

COURSE OUTLINE

COURSE: Shaping, Assembly and Installation Techniques

PROGRAM: 280.C0 Aircraft Maintenance

DISCIPLINE: 280 Aeronautics

WEIGHTING: Theory: 2 Practice: 3 Personal Study: 1

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

OFFICE HOURS FOR STUDENTS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

Coordinators(s)	Office	☎ Extension	✉ e-mail or web site
Éric Goudreault	C-160	4691	eric.goudreault@cegepmontpetit.ca
Serge Rancourt	C-160	4664	serge.rancourt@cegepmontpetit.ca

CONTEXTE OF THIS COURSE IN THE PROGRAM

This course is given during the first semester of the program.

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

- dexterity with tools
- research skills using technical manuals
- familiarity with materials and hardware;
- the ability to make and install a conduit using appropriate tools and hardware.

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 ».

COMPETENCIES OF THE EXIT PROFILE (STUDENT SKILL PROFILES)

To master the aeronautic maintenance work techniques.

MINISTRY OBJECTIVE(S) AND COMPETENCIES

025Q To use shaping, assembly and installation techniques.

TERMINAL OBJECTIVE OF THE COURSE (FINAL COURSE OBJECTIVE)

- Make and install a conduit using appropriate tools and hardware.
- Shaping aluminum with precision.

TEACHING AND LEARNING STRATEGIES

- Exposure with or without audio-visual support
- Demonstration.
- Laboratory
- Operation test

COURSE PLAN – THEORY

Time Period:

WEEK 1

Learning Objectives:

- 1.1 Describe the role and responsibilities of an AMT.
- 1.2 Establish a safe work environment.
- 1.3 Use and conduct research using the required reference manuals.

Content :

- Present Course Outline
- Regulation references
- General safety
- Introduction to course "Shaping, Assembly and Installation Techniques".
- Specific chapters in the manuals

Activities for Personal Study:

- Read Course Outline and Course Policies
 - Purchase the required manual "A & P Technician General Textbook" from Coop
 - Read *A. & P. General*, 7.1 to 7.5.
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Time Period:

WEEK 2

Learning Objectives:

- 2.1 Establish health and safety rules.
- 2.2 Describe materials used in aeronautics.
- 2.3 Identify and describe measuring tools.

Content:

Introduction to WHMIS

Activities for Personal Study:

Read A & P Technician Airframe Textbook, 2.6 to 2.12.

Time Period :

WEEK 3, 4

Learning Objectives:

- 3.1 Describe hand tools.
- 3.2 Identify and describe manual workshop tools.
- 3.3 Identify and describe mechanical workshop equipment.
Marking tools; dry point compass, scribes, pencils, combination square set, dividers, punches, Vernier protractor.

Content :

- Marking tools; dry point compass, scribes, pencils, combination square set, dividers, punches, Vernier protractor
- Vices, clamps
- Files, hammers, center punches, mallets
- Sheet metal shears
- Drills, drill bits, deburring tools

Activities for Personal Study:

Read A & P Technician Airframe Textbook, 9.2 to 9.14

Course outline 280-1A5-EM: Shaping, Assembly and Installation Techniques

Time Period: **WEEK 5**

EXAM 1 hour Multiple choice and short answer/description exam.

Learning Objectives: 5.1 Describe, interpret and measure using measuring instruments.

Content : Content of week 1 to week 4

Activities for Personal Study: Read A & P Technician General Textbook, 9-14 to 9-20.

Time Period : **WEEK 6**

Learning Objectives : 6.1 Describe cutting tools.

6.2 Identify and describe manual workshop tools.

Content:

- Drills
- Drill bits
- Hole cutter
- Reamers
- Taps & dies

Activities for Personal Study: Read: A & P Technician General Textbook, Ch. 9.

Time Period: **WEEKS 7, 8, 9**

Learning Objectives: 7.1 Describe and use aircraft hardware.

Content :

- Thread type and fit
- Designation codes
- Standard aircraft bolts
- Drilled engine bolts
- Types of nuts
- Types of screws
- Types of pins
- Types of washers
- Heli-coil insert
- Torque wrenches

Activities for Personal Study: A & P Technician General Textbook, Ch.8-20 to 8-38

Time Period: **WEEK 10**

EXAM 2 hours Open book exam

Learning Objective: 10.1 Describe and codify hardware.

Content: Codification bolts, screws, nuts, washers. Taps.

Activities for Personal Study: A & P Technician General Textbook

Course outline 280-1A5-EM: Shaping, Assembly and Installation Techniques

Time Period: **WEEKS 11, 12, 13**

Learning objectives: 11.1 Describe workshop equipment for bending materials.
11.2 Tube forming.

Content:

- Tubing hardware (codification)
- Rigid tubing
- Flexible hoses.
- Single flaring
- Double flaring
- Flareless fittings

Activities for Personal Study: A & P Technician General Textbook,

Time Period: **WEEK 14**

Time Period: 13.1 Revision for the final exam.

Content: Content of week 1 to week 13

Activities for Personal Study: A & P Technician General Textbook,

Time Period: **WEEK 15**

EXAM 14.1 Multiple choice and short answer/description exam.

COURSE PLAN – PRACTICAL PART

Time Period: **WEEKS 1, 2**

Learning Objective 1:

- 1.1 Outline plan as a reference for the course.
- 1.2 General safety.
- 1.3 Explain filing metal using the appropriate tools.

Content:

- Introduction to the laboratory section of the course
- Project outline
- Square head
- Files
- Filing fuselage
- Filing engines

Time Period: **WEEKS 3, 4, 5, 6**

Learning Objective 2:

- 2.1 Explain measuring tools.
- 2.2 Explain sawing, cutting.

Content:

- Measuring thickness of metal
- Measuring length of metal
- Using band saw
- Fabricating fuselage, wing engines, vertical stab, horizontal stab

Time Period: **WEEKS 7, 8, 9**

Learning Objective 3:

- 3.1 Explain drilling and finishing holes.
- 3.2 Make threads.

Content:

- Drilling holes
- Tapping holes

Time Period: **WEEKS 10, 11, 12**

Learning Objective 4: 4.1 Explain and carry out installation of hardware.
4.2 Explain and carry out safety precautions on parts.

Content:

- Tool kit # 169
- Torque wrench
- Safety wire
- Cutter pin

Time Period: **WEEKS 13, 14**

Learning Objective 5: 5.1 Explain bending and flaring for rigid tubing.
5.2 Explain making a flexible hose.
5.3 Check rigid tube & flexible hose on test bench.

Content:

- Manual tube bending and flaring
- Mechanical tube bending and flaring
- Single flare & double flare
- Specialized tool kit

Time Period: **15**

Learning Objective 6: 8.1 Final assembly of aircraft.

SYNTHESIS OF SUMMATIVE EVALUATION METHODS

THEORY

Description of evaluation activity	Learning context and method of evaluation	Learning Objective(s)	Evaluation criterias	Due Date (date to turn in homework or exam date)	Weighting (%)
Multiple choice or short answer/description exam	In class, individually, closed book (no notes).	Content of Weeks 1 to 4	Given to students first week	Week 4	10%
Multiple choice or short answer/description exam	In class, individually, closed book (no notes).	Content of Weeks 4 to 10	Given to students first week	Week 10	10%
Multiple choice or short answer/description exam	In class, individually, closed book (no notes).	Content of Weeks 10 to 15	Given to students first week	Week15	20%

40%

PRACTICAL

Description of evaluation activity	Learning context and method of evaluation	Learning Objective(s)	Evaluation criterias	Due Date (date to turn in homework or exam date)	Weighting (%)
ENG. (Squared ends)	In the lab; individual	Content of Weeks 1 to 2	Given to students in lab	Week 2	4%
H-STAB SLIT (center) V-STAB (dimensions)	In the lab; individual	Content of Weeks 3 to 4		Week 4	4% 2% <u>4%</u> 10%
FUSELAGE (trim lines)	In the lab; individual	Content of Week 5		Week 5	2%
PROPS (dimensions)	In the lab; individual	Content of Week 6		Week 6	4%
HOLES LOCATION THREADS HOLES LOCATION THREADS	In the lab; individual	Content of Weeks 7 to 8		Week 8	4% 4% 2% <u>2%</u> 12%
HELICOIL WHEELS THREADS	In the lab; individual	Content of Week 9		Week 9	2% 4% <u>4%</u> 10%

Plan de cours 280-115-EM : Techniques de façonnage, d'assemblage et d'installation

Description of evaluation activity	Learning context and method of evaluation	Learning Objective(s)	Evaluation criterias	Due Date (date to turn in homework or exam date)	Weighting (%)
SAFETY WIRE COTER PIN	In the lab; individual	Content of Weeks 10 to 12		Week 12	3% <u>3%</u> 6%
RIGID TUBE : SINGLE FLARE DOUBLE FLARE LENGTH HIGHT FLEXIBLE HOSE : FITTINGS LENGTH	In the lab; individual	Content of Weeks 13 to 14	Given to students in lab	Week 15	2% 2% 2% 2% 2% <u>2%</u> 12%
Final assembly of aircraft	In the lab; individual	Content of Weeks 14 to 15		Week 15	

60%

Total: 100%

REQUIRED MATERIAL

- A & P Technician General Textbook.
- A & P Technician Airframe Textbook.

MEDIAGRAPHY

ÉTATS-UNIS, DEPARTMENT OF TRANSPORTATION. FEDERAL AVIATION ADMINISTRATION. *Acceptable methods, techniques and practices*; v.1: Aircraft inspection and repair, AC 43.13-1A, v. 2: Aircraft alterations, AC 43.13-2A, Washington, D.C. US Government Printing Office, 1977, 2 volumes.

CRANE, Dale. *Aircraft hydraulic systems*, Basin, Wyo., Aviation Maintenance Publishers, c 1975, 91 p.

FEMINIER, Didier. *Cellules et systèmes d'aéronefs*, Outremont, Modulo, c 1982, 315 p.

HURTS, Dale. *Aircraft Structural Technician*, 2002, Standard Aircraft Handbook, 5e édition.

LEAVELL, Stuart et Stanley BUNGAY. *Standard aircraft handbook*, 5d ed., édition Larry Reithmaier, Calif., Aero, 1991, 232 p.

MCNICKLE, L.S. *L'hydraulique simplifiée*, trad. par J. Faisan-dier, Paris, Dunod, c 1979, 215 p.

MERRILL, Samuel W. *Fluid Power for Aircraft; Modern Hydraulic Technology*, 3th ed., Peston, Ida., Intermountain Air Press, c 1974, 286 p.

SANDERSON, JEPPESON. *A & P Technician General Textbook*, Englewood, Co., 1996. *

SANDERSON, JEPPESON. *A & P Technician Airframe Textbook*, Englewood, Co., 1992.

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.