



COURSE OUTLINE

COURSE: **Shaping, Assembly and Installation Techniques**

PROGRAM: 280.C0 Aircraft Maintenance

DISCIPLINE: 280 Aeronautics

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

<u>Instructor(s)</u>	<u>Office</u>	<u>☎ Extension</u>	<u>✉ e-mail or web site</u>
Claude Plante	C-182	4216	claud.plante@college-em.qc.ca

OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

<u>Coordinators(s)</u>	<u>Office</u>	<u>☎ Extension</u>	<u>✉ e-mail or web site</u>
Pierre Ménard	C-160	4207	pierre.menard@college-em.qc.ca
Gérard Leblanc	C-182	4531	gerard.leblanc@college-em.qc.ca

COURSE CONTEXT

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.

MINISTRY OBJECTIVE(S) OR COMPETENCY(IES)

025Q To use shaping, assembly and installation techniques.

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.

TC (Appendix C, part 2, 1.0.2)

- Activities for Personal Study:**
- Read Course Outline and Course Policies
 - Purchase the two required manuals at the Co-op: "A & P Technician General Textbook" and "A & P Technician Airframe Textbook".
 - Read *A.&P. General*, 7.1 to 7.5.

Time Period: **WEEK 2**

- Learning Objectives:**
- 2.1 Establish health and safety rules
 - 2.2 Describe materials used in aeronautics

- Content:**
- Introduction to WHMIS
 - Document *Prévention, détection des risques*
 - Aluminum, steel, etc. sheet metal

- Activities for Personal Study:**
- Formative evaluation of 5 questions related to the document *Prévention, détection des risques*
 - Read A & P Technician Airframe Textbook, 2.6 à 2.12.

TC (Appendix C, part 2, 1.0.4, 566.13a) i, iii)

Time Period : **WEEK 3**

- Learning Objectives :**
- 3.1 Describe manufacturing procedures
 - 3.2 Identify terminology for bending
 - 3.3 Review trigonometry elements
 - 3.4 Describe material constraints related to bending
 - 3.5 Select fittings according to tubing being used
 - 3.6 Make a conduit

- Content :**
- Bending radius, radius allowance, bending angle, shrinkage (contraction?), K value
 - Consult applicable (appropriate?) manuals
 - Necessary calculations for forming tubes

- Activities for Personal Study:**
- Complete formative assignment on bending terms
 - Complete bending calculations for Project 3 in the laboratory

TC (Appendix C, part 2, 1.0.5, 2.0.1)

Time Period:	WEEK 4
Learning Objectives :	4.1 Describe workshop equipment for bending materials and adjusting them. 4.2 Identify trigonometric basics related to internal measurements
Content :	- Tube bending machine, one- and multiple-point line of sight, internal dimensions.
Activities for Personal Study:	- Finish formative work on multiple bending exercises

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 :	- Document " <i>Prévention, détection des risques</i> " - Aluminum, steel, etc. sheet metal
Activities for Personal Study :	- Read <u>A & P Technician General Textbook</u> , 9-32 to 9-40. - Formative homework assignment on vernier callipers and micrometers

Time Period :	WEEK 6
Learning Objectives :	6.1 Describe marking instruments 6.2 Identify and describe manual workshop tools 6.2 Identify and describe mechanical workshop equipment
Content:	- Marking tools : dry point compass, scribes, pencils, combination square, dividers, punches, vernier protractor, French curve, gap gauge - Vices, clamps - Files, hammers, center punches, tappets - Sheet metal shears - Drills, drilling jig, deburring tool
Activities for Personal Study :	- Formative evaluation on files - Prepare 10 questions and responses on content to be covered in the next class written on the board : files, hammers, center punches, tappets, sheet-metal shears, deburring tools, pneumatic drill, cutter, micro-fraisage, inflexion, bisautage. - Read : <u>A & P Technician General Textbook</u> , Ch. 9.

TC (Appendix C, part 2, 2.0.1)

Time Period :	WEEK 7
Learning Objectives :	7.1 Describe and use components of a bandsaw and of a manual saw.
Content :	<ul style="list-style-type: none">- Safety procedures using saws- Bandsaw and manual saw : safety procedures to take while using them.
Activities for Personal Study :	COOP Course Manual

Time Period :	WEEK 8
Learning Objective 1:	8.1 Describe and use the components of a drill press and explain how it is used.
Content:	<ul style="list-style-type: none">- Drill press.
Activities for Personal Study:	COOP Course Manual

Time Period:	WEEK 9
Learning Objectives:	<p>9.1 Describe the different types of finish for holes, boring, define limits of use and procedures for finishing holes.</p> <p>9.2 Identifier, tap and thread different types of threads and repair when possible.</p>
Content:	<ul style="list-style-type: none">- Boring- Tapping- Threading- Coarse and fine threads- Pitch of a thread- Dimensions- Threaded rings
Activities for Personal Study:	COOP Course Manual

Time Period :	WEEKS 10 and 11
EXAM 1 hour	Multiple choice and short answer/description exam. (Week 10)
Learning Objective:	10.1 Describe and codify hardware.
Content:	Bolts, screws, nuts, washers, taps
Activities for Personal Study:	COOP Course Manual

Time Period:	WEEK 12
Learning objectives :	11.1 Describe the components and use of a torque wrench and extensions 11.2 Identify and describe the installation of cotter pins and safety wire.
Content:	- Torque wrench - Cotter pins and safety wire
Activities for Personal Study:	COOP Course Manual

Time Period:	WEEK 13
Learning Objective :	12.1 Install aeronautical components as well as tubing to conform to standards.
Content:	- Standards and specifications of procedures related to assembly. - Select adequate torque
Activities for Personal Study:	- COOP Course Manual

Time Period:	WEEK 14
Time Period:	13.1 Making a joint.
Content:	- Use different techniques : with flare, without flare, fastening. - Respect standards and specifications
Activities for Personal Study:	- COOP Course Manual

TC (Appendix C, part 2, 16.0.2)

Time Period:	WEEK 15
EXAM	14.1 Multiple choice and short answer/description exam.

COURSE PLAN – PRACTICAL PART

Time Period: **WEEK 1**

Learning Objective 1:

- 1.1 Outline plan as a reference for the course.
- 1.2 Identify measuring tools
- 1.3 Measure various assembly elements using the appropriate measuring tools

Content:

- Introduction to the laboratory section of the course
- Workshop tools
- Specialized tools
- Project outline

Time Period: **WEEKS 2, 3**

Learning Objective 2:

- 2.1 Explain bending and flaring for rigid tubing.
- 2.2 Make a rigid (stiff) tube.

Content:

- Manual tube bending and flaring
- Mechanical tube bending and flaring
- Specialized tool kit

Time Period: **WEEK 4**

Learning Objective 2:

- 3.1 Make a flexible conduit.
- 3.2 Check flexible conduit on the test bench.

Content:

- Mechanical and manual bending
- Simple flare.
- Specialized tools.

Time Period: **WEEKS 5 to 9**

Learning Objective 3: Explain sawing, drilling and finishing holes for your course project.

Content:

- 4.1 Cutting sheets and drilling.
- 4.2 Conical (tapered) and cylindrical tapping, definition.
- 4.3 Boring.

Time Period: **WEEKS 10 and 11**

Learning Objective 4: 5.1 Explain and carry out installation hardware installation.

Content:

- Toolkit No 169.

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

Time Period: **WEEKS 12 and 13**

Learning Objective 5: 6.1 Explain and carry out safety precautions on the part.

Content: - Toolkit No 169: safety wire, cotter pin, torque wrenche

Time Period: **WEEK 14**

Learning Objective 6: 7.1 Finalize project work and prepare for final exam.

Content: - Toolkit No 169.

Time Period: **15**

Learning Objective 7: 8.1 Final Exam

SYNTHESIS OF SUMMATIVE EVALUATION METHODS

THEORETICAL PART

Description of evaluation activity	Context	Learning Objective(s)	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	Week 4	15%
Multiple choice or short answer/description exam	In class, individually, closed book (no notes).	Content of Weeks 4 to 10	Week 10	15%
Multiple choice or short answer/description exam	In class, individually, closed book (no notes).	Content of Weeks 10 to 15	Week15	10%

40%

PRACTICAL PART

Description of evaluation activity	Context	Learning Objective(s)	Due Date (date to turn in homework or exam date)	Weighting (%)
Short practical test : Tube No. 1.	In the lab; individual	Content of Weeks 1 to 4	Week 4	10%
Short practical exam: "Hole inspection"	In the lab; individual	Content of Weeks 4 to 10	Week 10	20%
Project 1: "Hardware installation"	In the lab; individual	Content of Weeks 10 to 12	Week 12	10%
Project 2: "Assembly safety"	In the lab; individual	Content of Weeks 12 to 14	Week 14	5%
Final exam	In the lab; individual	Content of Weeks 1 to 15	Week 15	15%

60%

Total : 100%

REQUIREMENTS TO PASS THE COURSE

(1) Passing Mark

The passing mark for this course is 60%.

(2) Presence at Summative Evaluations

Presence is required at summative evaluations.

(3) Submitting Assignments

Assignments must be submitted by the date, place and time determined by the instructor. Any assignment submitted after the due date will be penalized 10% per day for each day it is late up to a week. After one week, the assignment will receive a zero (0) unless other arrangements have been made with the instructor.

(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** »

CLASS PARTICIPATION EXPECTATIONS

- Food and drinks are prohibited in the laboratory.
- For laboratories in the A, B and D wings on the ground floor as well as Room A-21, safety shoes or boots and ENA overalls or labcoat are obligatory; you must also have a pair of safety glasses at hand to be used whenever needed.

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. *

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: www.college-em.qc.ca. 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 the specific regulations for this course:

www.college-em.qc.ca/ena/preenvol/reglements