

## COURSE OUTLINE

**COURSE:** Aircraft Instrumentation

**PROGRAM:** 280.C0 Aircraft Maintenance Technology

**DISCIPLINE :** 280 Aeronautics

**WEIGHTING:** Theory: 3                      Practical Work: 2                      Personal Study: 2

Teacher(s)	Office	☎ Extension	✉ e-mail or web site
Roger D. Leblanc	C-182	4750	<a href="mailto:rogerd.leblanc@cegepmontpetit.ca">rogerd.leblanc@cegepmontpetit.ca</a>
Jean-François Ducharme	C-182	4761	<a href="mailto:jf.ducharme@cegepmontpetit.ca">jf.ducharme@cegepmontpetit.ca</a>

### OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					
Other					

Coordinator(s)	Office	☎ extension	✉ e-mail
Éric Goudreault	C-160	4691	<a href="mailto:eric.goudreault@cegepmontpetit.ca">eric.goudreault@cegepmontpetit.ca</a>
Stéphanie Arpin	C-160	4630	<a href="mailto:stephanie.arpin@cegepmontpetit.ca">stephanie.arpin@cegepmontpetit.ca</a>

## CONTEXT OF THIS COURSE IN THE PROGRAM

This course is offered during the fourth session of the program. It is intended for future Category M Aircraft Maintenance Engineers (AME). The objective is to enable them to diagnose and determine appropriate maintenance intervention for various aircraft instruments. In order to do this, they must know the terminology, their roles and operating principles. They must also be able to interpret the technical documentation provided by aircraft manufacturers.

This course presents a relatively complete overview of all types of instruments found onboard an aircraft. 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.

## COMPETENCIES OF THE EXIT PROFILE (STUDENT SKILL PROFILES)

Perform maintenance of aircraft systems.

## MINISTERIAL OBJECTIVE(S) AND COMPETENCIES

**0263** Verify the operation of simple alternating-current circuits on an aircraft.

**0265** Verify communications, navigation and instrumentation systems.

## TERMINAL OBJECTIVE OF THE COURSE (FINAL COURSE OBJECTIVE)

At the end of the course, the student will be capable of performing functional tests, recognized and troubleshoot deviations from manufacturers or Transport Canada and to certify the operation of various navigations instruments.

## TEACHING AND LEARNING STRATEGIES

### THEORY:

Synchron video presentation with Zoom. All theory classes will be conducted via Zoom. Teachers' availability periods and questions from the students can be conducted on the Zoom platform, via MIO or by phone. The theory exams will be in presence at ÉNA in accordance with the COVID-19 safety measures.

A Zoom link will be forwarded to students using LÉA prior to each class.

### LABORATORY:

Students will perform various inspection activities of aircraft and test/certification instruments in teams of two to four. There is eight (8) labs all together.

- Weeks 1 and 2 the teacher will demonstrate various test benches and safety information for the first 4 labs.
- The following weeks the students will perform each lab activities in teams, in rotation, so that the first 4 labs will be completed after 4 weeks leading to the first exam on week 7.
- The same process will be performed for the second part of the session with labs 5, 6, 7 and 8. This brings the final exam on week 14.
- The teams may be changed after the first 4 labs at the teacher's discretion.
- The exercises are performed using the manuals available in the laboratory.

- The laboratory manuals may include:
  - excerpts from CAR standards
  - excerpts from aircraft maintenance manuals
  - manuals of components
  - procedural manuals for use of test equipment
- For each exercise, students will need to complete the data sheets included in the laboratory course notes.
- The information students record in their course notes will serve as a study guide for the two exams which are individual and open books format.

## COURSE PLAN

### LEARNING OBJECTIVES

<ol style="list-style-type: none"> <li>1. Conduct functional checks on aircraft instruments</li> <li>2. Troubleshoot and diagnostic flights instruments.</li> <li>3. Perform operating certification on various flight instruments.</li> </ol>
--

### THEORY:

WEEK	# OBJECTIVE	CONTENT	MODE OF INSTRUCTION AND LEARNING ACTIVITIES	TECHNOLOGICAL TOOLS AND RESOURCES (URL address)
1	1, 3	Introduction, elements and characteristic of an instrument and types of errors.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
2	1, 3	Mechanical and electro-mechanical instruments, LCD, LED, Synchro transmission and basic T configuration.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
3	1, 3	Standard atmosphere, pitot static instruments system and aircraft pressurisation.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
4	1, 3	Magnetic compass, proprieties of a gyroscope and source of power for gyroscopes.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
5	1, 3	<b>Exam 1</b>	<b>In presence at ÉNA</b>	

6	1, 3	Gyroscopic instruments (cont.), Inertia Navigation System, and gyro lasers.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
7	1, 3	Measure of temperature, pressure and fuel quantity, tachometers, fuel flow, torque meters, EPR, vibration analysis, AOA and stall protections.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
8	1, 3	Lesson 7 continuation.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
9	1, 3	EICAS, ECAM and Maintenance Diagnostic System.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
10	1, 3	<b>Exam 2</b>	<b>In presence at ÉNA</b>	
11	1, 3	ADF, VOR, DME, ILS, Radio altimeters, INS, GPS	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
12	1, 3	Lesson 11 continuation.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
13	1, 3	Flight Director, Auto Pilot and RNAV.	Synchron Video conference on Zoom platform	Will be forwarded to student via LÉA prior to each lesson
14	1, 3	<b>Final Exam</b>	<b>In presence at ÉNA</b>	

**COURSE PLAN – PRACTICAL WORK (LABORATORY)**

WEEK	# OBJECTIVE	CONTENT	MODE OF INSTRUCTION AND LEARNING ACTIVITIES	TECHNOLOGICAL TOOLS AND RESOURCES (URL address)
1		Presentation of Course outline, briefing lab 1	Performed by teacher	
2		Briefing lab 2, 3, and 4.	Performed by teacher	
3	1, 2	Conduct first 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.
4	1, 2	Conduct first 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.

5	1, 2	Conduct first 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.
6	1, 2	Conduct first 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.
7	1, 2	<b>Exam 1</b>	<b>In presence at ÉNA</b>	
8		Briefing lab 5 and 6.	Performed by teacher	
9		Briefing lab 7 and 8.	Performed by teacher	
10	1, 2	Conduct last 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.
11	1, 2	Conduct last 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.
12	1, 2	Conduct last 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.
13	1, 2	Conduct last 4 labs in team, in rotation.	See <b>TEACHING AND LEARNING STRATEGIES</b> on page 2.	Manufacturers test booklets via LÉA platform.
14	1, 2	<b>Exam 2</b>	<b>In presence at ÉNA</b>	

## SYNTHESIS OF SUMMATIVE EVALUATION METHODS

### THEORY

Description of evaluation activity	Context	Learning objective(s)	Due date (approximate date assignment due or exam given)	Weighting (%)
Multiple choice and short answer exam	Individual	1, 3	Week 5	15%
Multiple choice and short answer exam	Individual	1, 3	Week 10	15%
Multiple choice and short answer exam	Individual	1, 3	Week 14	30%

**Sub-total : 60%**

**LABORATORY**

Evaluation Activity	Context	Learning Objective	Evaluation Period	Weighting %
Exam 1.	Essay exam. Individual.	1, 2	Week 7	20%
Exam 2.	Essay exam. Individual.	1, 2	Week 14	20%

**Sub-total : 40%**

**REQUIRED MATERIAL**

Course notes in laboratory and study documents (available on LÉA) for theory.

**MEDIAGRAPHY**

- ASH Georges et collaborateurs, Les capteurs en instrumentation industrielle, Éditeur Dunod, 1983. 620.0044 A 812 C 1983
- Aviation Technician Training Series, Avionics Fundamentals, Éditeur I.A.P. 1987.
- CHAPPUY J.P. : Grégori J.P. Instruments de bord, Éditeur Paris, Institut Aéronautique Jean Mermoz, 1978. 629.135 C 4671 1978
- Tome 1 : mesure de vitesse, incidence, température, dispositifs de sécurité, compas de navigation, contrôle moteurs.
- Tome 2 : équipements électroniques.
- Tome 3 : instruments gyroscopiques, altimètre, variomètre, compas magnétique.
- CRANE Dale, Aircraft Instruments Systems, Éditeur Aviation Maintenance Publishers Inc. 629.135 C 891a
- Orford Air Training School, Navigation aérienne. Les aides radio, Éditeur Modulo. P 629.1351 098 r 4Fq
- Oxford Air Training School, Navigation aérienne, Instruments de bord, Québec, Ministère de l'éducation, SGME 1981. 629.1352 098 i Fq.
- PALLETT EHJ, Automatic Flight Control, Éditeur Granada, Toronto, 1983. 629.1352 p 166 1983
- PALLETT EHJ, Aircraft Instruments, Éditeur Pitman Publishing Limited, 629.135 p 1662 Édition 1972-79, 629.135 p 1662 Édition 1981.
- PALLETT EHJ, Aircraft Instruments and Integrated System, édition Longman Scientific & Technical, 1992.629.135 P 166 ai
- POWELL J, Aircraft Radio Systems, Éditeur Pitman Publishing Limited, 1981. 629.135 p 8843
- R. Galan, Avionique 2002, Éditeur : Institut Aéronautique Jean Mermoz, 1993 629.1355G146
- Transports Canada, Règlement de l'aviation canadien (RAC 523, 525, 571, 605-625
- Jeppesen, Avionics Fundamentals. Éditeur : Sanderson Training Products. 629.135A958

**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 in the following manner:

**(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**”.

**METHODS OF COURSE PARTICIPATION**

All theory classes will be conducted via Zoom. Teachers' availability periods and questions from the students can be conducted on the Zoom platform, via MIO or by phone. The theory exams will be in presence at ÉNA.

All laboratory classes and exams will take place at ÉNA.

By attending online classes through videoconference technology, the student understands that his image and voice may be captured on video in the context of his courses and agrees to this. Videos are only visible during live classes and by the teacher and other participants exclusively.

For pedagogical reasons, some courses may be recorded. It is the teacher's responsibility to clearly inform students beforehand when their images and voices are to be captured on video . Any student opposed to his image and/or voice being recorded may turn off his camera and microphone but will be required to participate in writing through means established by the teacher. Otherwise, students who activate their cameras or their microphones are deemed to have agreed to their images and voices being taped. These recordings of courses will be available for the express and sole use of those students registered in the courses for the duration of the semester. It is strictly forbidden to broadcast these recordings in any public manner or to use them other than for pedagogical purposes.

No student may record an online course without prior consent from the teacher. Students whose personal information (voices and images) is captured on video may exercise such remedies as provided by the right to access records and the right of rectification per the Act respecting access to documents held by public bodies and the protection of personal information through the Cegep's Secretary General's Office.

**OTHER DEPARTMENTAL REGULATIONS**

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

<http://www.college-em.qc.ca/>  
[www.college-em.qc.ca/ena/preenvol/reglements](http://www.college-em.qc.ca/ena/preenvol/reglements)

**NOTE:** This Course Outline is a translation of the *Plan de cours* for 280-605-EM: *Instrumentation d'aéronefs*. If there is a disparity, then the original French version will be considered the official version for legal purposes.

**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](http://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.

### **STUDENT ACCESSIBILITY CENTER - FOR STUDENTS WITH DISABILITIES**

Students having received a professional diagnosis of impairment (motor skills, neurological, organic, sensory, learning difficulties, mental health, autism spectrum disorder or other) or suffering from a temporary medical condition may request special accommodations.

Students seeking these accommodations must forward their diagnosis to the CSA by either MIO to « Service, CSA-ENA » or email to « [servicesadaptesena@cegepmontpetit.ca](mailto:servicesadaptesena@cegepmontpetit.ca) ».

Students already registered with the CSA must communicate with their teachers at the beginning of the semester to discuss those accommodations they have been awarded by the CSA.