

# **280-3D4-EM** FALL 2021 Avionics Department

# **COURSE OUTLINE**

# COURSE: Direct-Current Avionics Systems

PROGRAM: 280.C0 Aircraft Maintenance

DISCIPLINE: 280 Aeronautics

WEIGHTING: Theory: 2

Practice: 2

Personal Study : 2

Your Teacher	Office	🕾 extension	🖂 e mail or website
Chevalier, Mathieu	A-192	4681	mathieu.chevalier@ena.ca
Daigle, Jean-François	A-192	4638	jean-francois.daigle@ena.ca
Desruisseaux, Benoit	A-187	4486	<u>benoit.desruisseaux@ena.ca</u>
Gagnon, Marie-Hélène	A-192	4131	<u>marie-helene.gagnon@ena.ca</u>
Gillard, Pierre	A-187	4552	pierre.gillard@ena.ca
Laurin, Nicholas	A-192	4665	<u>nicholas.laurin@ena.ca</u>
Lavallée, Éric	A-187	4132	eric.lavallee@ena.ca
Levasseur, Jacques	A-187	4399	jacques.levasseur@ena.ca
Morin, Frédéric	A-187	4397	<u>fa.morin@ena.ca</u>
Parenteau, Martin	A-192	4675	martin.parenteau@ena.ca
Richer, Jean-François	A-192	4130	jean-francois.richer@ena.ca
Séguin-Brodeur, Judith	A-192	4103	j.seguin-brodeur@ena.ca
Sonokpon, Kofi	A-192		<u>kofi.sonokpon@ena.ca</u>

# OFFICE HOURS FOR STUDENTS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					
Other					

Coordinator(s)	Office	🕾 extension	🖂 e-mail or website
Laurin, Nicholas	A-192	4665	nicholas.laurin@ena.ca
Parenteau, Martin	A-192	4675	<u>martin.parenteau@ena.ca</u>

# **CONTEXT OF THIS COURSE IN THE PROGRAM**

This course is offered during the third session of the program.

By the end of the course, students will be able to use their understanding of electrical systems to acquire other skills in electricity and aircraft electronics.

This course is an absolute prerequisite for 280-533-EM.

# 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 <u>Ma réussite à l'ÉNA</u> website under the heading « Privilèges accordés par Transports Canada ».

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

Master the aeronautical maintenance techniques.

#### **MINISTERIAL OBJECTIVE(S) AND COMPETENCIES**

025T To maintain direct-current circuits on an aircraft. (Training time: 100 class periods)

Distribution of Competence O25T in the program:

	Distribution	of Competence	OZUT III ule program.	
	<ul> <li>3<sup>rd</sup> session</li> </ul>	280-3D4-EM:	Direct-Current Avionics Systems	55 periods of 100
	4 <sup>th</sup> session	280-4A4-EM:	Direct-Current Avionics Systems	30 periods of 100
	6 <sup>th</sup> session	280-6A3-EM:	Avionics Maintenance	15 periods of 100
	Total:			100 periods
0263	(Training tir	ne: 70 class pe		
	Distribution of	of Competence	<u>O263 in the program :</u>	
►	<ul> <li>3<sup>rd</sup> session</li> </ul>	280-3D4-EM:	Direct-Current Avionics Systems	5 periods of 70
	4 <sup>th</sup> session	280-4A4-EM:	Direct-Current Avionics Systems	30 periods of 70
	4 <sup>th</sup> session	280-605-EM:	Aircraft Instrumentation	5 periods of 70
	6 <sup>th</sup> session	280-6A3-EM:	Avionics Maintenance	30 periods of 70
	Total:			70 periods

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

At the end of the course, the student will be able to troubleshoot electrical generation and distribution systems on single piston aircraft.

#### **TEACHING AND LEARNING STRATEGIES**

# Theory:

The theoretical course will be delivered asynchronously remotely with multimedia support when possible and appropriate. Among others, simulation software such as *Multisim* will be used to quickly simulate circuit operation.

#### **Practical Work:**

Acquisition of the theoretical knowledge will be facilitated by a series of experiments divided into 15 laboratory sessions.

# **COURSE PLAN**

#### 025T To maintain direct-current circuits on an aircraft.

Element of the Ministerial Objective	Learning Objective	Transport Canada Reference
<ul> <li>#1. Take measurements on :</li> <li>series circuits</li> <li>parallel circuits</li> <li>series-parallel circuits</li> </ul>	<ul> <li>THE STRUCTURE OF MATTER</li> <li>1. Define the basic elements of the structure of matter</li> <li>- identify the internal organization of the atom; atomic forces</li> <li>- distinguish atoms and ions</li> </ul>	
	<ul> <li>STATIC LOADS</li> <li>Plot the forces exerted on electrical charges on a Cartesian plane.</li> <li>Explain the effect of electrical field on a charge in space.</li> </ul>	
	4 Explain the relationship between electrical field and potential energy of an electric charge.	
	<ol> <li>Define the concept of electric potential.</li> <li>Explain the means of protection against static electricity used in an aircraft.</li> </ol>	
	7 Check the installation of static dischargers and the presence and condition of protection braids on moving surfaces.	
	<ul><li>MOVING CHARGES</li><li>8. Find relationships and differences between the concepts of power and energy.</li></ul>	
	<ol> <li>Define the concept of electric current.</li> <li>Define the quantities used in electricity and identify their units of measure.</li> </ol>	
	<ol> <li>Define the relationship between the electric potential difference, current and electric resistance.</li> <li>Identify methods used to produce electrical energy</li> </ol>	
	onboard aircraft. 13. Describe the characteristics of resistance.	
	<ol> <li>Identify types of electrical circuits on aircraft.</li> <li>Solve a simple circuit made up of two or more resistors, in series and in parallel.</li> </ol>	
	<ol> <li>Solve a mixed circuit (series-parallel)</li> <li>Use a multimeter as: voltmeter, ammeter and ohmmeter.</li> </ol>	
	<ol> <li>Check a faulty circuit with a multimeter.</li> <li>Explain the factors that affect the resistance of a circular lead wire.</li> </ol>	

Element of the Ministerial Objective	Learning Objective	Transport Canada Reference
#2. Verify the direct current of passive components.	<ol> <li>Check the operation of various control devices used in circuits:         <ul> <li>All types of switches</li> <li>Various types of relays</li> </ul> </li> <li>Check the operation of various protective devices: temperature, pressure, light and position transducers</li> <li>Check the operation of various protective devices.</li> <li>Check the operation of various protective devices.</li> <li>Interpret plans and diagrams involving semi-conductor components.</li> </ol>	
#3. Verify the direct-current	1. Check the operation of a DC generator	-
electrical power supply and distribution system	2. Check the operation of a D.C. electric motor.	•
of an aircraft.	<ol> <li>Check a DC generation system of a single engine piston aircraft</li> </ol>	
	<ol> <li>Check a DC generation system on a single engine turbine aircraft.</li> </ol>	
	<ol> <li>Check a DC distribution system of a single engine piston and a single engine turbine aircraft while respecting safety procedures.</li> </ol>	
	<ol> <li>Diagnose malfunctions in the DC generation and distribution systems of a single engine piston and a single engine turbine aircraft.</li> </ol>	
#5. Test the operation of lead-acid batteries.	<ol> <li>Describe in general the principle of chemical reactions that occur in the lead-acid batteries while charging and discharging.</li> </ol>	
	2. Explain the procedure for handling lead-acid batteries.	•
	3. Explain the steps in the initial operation of a lead-acid battery.	
	<ol> <li>Explain the procedure for complete maintenance of a lead- acid battery.</li> </ol>	
#7. Determine the charge balance of a direct- current circuit in an aircraft.	<ol> <li>Identify information relevant to the electrical load analysis for a single engine aircraft:         <ul> <li>AC 43 13</li> <li>FAR 23</li> <li>JAR 23</li> <li>Manufacturer's manuals</li> </ul> </li> <li>Identify regulations concerning the need to mandatorily perform a new electric load analysis .</li> </ol>	

#### 0263 To inspect the operation of simple alternating-current circuits on an aircraft

	Element of the Ministerial Objective		Learning Objective	Transport Canada Reference
#	1 Describe in general the principle of chemical reactions that occur in nickel cadmium batteries while charging and discharging.	1. 2.	Make conclusions from chemical reactions regarding inspection methods that cannot be used with nickel cadmium batteries. Explain the procedure for handling nickel cadmium batteries.	
	charging and discharging.	3.	Explain the maintenance procedure for a nickel cadmium battery.	

# Session Calendar:

# Theory:

Peri	iods	Content		Personal Study	Objectives
	1 per	Introduction to the course	Course Outline		
Week 1	1 per	Structure of Matter Static Charges	<ul> <li>Structure of atoms</li> <li>Conductors, insulators and semi- conductors</li> <li>Definition of Coulomb unit</li> <li>Explanation of the use of static dischargers and bonding braids on an aircraft.</li> </ul>	<ul> <li>Study:</li> <li>PowerPoint of the week</li> <li>Reference manual:Aircraft Electricity &amp; Electronics 7<sup>th</sup> edition.</li> <li>Weekly exercises to do at home in the reference manual.</li> </ul>	#1.1 to #1.7 (025T)
Weeks 2 to 4	6 per	Concepts of voltage, current and resistance Ohm's Law Concepts of power and energy Series circuits Parallel circuits Explanation of an equivalent circuit Mixed circuits	<ul> <li>Definition of voltage</li> <li>Sources of voltage</li> <li>Definition of current</li> <li>Definition of resistance</li> <li>Types of resistors used in aircraft circuitry</li> <li>Common components of an electrical circuit (relay, switch, fuse, lamp)</li> <li>Identification of a series circuit. Circuits of anti-collision lights, gas levels and others will be explained.</li> <li>Voltage in a series circuit</li> <li>Current in a series circuit</li> <li>Laws applied to series circuits</li> <li>Identification of a parallel circuit. The circuits of an avigation lights, landing lights and others will be explained.</li> <li>Voltage in a parallel circuit</li> <li>Laws applied to series circuits</li> <li>Identification of a parallel circuit. The circuits of navigation lights, landing lights and others will be explained.</li> <li>Voltage in a parallel circuit</li> <li>Current in a parallel circuit</li> <li>Equivalent resistanceparallel</li> <li>Power in a parallel circuit</li> <li>Identification in a mixed circuit of the relationships in series and in parallel</li> <li>Total current of a mixed circuit; current in the branches.</li> <li>Equivalent resistance in a mixed circuit</li> <li>Examples of simple malfunctions in parallel series circuits</li> </ul>	<ul> <li>Study:</li> <li>PowerPoint of the week</li> <li>Reference manual:Aircraft Electricity &amp; Electronics 7<sup>th</sup> edition.</li> <li>Weekly exercises to do at home in the reference manual.</li> </ul>	#1.6 to #1.16 (025T)
Week 5	2 per.	Resistance of a circular lead wire	<ul> <li>Resistance of conductors</li> <li>Types and characteristics of conductors used in aeronautics: AC 43.13-1B and AC 43.13-2A</li> <li>Definition of a circular mil</li> <li>Selecting a gage of wire according to the criteria of voltage, current and distance from the source.</li> <li>Protection devices</li> </ul>	<ul> <li>Study:</li> <li>PowerPoint of the week</li> <li>Reference manual:Aircraft Electricity &amp; Electronics 7<sup>th</sup> edition.</li> <li>Weekly exercises to do at home in the reference manual.</li> </ul>	#2.1 (025T)

Week 6	2 per.	Semi-conductors	<ul> <li>N, P-type materials, PN junctions and polarization of PN junctions</li> <li>Recognizing the symbol for diodes (rectifiers)</li> <li>Functions of diodes <ul> <li>Switching circuits</li> <li>Free-wheel circuits</li> <li>LED</li> <li>photodiodes</li> </ul> </li> <li>Other functions of the diode (Rectifier circuits will be studied in the course 280-404)</li> </ul>	<ul> <li>Study:</li> <li>PowerPoint of the week</li> <li>Reference manual:Aircraft Electricity &amp; Electronics 7<sup>th</sup> edition.</li> <li>Weekly exercises to do at home in the reference manual.</li> </ul>	
Week 7	2 per	Exam 1 (20 points	)		Subject from Week 1 to 7
Weeks 8 to 10	6 per.	DC electrical machines	Qualitative study of Concepts of electromagnetism DC output alternator DC generator Voltage regulator DC motor Starter Generator	<ul> <li>Étude :</li> <li>PowerPoint of the week</li> <li>Reference manual:Aircraft Electricity &amp; Electronics 7<sup>th</sup> edition.</li> <li>Weekly exercises to do at home in the reference manual.</li> </ul>	#2.5 (025T)
Weeks 11 to 13	6 per.	Power generation, distribution and starting systems for piston and turbine single engines.	<ul> <li>Using diagrams of a single-engine piston aircraft (Cessna 172 and other examples) make an analysis :         <ul> <li>of the power generation and distribution system of electrical energy</li> <li>of the starter system</li> </ul> </li> <li>Using diagrams of a single-engine turbine aircraft (Bell 206 and other examples) make an analysis of:         <ul> <li>the power generation and distribution system of electrical energy</li> <li>starting system</li> </ul> </li> <li>Explain the electrical load analysis on an aircraft.</li> </ul>	<ul> <li>Study:</li> <li>PowerPoint of the week</li> <li>Reference manual:Aircraft Electricity &amp; Electronics 7<sup>th</sup> edition.</li> <li>Weekly exercises to do at home in the reference manual.</li> </ul>	#5.1 (025T) #1.1 (0263)
Week 14	2 per.	Batteries	<ul> <li>Lead-acid batteries</li> <li>Nickel-Cadmium Batteries Principle of chemical reactions</li> </ul>	<ul> <li>Study:</li> <li>PowerPoint of the week</li> <li>Reference manual:Aircraft Electricity &amp; Electronics 7<sup>th</sup> edition.</li> <li>Weekly exercises to do at home in the reference manual.</li> </ul>	#2.2 (025T) #2.3 (025T) #2.5 (025T)
Week 15	2 per	Exam 2 (Final) (3	0 points)		ALL

# **Practical Work:**

Peri	iods	Content		Personal Study	Objectives
Weeks 1, 2 and 3	6 per	Introduction to the course Inspecting switches and relays	<ul> <li>Safety concepts in the avionics laboratory</li> <li>Digital Multimeter: Explanation of the voltmeter. Measuring DC voltage on a power supply and batteries.</li> <li>Static tests with the Ohm meter : <ul> <li>a) Explanation of the Ohm meter</li> <li>b) Measuring resistance</li> <li>c) SPST, DPDT, SPDT, DPDT switches</li> <li>d) Circuit-breakers and fuses</li> <li>e) SPST, SPDT relays</li> </ul> </li> </ul>	Laboratory Preparation: Read the corresponding laboratory activity text Laboratory Reports: Record the measurements taken and compare them with the theoretical values. Comment on the results = 50% of the report's mark. Professor will ask individual questions to verify the student's comprehension = 50% of the report's mark.	#1.17 (025T) #2.2 (025T) #2.4 (025T)
			f) Circuit testing The inspection will determine whether the component is functioning		
Week 4	2 per	Presentation and use of the DC simulator (Familiarization with) Using the wiring diagram in order to use the Voltmeter	Quiz 1 A practical presentation of how to use the DC simulator (FR601-M) by the teacher Explanation and demonstration on the operation of a ground power unit used with simulator (30 min.). Students will use the simulator as operators to start various systems. - Identifying elements on the diagram - Identifying elements on the simulator - Measuring voltage and resistance on the different elements of the DC simulator (FR601-M). (90 min)	<u>Laboratory Preparation:</u> Read the corresponding laboratory activity text <u>Laboratory Reports:</u> Complete the procedures taken. Comment on the results.	#1.12 (025T) #1.14 (025T)
Week 5	2 per	Explanation of troubleshooting method	Experimentation of the troubleshooting method on light systems.	<u>Laboratory Preparation:</u> Read the corresponding laboratory activity text <u>Laboratory Reports:</u> Troubleshooting methods.	#1.17 (025T) #1.18 (025T)
Week 6 - 7	4 per	Troubleshooting systems Finding defects	Troubleshooting FR601-M DC single engine simulator using the voltmeter or the Ohm meter in compliance with the <u>14 V piston</u> <u>single engine Procedures Manual</u> (executing a test procedure). Failures will be of the open- circuit type. Systems studied: - Anti-collision - Navigation lights - Landing lights - Fuel level	Laboratory Preparation: Read the corresponding laboratory activity text Laboratory Reports: Record the measurements taken and compare them with the theoretical values. Comment on the results.	#1.18 (025T) #2.5 (025T) #3.3 (025T) #3.4 (025T) #3.5 (025T)

Peri	iods	Content		Personal Study	Objectives
Week 8	2 per	Troubleshooting Exam	Individually, using <u>14V piston single engine</u> <u>Procedures Manual</u> students will find on the DC datasheet (FR601-M) the system defect chosen by the teacher. Open-circuit type failure Systems on the exam : - Anti-collision - Navigation lights - Landing lights - Fuel level		#1.18 (025T) #2.5 (025T) #3.3 (025T) #3.4 (025T) #3.5 (025T)
Week 9	2 per	Troubleshooting on aircrafts	In the hangar on a single-engine piston aircraft Explanation and demonstration on the operation of a ground power unit used with aircrafts. Check operation of these elements to detect defects in the systems: - Anti-collision lights - Navigation lights - Landing lights - GPU - Fuel level	<u>Laboratory Preparation:</u> Study class notes on that subject. <u>Laboratory Reports:</u> Research report to be submitted at the beginning of the next class.	#1.18 (025T) #2.5 (025T) #3.3 (025T) #3.4 (025T) #3.5 (025T)
Week 10	2 per	2 per	Inspecting power generation and starting system components on an aircraft	In the hangar on a single-engine turbine : Demonstration and inspection : Review inspection procedures for the operation of components to detect defects in the power generation or starting system. Explanation and demonstration of use of the GPU	#1.18 (025T) #2.5 (025T) #3.3 (025T) #3.4 (025T) #3.5 (025T)
Week 11	2 per	Troubleshooting exercises	Team troubleshooting exercise using the DC simulator (FR601-M) (starting and generation).	Laboratory Preparation: Read the corresponding texts in the Course Notes and the Reference Manual Laboratory Reports: Record activities and measurements taken and compare them with the theoretical values. Comment on the results.	#5.1 (025T) #5.2 (025T) #5.3 (025T) #5.4 (025T)
Week 12-13	2 per	Research	In rotation: Troubleshooting preparation and research on the elements of an aircraft generation and start system.	Laboratory Preparation: Study class notes on that subject.	#5.1 (025T) #5.2 (025T) #5.3 (025T) #5.4 (025T)
Week 12-13	2 per	Troubleshooting exercises	In rotation: Individual troubleshooting exercise using the DC simulator (FR601-M) (starting and generation).	Laboratory Preparation: Read the corresponding texts in the Course Notes and the Reference Manual Laboratory Reports: Record activities and measurements taken and compare them with the theoretical values. Comment on the results.	#5.1 (025T) #5.2 (025T) #5.3 (025T) #5.4 (025T)

Week 14 -15	2 per	Demonstration on the maintenance of lead-acid batteries and Nickel-Cadmium batteries	In rotation: - Demonstration by the technician on the maintenance of lead-acid batteries and Nickel-Cadmium batteries	
Week 14 - 15	2 per	Exam on power generation or starter circuit troubleshooting	In rotation: Individually, students will use the <u>14V piston</u> <u>single engine Procedures Manual</u> , to find system defects selected by the instructor (starting or power generation) on the DC simulator (FR601-M)	

# SYNTHESIS OF SUMMATIVE EVALUATION METHODS

#### Theory

Description of Evaluation Activity	Context and evaluation manner	Learning Objective(s)	Evaluation Criteria	Due Date (date assignment is due or exam given)	Weighting (%)
Quiz#1	Online via Moodle; 30 min	1.1 to 1.7, 2.1 (025T)	- Accuracy of results - Accuracy of the diagnostics and approach	Week 5	5%
Quiz#2	Online via Moodle; 30 min	1.1 to 1.16, 2.1(025T) 5.1(025T) 1.1(025T)		Week 11	5%
Exam 1 Commun examination in person	Time: 2 periods	1.1 to 1.16 (025T)		Week 7	20%
EXAM 2 course's terminal évaluation Commun examination in person	Time: 2 periods	All		Week 15	30%

Sub-total:

60%

#### **Practical Work**

Description of Evaluation Activity	Context	Learning Objective(s)	Evaluation Criteria	Due Date (date assignment is due or exam given)	Weighting (%)
1,2,3. Quiz on Switches and relays	Quiz 1 (50%)	#1.17(025T) #2.2 (025T) #2.4 (025T)	Accuracy of explanation	Week 4	4%
9. Troubleshooting Exam	ÉVALUATION 1 (Individual)	#1.18 (025T) #2.5 (025T) #3.3 (025T) #3.4 (025T) #3.5 (025T)	Accuracy of diagnostics and approach	Week 8	10%
12 - 13. In rotation: Trouble shooting preparation.		1.18 (025T) #2.5 (025T) #3.3 (025T) #3.4 (025T) #3.5 (025T)	Accuracy of explanation and approach	Week 13 or 14 according to the rotation	4%
14 - 15. In rotation. Lab on maintenance of lead- acid and Nickel-Cadmium batteries		#5.1 (025T) #5.2 (025T) #5.3 (025T) #5.4 (025T) #1.1 (0263) #1.2 (0263) #1.3 (0263)	Accuracy of explanation	Week 14 or 15 according to the rotation	2%
15. Troubleshooting Exam on power generation circuit or starting circuit	EVALUATION 2 (Individual)	#1.1 (0263) #1.2 (0263) #1.3 (0263) #1.1 (0263)	Accuracy of diagnostics and approach	Week 15	20%

Sub-total:

TOTAL:

100%

40%

# MEDIAGRAPHY

#### Mandatory manual

EISMIN, THOMAS K. – Aircraft Electricity & Electronics, \*<u>7th Edition</u>, McGraw-Hill, 2019. ISBN 978-1-260-10821-7

#### \*NO OTHER VERSION WILL BE ACCEPTED

# **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

Students must be present for summative evaluations and must comply with the instructions given by the instructor to carry out the evaluation activity and written in the course outline. Unexcused tardiness for a summative evaluation could result in being excluded from the activity. Any absence from a summative evaluation that is not due to serious reasons (illness, death in the family, etc.) could result in a mark of zero (0) for the activity.

Students are responsible for meeting with the instructor before an evaluation activity is held or immediately upon returning to ENA to explain the reason for an absence. Proper documentation, such as a medical certificate, a death certificate, legal papers, etc., must be shown if the reason for absence is serious and recognized as such by the instructor(s), arrangements will be made between the instructor(s) and the student to make up the activity.

#### 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

The instructor(s) will provide students with information and guidelines regarding the presentation of written work. When the presentation of an assignment is inacceptable, the work will be penalized as a late assignment until an acceptable version is submitted. In this case, the penalities 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 : <u>http://rmsh.cegepmontpetit.ca/normes-de-presentation-materielle-des-travaux-ecrits-du-cegep/</u>.

This course outline is the translation of "Plan de cours – 280-354-EM – Avionique des systèmes de courant continu". In case of any contradictions, the French version, which is the original, prevails.

# **CLASS PARTICIPATION EXPECTATIONS**

#### Laboratory safety and use of the premises:

Students must be under the supervision of a teacher or a technician whenever they are in the laboratory or using the equipment, unless otherwise indicated.

Any student whose conduct in the laboratory poses a risk to others will receive a warning from the teacher and then be excluded from the laboratory until the case can be reviewed by the teacher and the coordinator of the Avionics Department.

#### For bimodal classes, add this notice:

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 responsability 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 the specific regulations for this course: <a href="http://guideena-en.cegepmontpetit.ca/department-rules/">http://guideena-en.cegepmontpetit.ca/department-rules/</a> <a href="https://mareussite.cegepmontpetit.ca/ena/mon-parcours/mon-programme/regles-departementales">https://guideena-en.cegepmontpetit.ca/department-rules/</a> <a href="https://mareussite.cegepmontpetit.ca/ena/mon-parcours/mon-programme/regles-departementales">https://guideena-en.cegepmontpetit.ca/department-rules/</a>

# INSTITUTIONAL POLICIES AND REGULATIONS

All students enrolled at Cégep 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* (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: <a href="http://www.cegepmontpetit.ca/ena/a-propos-de-l-ecole/reglements-et-politiques">http://www.cegepmontpetit.ca/ena/a-propos-de-l-ecole/reglements-et-politiques</a>. If there is a disparity

This course outline is the translation of "Plan de cours – 280-354-EM – Avionique des systèmes de courant continu". In case of any contradictions, the French version, which is the original, prevails.

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 ACCOMODATIONS.

Students seeking these accomodations must forward their diagnosis to the CSA by either MIO to "Service, CSA-ENA" 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 accomodations they have been awarded by the CSA.

#### ANNEX

No.