

Course Outline

COURS : Avionics Maintenance

PROGRAMME : 280.C0 Aircraft Maintenance Technology

DISCIPLINE : 280 Aéronautique

WEIGHTING: Theory : 0 Practice : 3 Personal study : 1

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Office hours

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					
Others					

Coordinator(s)	Office	☎ extension	✉ email
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1. CONTEXT OF THIS COURSE IN THE PROGRAM

This course is offered in the program's fifth semester. It is assumed that students who enroll in the course have passed the courses in their preceding semesters, 280-3D4-EM « DC avionics systems », AC Avionics (280-4A4) and 280-5B3-EM « Radio systems ». Students who do not meet these conditions may still enroll in the course, however the Avionics Department believes that these students will find it more difficult to pass the course.

In addition, students should have acquired the restricted radio operator certificate to be able to test onboard radio systems. Students not having the restricted radio operator license will not be able to perform some of the activities thereby resulting in a penalty in the assessment.

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

- The ability to perform installation and repair on aircraft AC and DC electric distribution and generation systems.
- The ability to diagnose and fix basic problems on aircraft AC and DC power distribution and generation systems.

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) according to Transport Canada requirements. The application of Transport Canada policies regarding absences is available on the [Student Guide](#) website under the heading « Information/AME and AML licences ».

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2. COMPETENCIES OF THE EXIT PROFILE (STUDENT SKILL PROFILES)

Check the operation, perform the maintenance and repair of electrical systems.

3. MINISTERIAL OBJECTIVE(S) AND COMPETENCIES

025T	Perform maintenance of DC circuits on an aircraft.
0263	Check the operation of simple AC circuits on an aircraft.

4. TERMINAL OBJECTIVE OF THE COURSE (FINAL COURSE OBJECTIVE)

At the end of this course, students will be able to maintain and troubleshoot simple avionic system on aircraft.

5. TEACHING AND LEARNING STRATEGIES

1. Repair and replace wires and terminals by completing the transmission of information.
2. Diagnose anomalies following audits of DC and AC power generation and distribution systems on an aircraft that will lead to the replacement of the modular unit while transmitting information.
3. Perform electrical motor maintenance and information transmission.

6. COURSE PLAN

Week	Mode of operation			TECHNOLOGY RESOURCES AND TOOLS (URL Link)
	Objective	Content	Learning activities	
1	Course introduction	<ul style="list-style-type: none"> • Presentation of the course outline. • Reminder of health and safety in Laboratories and hangars. • Reminder of the 12 human factors in aviation. • Use of manuals from the manufacturer. • Drafting of the work cards. • Reminder on AC and DC GPU's connection. • Introduction to the realization of the different types of crimping and harness. 	<ul style="list-style-type: none"> • Didactic presentations • Interactive activities • Formative diagnostic test 	<ul style="list-style-type: none"> • Reference documents on Léa.
2	Repair and replace wires and terminals by completing the transmission of information .	<ul style="list-style-type: none"> • Description of wire identification, use of wire marking, stripping and crimping tools. • Using the documentation provided by the tools and connectors manufacturers. • Respect of the required regulatory. • Calibration of tools verification. • Wire marking and identification in accordance with the applicable standards. • Realization of a harness with connectors and lugs following an installation document. • Installation of shielded wire using solder sleeves. • Secure wires to the harness by lacing techniques using plastic ties and lacing cord. • Inspection of harness connectors crimping. • Explanations on contacts common problems. • Harness installation in an aircraft and use of appropriate fasteners. • Final inspection of the harness on the structure. 	<ul style="list-style-type: none"> • Convenient handling of avionics assemblies. 	<ul style="list-style-type: none"> • Reference documents on Léa. • AC.43.13 • CASA AC21-99 • ESPM - ATA 20 • OHS Rules.
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7	Harness construction and inspection of avionics assembly handling. (32%)	Individual assessment of work performed: <ul style="list-style-type: none"> • Identification and respect of wire dimensions. • Crimping. • Thermal sleeves. • Mounting the harness. • Compliance with OHS rules. 		<ul style="list-style-type: none"> • Reference documents on Léa. • AC.43.13 • CASA AC21-99 • ESPM - ATA 20 • OHS Rules.
8	Diagnose anomalies following audits of DC and AC power generation and distribution systems on an aircraft that will lead to the replacement of the modular unit while transmitting information.	<ul style="list-style-type: none"> • Find the correct procedure in the manufacturer's technical documentation. • Check operation of AC secondary circuit(s). 	<ul style="list-style-type: none"> • Taking measurements on an AC electrical circuit. • Electrical schematic analysis. • Formative evaluation of failure analysis. 	<ul style="list-style-type: none"> • Reference documents on Léa. • Documentation applicable to the aircraft being serviced. • OHS Rules.
Weeks 9 to 14 will be held in rotation in teams of 2.				
9	Diagnose anomalies following audits of DC and AC power generation and distribution systems on an aircraft that will lead to the replacement of the modular unit while transmitting information.	Check the operation of indicating system. (Lab #1 in rotation) <ul style="list-style-type: none"> • Search the appropriate circuits involved in the technical documentation. • Locate the components and circuits involved on the aircraft. • Verify the operation in accordance with the procedures in the maintenance manual. • Open access panels or clear access to the components in question; If necessary, drafting of new work cards work. • Closure of the work cards open in relation to the work performed. 	<ul style="list-style-type: none"> • Taking measurements on an AC electrical circuit. • Electrical schematic analysis. 	<ul style="list-style-type: none"> • Reference documents on Léa. • Documentation applicable to the aircraft being serviced. • OHS Rules.
10		Troubleshooting of DC system. (Lab #2 in rotation) <ul style="list-style-type: none"> • Perform work card instructions related to the failure of the aircraft DC generation and distribution electric system. • Search for the appropriate technical documentation. • Locate the components and circuits involved on the aircraft. • Develop a measurement and troubleshooting strategy. • Open access panels or clear access to the components in question; If necessary, drafting of new work cards work 		

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		<ul style="list-style-type: none"> • Perform the tests and measurements leading to the resolution of the problems. • Identify the cause of the problems. • Verification of the circuits in question by functional tests. • Closure of the work cards open in relation to the work performed. 		
11		<p>Troubleshooting of secondary AC system from a primary DC generation aircraft. (Lab #3 in rotation)</p> <ul style="list-style-type: none"> • Prise en charge d'une carte de travail (NRWC) relative to une panne over le système de génération et de distribution électrique AC d'un aéronef primaire DC. • Search for the appropriate technical documentation. • Locate the components and circuits involved on the aircraft. • A strategy of measurement and troubleshooting. • Open access panels or clear access to the components in question; If necessary, drafting of new work cards work • Perform the tests and measurements leading to the resolution of the problems. • Identify the cause of the problems. • Verification of the circuits in question by functional tests which may include a ground run. • Closure of the work cards open in relation to the work performed. 	<ul style="list-style-type: none"> • Taking measurements on an AC electrical circuit. • Electrical schematic analysis. 	<ul style="list-style-type: none"> • Reference documents on Léa. • Documentation applicable to the aircraft being serviced. • OHS Rules.
12	Perform repair and replacement of wires and terminals by completing with the transmission of information.	<p>Repair and/or installation of wires, terminals, connectors on an aircraft. (Lab #4 in rotation)</p> <ul style="list-style-type: none"> • Identification of the work to be performed. • Opening a work card. • Determine the sequence of work. • Search for the appropriate technical documentation. • Perform tasks. • Visual inspection of the installation or repair. • Functional check of the circuits installed or repaired. • Closure of the work card. 	<ul style="list-style-type: none"> • Practical handling of avionics assemblies. 	<ul style="list-style-type: none"> • Reference documents on Léa. • AC.43.13 • CASA AC21-99 • ESPM - ATA 20 • OHS Rules.
13		<p>Electrical wiring repair as per aeronautical documentation. (Lab #5 in rotation)</p>	<ul style="list-style-type: none"> • Practical handling of avionics assemblies. 	<ul style="list-style-type: none"> • Reference documents on Léa.

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Course outline 280-6A3-EM : Avionics Maintenance

		<ul style="list-style-type: none"> • Perform work card instructions related to the failure of the test of an aircraft's anti-ice system. • Search for the appropriate technical documentation. • Identify the location of the LRU to test • Perform a functional test of the LRU. • Closure of the work cards open in relation to the work performed. 		<ul style="list-style-type: none"> • AC.43.13 • CASA AC21-99 • ESPM - ATA 20 • OHS Rules.
14	Carry out the maintenance of an electric motor and the transmission of information.	<p>Maintenance of a DC Starter-generator. (Lab #6 in rotation)</p> <ul style="list-style-type: none"> • Research of the maintenance in the manufacturer's documentation (CMM-Component Maintenance Manual, Falcon 20). • Work card completion. • Inspection and maintenance in accordance with the manufacturer specifications. • Complete the work card as well as an authorized release certificate card « Form One ». 	<ul style="list-style-type: none"> • Physical installation and removal of a starter-generator. 	<ul style="list-style-type: none"> • Reference documents on Léa. • Documentation applicable to the aircraft being serviced. • OHS Rules.
15 (EC)	Theoretical examination on avionics in industry. (32%)	<p>Individual written assessment summary.</p> <ul style="list-style-type: none"> • Understanding of the various avionics tools and their use. • Understanding of different avionics components and their uses. • Understanding of different avionics tasks in industries. • Be able to diagnose system status. 		<ul style="list-style-type: none"> • Reference document provided for the exam.

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7. SYNTHESIS OF SOMMATIVE EVALUATION METHODS

Due date	Description of Evaluation Activity	Context	Learning objective(s)	Evaluation Criteria	Weighting (%)
Week 7	Harness Evaluation Harness construction and inspection of avionics assembly handling.	✓ Individual assessment of work performed.	1.	<ul style="list-style-type: none"> - Recognition and respect of the wire length. - Crimping. - Solder sleeves. - Harness fabrication. - Compliance with OHS rules. 	32%
Weeks 9 à 14	Laboratory #1 Checking the operation of an indication system.	✓ Delivery of the mandatory preparation at the beginning of the session.	2.	<ul style="list-style-type: none"> - Taking measurements on an AC electrical circuit. - Electrical schematic analysis. - Adequate documentation of information. - Compliance with OHS rules. 	6%
	Laboratory #2 Troubleshooting of DC electrical systems.	✓ Handover of the lab book as a team at the end of each session.			6%
	Laboratory #3 Troubleshooting of AC secondary generation systems of a DC primary electric generation aircraft.	✓ Practical work on aircraft.			6%
	Laboratory #4 Repair and/or installation of wires, terminals, connectors on an aircraft.	<ul style="list-style-type: none"> ✓ Delivery of the mandatory preparation at the beginning of the session. ✓ Handover of the lab book as a team at the end of each session. 	1.	<ul style="list-style-type: none"> - Practical handling of avionics assemblies. - Adequate documentation of information. - Compliance with OHS rules. 	6%
	Laboratory #5 Electrical wiring repair according to aeronautical standards.	✓ Practical work on aircraft.			6%
	Laboratory #6 Maintenance of a starter-generator DC.	<ul style="list-style-type: none"> ✓ Delivery of the mandatory preparation at the beginning of the session. ✓ Handover of the lab book as a team at the end of each session. ✓ Practical work on aircraft. 	3.	<ul style="list-style-type: none"> - Compliance with applicable rules. - Compliance with OHS rules. - Adequate documentation of information. 	6%
Week 15	Examen final Examen théorique sur la pratique avionique en industrie	✓ Individual written assessment in the form of scenarios	1.-2.-3.	<ul style="list-style-type: none"> - Understanding of different avionics tools and their use. - Understanding of different avionics components and their uses. - Understanding of different avionics tasks in industries. - Be able to diagnose system status. 	32%

TOTAL : **100%**

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Extracurricular activities of an aeronautical nature.

In order to increase their knowledge of the aviation environment, the Avionics Department strongly advises students to actively participate in the development as well as to take part in any extracurricular activities of an aeronautical nature such as visits (industries, operators, airports, air traffic management, military bases, museums, theme parks, etc.), conferences or events organized both within and outside the National School of Aeronautics.

8. REQUIRED MATERIAL

- Clothing and safety equipment according to ÉNA rules.
- Lab workbook and presentations (available on the intranet).
- Additional manufacturer documents (available on intranet and Internet).

Students must attend classes with the required documents.

Students must wear safety glasses, safety shoes and approved clothing for all laboratory activities.

No mandatory manual.

9. MEDIAGRAPHY

Students should consult extensively the technical manuals of aircraft studied in progress or on which they must work in the laboratory.

EISMIN, THOMAS K. – Aircraft Electricity & Electronics, Fifth Edition, Glencoe, 1997.

10. REQUIREMENTS TO PASS THE COURSE

1. Passing Mark

The passing mark for this course is 60% by adding the marks for the theory and practical work for the course.

2. Attendance for Summative Evaluations

Presence at exams is obligatory. Any absence from an evaluation activity which is not justified by a serious reason will mean a mark of zero and failure of this evaluation. According to article 5.2.5.1 of the *Institutional Policy on the Evaluation of Student Achievement* (IPESA). *“it is the student’s responsibility to take the necessary means to meet his teacher and explain the motives for his absence with a supporting document explaining his absence. If the motives are serious and recognized as such by the teacher, the teacher and the student will agree to the terms of the delay for doing the evaluation or assignment.”*

In addition, the IPESA indicates that *“if a student is late for an evaluation activity with no justifiable reason, the teacher can refuse to allow the student to participate in the said activity.”*

Serious reasons that can be considered are: illness (with a medical certificate), death of a family member (with a death certificate), a force majeure or overpowering event, activities authorized by the College, and legal reason (proof of the court summons).

3. Submitting Assignments

All assignments must be submitted by the date, time and place designated by the teacher (s). Unless there is an agreement with the teacher, late assignments are penalized by the deduction of 10% per day, and a mark of zero will be given when the assignment is six days late. Any assignments due in the fifteenth week cannot be submitted late.

4. Presentation of Written Work

The teacher (s) will provide students with information and guidelines regarding the presentation of written work. When the presentation of an assignment is judged unacceptable, the work will be penalized as a late assignment until an acceptable version is submitted. In this case, the penalties for late work will be applied.

Students must follow the standards adopted by the Cégep for written work (« *Normes de présentation matérielle des travaux écrits* »). These can be found at : <http://rmsh.cegepmontpetit.ca/normes-de-presentation-materielle-des-travaux-ecrits-du-cegep/>.

5. Plagiarism and other breaches of academic integrity

- a) Plagiarism consists of copying, translating, paraphrasing, in whole or in part, the work of another person and wrongfully attributing it to oneself, with or without their consent, and constitutes a breach of academic integrity.
- b) The use of works generated entirely or partially by artificial intelligence, if not authorized by the professor, is also considered a breach of academic integrity.
- c) Acts of fraud, such as impersonating another student during a summative assessment, deceiving, cheating, or falsifying documents or results, also constitute breaches of academic integrity.
- d) Any collaboration in such acts or any attempt to commit them is also considered a breach of intellectual ethics.

Any violation of intellectual honesty, as well as any attempt at or collaboration in such an action will result in a mark of “0” for the exam, the assignment or the evaluation activity in question. In this case, the teacher will make a written report to departmental coordination which will be transmitted to the Dean of Studies in accordance with article 5.6.1 IPESA.

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11. METHODS OF COURSE PARTICIPATION

Accident prevention is the responsibility of each and every individual. We invite you to familiarize yourself with all health and safety measures at <https://mareussite.cegepmontpetit.ca/ena/mes-outils/sante-et-securite/>.

Bringing food or beverages into the laboratories is strictly prohibited.

Attire worn by students in laboratories and workshops must feature the ÉNA logo. The use of hooded sweatshirts with drawstrings is not permitted due to safety risks when using equipment or machinery. ÉNA-branded clothing is available for purchase at the ÉNA Coop (room C163-A).

Authorized pants include work pants or jeans without any decorations (nails, metal parts, etc.).

Personal Protective Equipment (PPE) is essential for the safety of students and is mandatory in laboratories, workshops, and hangars. This includes wearing safety footwear (boots or shoes) and safety glasses. Protective clothing such as lab coats or uniforms is only necessary when required.

12. OTHER DEPARTMENTAL REGULATION

Students are invited to consult the website for the specific rules for this course:

<https://guideena-en.cegepmontpetit.ca/departement-rules/>

13. INSTITUTIONAL POLICIES AND REGULATION

Any student registered at Cégep Édouard-Montpetit must read the content of certain institutional policies and regulations and comply with them.

The French titles for these policies are: *Politique institutionnelle d'évaluation des apprentissages* (PIEA), la *Politique institutionnelle de la langue française* (PILF), *la Politique pour un milieu d'études et de travail exempt de harcèlement et de violence* (PPMÉTEHV), *les Conditions d'admission et cheminement scolaire*, la *Procédure concernant le traitement des plaintes étudiantes dans le cadre des relations pédagogiques*.

The full text of these policies and regulations is accessible on the Cégep web site at the following address: <http://www.cegepmontpetit.ca/ena/a-propos-de-l-ecole/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.

14. 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-ÉNA” or email to “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.

15. ANNEX

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None

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