<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. 	Familiarise with King Air Maintenance Manual.
	<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. 	Any activity aimed at improving manual dexterity.
	<ul style="list-style-type: none"> • Appropriate use of masking tape and specific protection covers. • Protection of the environmental surfaces for the treated area. 	
	<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. 	
	<ul style="list-style-type: none"> • Appropriately using tools and equipment according to their characteristics and the nature of the corroded material. 	
	<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. 	
	<ul style="list-style-type: none"> • Following directives and operating instructions according to the products being used. • Respecting procedures. • Methods to be used. 	
	<ul style="list-style-type: none"> • Checking the quality of the work. • Checking complete shrinkage from masking to protect environmental surfaces. 	

Activity Period: Week 10 to 15

THEME: Inspection and Classification of Corrosion and general Damage

Learning Objective	Content	Personal Study Activities
7. Use cleaning, inspection and testing procedures.	<ul style="list-style-type: none"> • Technical Documentation • Choose the correct product according to material to be clean • Apply environment rules • Cover zones to protect • Plan and carry out cleaning operation • Use of proper tools and equipment • Inspect quality of work 	Familiarise with Q400 maintenance manual.
	<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. 	Any activity aimed at improving manual dexterity.
	<ul style="list-style-type: none"> • Identifying different materials used in aeronautics and their interrelation. 	
	<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. 	
	<ul style="list-style-type: none"> • Respecting established procedures. • Methods used. 	
	<ul style="list-style-type: none"> • Identifying types of corrosion and signs of fatigue and defects (e.g. small and large cracks, wear, etc.). 	
	<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. 	
	<ul style="list-style-type: none"> • Appropriate use of measuring tools. • Evaluating damage regarding tolerances, standards and specifications. 	
	<ul style="list-style-type: none"> • Formulating entries in the inspection and follow-up reports. 	
	<ul style="list-style-type: none"> • Using appropriate technical vocabulary. 	

SYNTHESIS OF SUMMATIVE EVALUATION METHODS

Description of Evaluation Activity		Context	Learning objective(s)	Evaluation Criteria	Due Date (approximate date assignment due or exam given)	Weighting (%)
Theory (40%)						
Written exam		Individual, no personal notes.	1 to 2.2	Accuracy of answers in choosing the correct items for the repair and comprehension in the use of the different repair documentations	Week 5	15%
Written exam		Individual, no personal notes.	3	Accuracy of answers on techniques and methods to eliminate different types of corrosion	Week 10	15%
Written exam		Individual, no personal notes.	4	Accuracy of answer on methods of identifying, locating and evaluating different types of damage	Week 15	10%
Laboratory (60%)						
Metal assembly project		Individual with the help of an assembly plan	5	①	Week 6	15%
Treatment of a corroded plate		Individual using aeronautical documentation	6	②	Week 9	15%
Final Exam	Snag simulation using technical manual & corrosion treatment auto evaluation	Individual using aeronautical documentation	All	③	Week 14 (20%)	30%
	Damage analysis Q400	Individual using aeronautical documentation	All		Week 15 (10%)	
					TOTAL	100 %

- ① Riveting assembly of metal parts
 Understanding the application / project
 Respect of the procedure to follow
 Proper use of tooling
 Work planning
 Compliance with health and safety standards
 Cleanliness of work area on completion of task.
- ② Careful consultation of documentations
 Proper masking of the areas to protect them from the products
 Proper use of tools and equipment
 Respect of the procedure and the technique.
 Compliance with health and safety standards
 Cleanliness of work area on completion of task.
- ③ Careful consultation of the documentation
 Detection of damage caused by corrosion
 Identifying the location of a damage
 Accurate measurement of corrosion penetration depth
 Identifying if snag is repairable
 Choice of the technique and method according to the characteristics of the materials, the standards and the nature of the operations to be performed.
 Inspection of a repair
 Recording of results.

REQUIRED MATERIAL

In the lab, safety glasses, safety boots/shoes and overalls are obligatory.
Some exercises will require a mask.

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 minor repairs and inspection (280-2B5).

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.

REQUIREMENTS TO PASS THE COURSE

(1) Passing Mark

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

(2) Tardiness

Students who arrive late after the beginning of the first period of a course are considered absent for this period.

(3) Attendance for Summative Evaluations

Attendance at summative assessment activities is mandatory (PIEA article 5.2.5.1)

(4) Submitting Assignments

Homeworks required by a teacher must be submitted to the date, the place and time set. The penalties associated with delays are established according to departmental rules (PIEA, section 5.2.5.2).

In case of delay penalties are:

- See section « Règles des départements » at the following link:

<http://guideena-en.cegepmontpetit.ca/department-rules/>

(5) Presentation of Written Work

The student must meet the "Written Work Standard Presentation" adopted by the CEGEP. Non-compliance of these standards may delay the acceptance of the work or affect the rating granted. These standards are available in **Flash Links, Bibliothèques** under "**Méthodologie**" of the CEGEP Documentation Centers at: www.cegepmontpetit.ca/normes.

The **departmental penalties** for non-compliance with Written Work Standard Presentation (PIEA, article 5.3.2) are:

- See section « Règles des départements » at the following link:

<http://guideena-en.cegepmontpetit.ca/department-rules/>

OTHER DEPARTEMENTAL REGULATIONS

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

<http://guideena-en.cegepmontpetit.ca/department-rules/>

INSTITUTIONAL POLICIES AND REGULATIONS

All students enrolled in the École Nationale d'aérotechnique of Édouard-Montpetit CEGEP must be aware of and comply with the contents of institutional policies and regulations. In particular, the *Politique institutionnelle de la langue française (PILF)*, the *Politique pour un milieu d'études et de travail exempt de harcèlement et de violence (PPMÉTEHV)*, the conditions of admission and academic progress, the procedure dealing with student complaints within educational relations.

The complete version of these policies and regulations is available on the CEGEP website at the following address: <http://www.cegepmontpetit.ca/ipesa>

<http://www.cegepmontpetit.ca/ena/a-propos-de-l-ecole/reglements-et-politiques>. In case of discrepancy between the version appearing elsewhere and the complete version, the complete version will be applied and will be considered the official version for legal purposes.