

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

<u>Instructor(s)</u>	<u>Office</u>	<u>☎ extension</u>	<u>✉ e-mail or website</u>
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OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

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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.

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

025X To clean, inspect and protect aircraft materials

Activity Period: Week 1

THEME: Using Technical Manuals

Transport Canada Reference: Appendix C, part 2, (1.05, 4.05)

Learning Objective	Content	Personal Study Activities
1.1. Consult technical documentation.	<ul style="list-style-type: none"> ▪ Manufacturer's maintenance or service manual. ▪ ATA classification standards. ▪ AC 43-4A. ▪ Preventative inspection reports and follow-up reports of a given aircraft. 	<ul style="list-style-type: none"> ▪ Read course outline and rules.

Activity Period: Weeks 2 to 6

THEME: Inspection and Classification of Damage

Transport Canada Reference: Chapter 566.15 a) III, Appendix C, part 2 (1.04, 2.01, 3.05, 3.09, 7.03)

Learning Objective	Content	Personal Study Activities
2.1 Distinguish and identify materials that are being inspected or tested.	<ul style="list-style-type: none"> ▪ Identifying different materials used in aeronautics and their interrelation. 	<ul style="list-style-type: none"> ▪ Produce a summary of the concepts.
2.2 Tag signs of corrosion and defects.	<ul style="list-style-type: none"> ▪ Identifying types of corrosion, signs of fatigue and defects (e.g. small and large cracks, wear, etc.). 	<ul style="list-style-type: none"> ▪ Consult recommended readings.
2.3 Tag appropriate areas of corrosion and defects on an aircraft.	<ul style="list-style-type: none"> ▪ Distinguishing different types of corrosion and what causes them. ▪ Identifying problem areas according to the aircraft and the environment. 	<ul style="list-style-type: none"> ▪ Review personal notes.
2.4 Determine tolerances for damage caused by corrosion and 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 manufacturer's structural repair manual to verify whether the damage is minor. 	
2.5 Evaluate the damage.	<ul style="list-style-type: none"> ▪ Evaluating damage regarding tolerances, standards and specifications. 	
2.6 Record the results.	<ul style="list-style-type: none"> ▪ Recording inspection reports and follow-up. ▪ Using appropriate technical vocabulary. 	

Activity Period: Week 7 to 10

THEME: Prevention and Elimination of Corrosion

Transport Canada Reference: Ch. 566.13 a) (I, II), Ch. 566.17 a) (I, II, III), Appendix C, part 2, (1.04, 3.05, 3.09, 7.03, 7.04, 23.0.7)

Learning Objective	Content	Personal Study Activities
3.1 Distinguish techniques and methods of prevention and elimination of corrosion.	<ul style="list-style-type: none"> ▪ 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. 	<ul style="list-style-type: none"> ▪ Produce a summary of the concepts. ▪ Consult recommended readings. ▪ Review personal notes.
3.2 Select appropriate techniques and methods.	<ul style="list-style-type: none"> ▪ Making a choice according to: <ul style="list-style-type: none"> - characteristics of the material and damage; - standards and specifications; - the nature of the operations to carry out. 	
3.3 Select various sealing products.	<ul style="list-style-type: none"> ▪ Distinguishing sealants. ▪ Choosing a product according to the area where it will be applied. ▪ Operating instructions according to the products used. ▪ Respecting the expiration date of the products used. 	

025Z To prepare and assemble sheet metal

Activity Period: Weeks 11 to 14

THEME: Minor Repairs and Riveting

Transport Canada Reference: Ch. 566.13 b (III), Ch. 566.17 a) (II, IV, VI), Appendix C, part 2, (1.05, 2.0.1, 3.09, 7.0.1, 7.0.3, 21.04, 23.0.7)

Learning Objective	Content	Personal Study Activities
4.1 Interpreting correctly the instruction work to be achieved.	<ul style="list-style-type: none"> ▪ Work card ▪ Work sheet 	<ul style="list-style-type: none"> ▪ Produce a summary of the concepts. ▪ Consult recommended readings. ▪ Review personal notes.
4.2 In the structural repair manual, locate the nature and extent of work to be done	<ul style="list-style-type: none"> ▪ Structure of the structural repair manual and other pertinent information. 	
4.3 Plan a minor repair of a damaged part as authorized in the structural repair manual	<ul style="list-style-type: none"> ▪ Distinguishing between minor and major repairs. ▪ Procedures for making repairs: <ul style="list-style-type: none"> - polishing the damage - drilling stop holes - filling compound - reinforcing and plugging - protecting materials 	
4.4. Explain the use, the installation and the removal of aeronautical fasteners.	<ul style="list-style-type: none"> ▪ Hardware. ▪ Solid and blind rivets. 	
4.5. Apply the standards for positioning aeronautical fasteners.	<ul style="list-style-type: none"> ▪ Pitch, edge distance, spacing ▪ Riveting. 	

COURSE PLAN – PRACTICAL WORK (LABORATORY)

Activity Period: Weeks 1 and 2

THEME: Cleaning Aeronautical Parts

Learning Objective	Content	Personal Study Activities
1.1. Chose cleaning products according to the situation and the materials to be cleaned.	<ul style="list-style-type: none"> • Evaluating type of dirtiness • Product compliance according to compatibility with the materials. 	<ul style="list-style-type: none"> ▪ Any activity aimed at improving manual dexterity.
1.2. Apply safety regulations as well as environmental standards.	<ul style="list-style-type: none"> • Respecting regulations and instructions, applying methods of individual protection. • Respecting environmental standards according to the work situation. 	
1.3. Cover the areas to be protected.	<ul style="list-style-type: none"> • Appropriate use of masking tape and specific protection covers. 	
1.4. Plan and carry out cleaning operations according to the equipment and the materials to be cleaned.	<ul style="list-style-type: none"> • Appropriately choosing equipment according to its characteristics. • Planning and choosing the priority of operations according to the equipment chosen and the material to be cleaned. 	
1.5. Use tools and equipment.	<ul style="list-style-type: none"> • Using appropriate and safe methods. 	
1.6. Check the quality of work and assure that the aircraft is back in service.	<ul style="list-style-type: none"> • Professionalism. • Team work. • Ability to manage team work. • Checking complete shrinkage from masking. • Inspecting drainage openings. • Purging the system of fuel. 	

Activity Period: Weeks 3 to 6

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. 	
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 7 to 10

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.
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. 	<ul style="list-style-type: none"> ▪ Any activity aimed at improving manual dexterity.
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. 	

025Z To prepare and assemble sheet metal

Activity Period: Week 11 to 14

THEME: Minor Repairs and Riveting

Learning Objective	Content	Personal Study Activities
4.1. Correctly interpret the work instructions to be done.	<ul style="list-style-type: none"> • Work cards. • Work sheets. 	<ul style="list-style-type: none"> ▪ Any activity aimed at improving manual dexterity.
4.2. In the structural repair manual, locate the nature and the scope of the work to be done.	<ul style="list-style-type: none"> • Structure of the structural repair manual and other pertinent information. 	
4.3. Choose tools according to the repair to be done.	<ul style="list-style-type: none"> • 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. 	
4.4. Carry out minor damage repairs as authorized by the structural repair manual.	<ul style="list-style-type: none"> • Distinguishing minor and major repairs. • Procedures for making repairs: <ul style="list-style-type: none"> ▪ Polish damage; ▪ Drilling a stopping hole; ▪ Filling compound ▪ Reinforcement and plugging. ▪ Protecting the material. 	
4.5. Explain the use, the installation and the removal of aeronautical fasteners.	<ul style="list-style-type: none"> • Hardware. • Solid and blind rivets. 	
4.6. Apply standards for installing aeronautical fasteners.	<ul style="list-style-type: none"> • Pitch, edge distance, spacing. • Riveting. 	
4.7. Recognize health and safety risks.	<ul style="list-style-type: none"> • Safe handling. • Standards and instructions that apply to materials and tools. • Review of WHMIS. 	

SYNTHESIS OF SUMMATIVE EVALUATION METHODS

OPTION 1

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)
six 30-minute mini-tests	Individual	Technical Manuals	Every 2 weeks	6%
	Individual	Inspection and evaluation		10%
	Individual	Corrosion		12%
Written exam	Individual	Minor repairs and riveting	Week 15	12%

Sub-total : 40%

OPTION 2

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)
Written exam	Individual	Technical manuals / Inspection and evaluation	Weeks 1 to 5	15%
Written exam	Individual	Corrosion	Weeks 6 to 10	15%
Written exam	Individual	Minor repairs and riveting	Weeks 11 to 15	10%

Sub-total : 40%

SYNTHESIS OF SUMMATIVE EVALUATION METHODS OF PRACTICAL WORK

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 inspect and evaluate.	Individual: Select appropriate method and write a report.	Inspection, measuring and evaluation of damage	Week 6	20%
Treatment of a corroded plate in three stages.	Individual	Corrosion treatment	Week 10	15%
Final Exam	Various tasks and riveting aluminum sheets.	Minor repairs and riveting	Week 14	20%
	Riveting to make minor repairs.	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 centre on the College web site (<http://ww2.college-em.qc.ca/biblio/normes.pdf>) under the heading « **Aides à la recherche**.

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 bandsaw.
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 are obligatory.

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).

INSTITUTIONAL POLICIES AND REGULATIONS

All students enrolled at Collège 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.college-em.qc.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.college-em.qc.ca/>
<http://ena.college-em.qc.ca/etudiants-actuels/programmes-d-etudes/departements-d-enseignement#a2>