

Course outline

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|--------------------|---|-------------------|-------------------|
| 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@cegepmont |

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:

- 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 ».

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 maintain aircraft structures 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 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. AC 43-13 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 | Weeks 1 to 5 | 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 10 | 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. | |

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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, corrosion, Inspection methods, Abrasives and scellants | Weeks 1 to 15 | 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. | |

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|--|---|
| 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%

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).

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** ».

METHODS 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.

OTHER DEPARTMENTAL 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/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.