

Course Outline

COURSE: **Radio communication and navigation systems**

PROGRAM: 280.C0 Aircraft maintenance techniques

DISCIPLINE: 280 Aeronautics

PONDERATION : Theory :2 Practical :2 Personal Study : 2

Professor(s)	Office	☎ Extension	✉ Email
Chevalier, Mathieu	A-192	4681	mathieu.chevalier@cegepmontpetit.ca
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Laurin, Nicholas	A-192	4665	nicholas.laurin@cegepmontpetit.ca
Lavallée, Éric	A-187	4132	eric.lavallee@cegepmontpetit.ca
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Parent, Martin	A-192	4675	martin.parenteau@cegepmontpetit.ca
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Séguin-Brodeur, Judith	A-192	4103	j.seguin-brodeur@cegepmontpetit.ca

Period of availability to students

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					
Other					

Department Coordinator	Office	Extension	Email
Laurin, Nicholas	A-192	4665	nicholas.laurin@cegepmontpetit.ca
Parent, Martin	A-192	4675	martin.parenteau@cegepmontpetit.ca

1 PLACE OF THE COURSE IN THE STUDENT'S TRAINING

This course is in the fifth session of the program. By registering for this course, the student is assumed to have successfully completed courses from previous terms, including 280-354 "Electrical Systems 1" and 280-404 "Electrical Systems 2". A student who does not meet these requirements may still take the course, but the Avionics Department considers that he or she may have more difficulty passing the course.

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

- The ability to explain the general principle of operation of the aeronautical radiocommunication and intercommunication system.
- The ability to identify, from technical documents, equipment verification procedures and the appropriate instruments for these verifications.
- The ability to transmit information about communication systems in a structured form and in appropriate language.
- The ability to carry out checks, repairs, installation and removal work related to the communication and navigation systems of an aircraft.

This lesson plan must be kept by the student throughout his or her studies, as it will be useful at the time of the integration activity.

Transport Canada: This course syllabus meets Transport Canada requirements as outlined in the Training Control Manual (TCM). The Department applies the Transport Canada standard that sets the tolerated absences from courses (theory and laboratory) at 5%. The Department compiles the absences of students enrolled in the *Aircraft Maintenance Engineering (280.C0)* and *Avionics Engineering (280.D0)* programs according to Transport Canada requirements. The application of the Transport Canada policy on absence control is available on the ÉNA website and in the student agenda under the heading "Privileges granted by Transport Canada".

In the event of a conflict between this syllabus and Canadian Aviation Regulation Standard 566 or the CAFM, the latter shall prevail.

2 COMPETENCY(IES) OF THE GRADUATE PORTRAIT

Perform maintenance on aircraft systems.

3 DEPARTMENTAL OBJECTIVE(S)

0265 - To verify the operation of communication, navigation and instrumentation systems. Provided that the student has successfully completed the courses of the previous sessions, the acquisition of competency 0265 will be completed upon successful completion of this course.

4 FINAL COURSE OBJECTIVE

By the end of this course, students will be able to verify the basic operation of avionics systems on aircraft.

5 EDUCATIONAL GUIDELINES

Theoretical part :

The theory course will be delivered in a lecture format and, where possible and useful, supported by handouts, examples of applications in aircraft maintenance manuals, documentation from radio manufacturers, excerpts from reference manuals and multimedia presentations.

Practical part:

Divided into 14 laboratory sessions, the acquisition of know-how will be facilitated by a series of experiments ranging from the basic characteristics of electronic components, the removal and installation of components in communication systems to simple performance verification and repair of different types of airborne communication systems.

6 COURSE PLANNING

0265 Verify the operation of navigational and instrumentation communication systems

LEARNING OBJECTIVES

Elements of Competence	Learning Objectives
#1. Gathering information for systems operation.	1. Describe the interconnections of the avionics systems.
	2. Describe phenomena related to electromagnetic waves.
	3. Recognize antennas and how they work.
	4. Identify oscillating circuits, oscillators and synthesizers.
	5. Explain the general principle of operation of aeronautical radiocommunication.
	6. Explain the general principle of operation of the intercommunication system.
	7. Describe the different types and methods of display.

Elements of Competence	Learning Objectives
#2. Power up the aircraft systems.	1. Locate appropriate equipment.
	2. Identify applicable procedures.
	3. Observe and follow technical procedures.
#3. Check the status of the systems.	1. perform checks, repairs, installation and removal of equipment related to the communication and navigation systems of an aircraft.
#4. Compare the operation of the systems with the manufacturer's specifications and preset parameters.	1. Locate the manufacturer's specifications for aircraft communication and navigation systems.
	2. Check the conformity of navigation and communication instruments on aircraft.
#5: Transmit the information.	1. Record the results of tests or inspections performed.

Semester Schedule Theoretical part

Week	LEARNING OBJECTIVE NUMBER	CONTENT	METHODS AND LEARNING ACTIVITIES	TECHNOLOGICAL TOOLS AND RESOURCES (URL link)
1	0265 #1.1	<p>Introduction to the course</p> <p>Introduction to the lesson plan.</p> <p>Introduction to airborne radiocommunication and radionavigation systems.</p> <p>Brief presentation of the avionics systems found in various aircraft and helicopter cockpits.</p>	<p>Introduction to the course</p> <p>Presential</p> <p>Questionnaire</p>	<p>MS Teams</p> <p>Powerpoint</p> <p>Moodle/Teams or other</p>
2 - 3	0265 #1.1 and 1.2	<ul style="list-style-type: none"> • Fundamentals of radio communications. • Nature of electromagnetic (EO) waves. • Creation of electromagnetic waves by an electric current. <ul style="list-style-type: none"> • Electric field. • Magnetic field. • Polarization of electromagnetic waves. • Speed of propagation of electromagnetic waves. • Frequency and wavelength: relationship. • Definition of frequency bands; description of bands 	Presential	Video/Powerpoint

		<p>reserved for aeronautical applications.</p> <ul style="list-style-type: none"> • The dangers of electromagnetic waves. • Modes of propagation of electromagnetic waves : <ul style="list-style-type: none"> • Waves of sky. • Direct waves. • Ground waves. • The characteristics of the different atmospheric layers. • Variations in the ionospheric layer depending on the season and time of day. • Comparison between different propagation modes and applications in aeronautical communications systems. <p>Properties of HF, VHF, UHF and SHF radiocommunication systems.</p>		
4	0265 #1.1 and 1.2	<p>Minitest 1 (4 points) 10 multiple-choice questions on the subject seen during weeks 1 to 3.</p>	Presential	Moodle
4 - 5	0265 # 1.3	<ul style="list-style-type: none"> • Principle of operation of the antennas. • Effective lengths and shapes of the antennas. • Antenna efficiency. • Types of antenna polarization. • Choice of the location of the facilities. <ul style="list-style-type: none"> ○ Ground plan and radiation. ○ Antenna couplers and their uses. • Examples of aircraft antenna installations. <p>Antenna maintenance and protection</p>	Presential	Video/Powerpoint
6	0265 #1.1, 1.4 and 1.5	<ul style="list-style-type: none"> • RF power. <ul style="list-style-type: none"> • Definitions of Bel, decibel and dBm. • Introduction to the basics of radio circuits (qualitative approach) : <ul style="list-style-type: none"> • Filters: high-pass, low-pass, band-pass, notch. • The amplifier circuits. • The oscillator circuits. • The replicators. • Block diagram of a transceiver. <p>The modulation and the types of modulation used in</p>	Presential	Video/Powerpoint

		aeronautics: CW, AM, SSB, FM and PM.		
20 or 22 or 23 October 2020	0265 # 1.1, 1.2, 1.3, 1.4, 1.5 1.7	<ul style="list-style-type: none"> • Written exam # 1 closed book (18 points) • Covering all subjects seen during weeks 1 to 6. 	Presential	Paper/Pencil
7	0265 # 1.7.	<p>Basic principles of digital electronics (qualitative approach) :</p> <p>Logical states. Combinatorial logic gates. Coding and decoding (example of 7-segment BCD decoding). Binary, octal and hexadecimal and their application (24-bit code of an aircraft). Aeronautical applications of basic logic functions.</p>	Presential	Video/Powerpoint
8	0265 1.1, 1.2, 1.4, 1.5	<ul style="list-style-type: none"> • Roles of aeronautical communication systems. • Definitions of terms used in radiocommunication. • Types of radios used in aeronautics. • Principle of operation of an aeronautical radio. • Transmitter/Receiver. 	Presential	Video/Powerpoint
9	0265 # 1.6	<ul style="list-style-type: none"> • On-board audio systems : <ul style="list-style-type: none"> ○ Main components in an intercom system and their operation. ○ Installation and important points of the installation. ○ The different types of : <ul style="list-style-type: none"> ▪ Microphones, speakers and headphones. ▪ The connectors. ▪ Impedances and impedance matching. • Other audio systems (PA, entertainment, etc.) • Examples of audio systems (excerpts from aircraft maintenance manuals). Audio consoles. 	Presential	Video/Powerpoint
10	0265 #1.1, 1.2, 1.4, 1.5, 1.6	<p>Minitest 2 (4 points) 10 multiple-choice questions on the subject seen during weeks 7 to 9.</p>	Presential	Moodle
10 - 12	0265 #1.2, 1.4	<ul style="list-style-type: none"> ▪ Principles of radionavigation systems ▪ Short-range navigation systems (elements) : <ul style="list-style-type: none"> ▫ ADF ▫ VOR ▫ ILS ▫ DME 	Presential	Video/Powerpoint

		<ul style="list-style-type: none"> ▫ Global Navigation Satellite System (GNSS) (elements) : ▫ GPS. ▫ SBAS ▫ LPV ▫ Identification and positioning systems (elements) : ▫ Transponder. ▫ TCAS. ▫ ADS-B. 		
13	0265 # 1.2 and 1.4	<p>Minitest 3 (4 points) 10 multiple-choice questions on the subject seen during weeks 10 to 12.</p>	Presential	Moodle
13	0265 # 1.7.	<ul style="list-style-type: none"> • Electronic flight data display systems. (EFIS and HUDS) <ul style="list-style-type: none"> ○ Operating principle and system interfaces. ○ The information and the colour coding of the information. • Head-up display systems. (HGS/HUDS). • Synthetic vision systems. • Multi Function Displays (MFDs). • EICAS, ECAM and VEMD systems. <p>Flight Management System (FMS) interfaces.</p>	Presential	Video/Powerpoint
14	0265 # 1.5	<ul style="list-style-type: none"> • Examples of VHF-FM and UHF-FM systems installed on aircraft and information about transceiver programming; description of digital transmissions (P25). • The operating principle of a HF-AM transceiver. <ul style="list-style-type: none"> ○ Frequency band. ○ The components in the system : <ul style="list-style-type: none"> ▪ Antenna. ▪ The antenna coupler. ▪ The transceiver. ▪ The amplifier. ▪ The control box. ○ The separation between the channels. ○ Advantages and dangers related to the use of HF radio. • SELCAL and ACARS systems : <ul style="list-style-type: none"> ○ Operation. ○ Programming codes according to the aircraft. ○ Example of a SELCAL system installed on board an aircraft. ○ Description and usefulness of the ACARS system. • SATCOM System : 	Presential	Video/Powerpoint

		<ul style="list-style-type: none"> ○ Presentation. ○ Description of antenna types. ○ Description of the equipment required. ○ Presentation of Inmarsat-3, 4 and 5. ○ Presentation of Iridium. ○ Presentation of Viasat. ○ Presentation of Gogo. 		
Common Event	0265 : # 1	Written synthesis exam of the course.	Presential	Paper/Pencil

Practical part

Week	LEARNING OBJECTIVE NUMBER	CONTENT	METHODS AND LEARNING ACTIVITIES	TECHNOLOGICAL TOOLS AND RESOURCES (URL link)
1	0265	<p>Introduction to the course and reminder of security measures.</p> <p>Introduction to safety rules and work methods in the laboratory, in the hangars and on the runways.</p> <p>Safety measures, GPU connection and electrostatics.</p>	<p>Presential</p> <p>Questionnaire</p>	<p>MS Teams</p> <p>Powerpoint</p> <p>Moodle/Teams or other</p>
2	0265 # 2.1 and 5.1.	<ul style="list-style-type: none"> • Familiarization with avionics systems installed in general and business aviation • Identification of radiocommunication and radionavigation systems installed in school aircraft. 	Asynchronous	<p>MS Word Questionnaire</p> <p>Or Moodle</p>
3	0265 # 2.3.	<ul style="list-style-type: none"> ○ Analysis of the difficulties encountered during the study of document CIR21. ○ Exercises for radio communication scenarios. <p>Questionnaire for setting up the situation.</p>	Asynchronous	Powerpoint/Kahoot
4	0265 # 2.3.	Licence examination for the Restricted Radiotelephone Operator Aeronautical Certificate.	Presential/Synchronous	Paper/Pencil
5	0265 # 2.1.	<p>Antenna identification :</p> <ul style="list-style-type: none"> ○ COM (VHF AM and FM). ○ HF. ○ ELT. ○ ADF (framework and doubt resolution) ○ VOR-LOC-GS. ○ EMR. ○ MKR. ○ GPS. ○ Transponder. ○ TCAS. 	Asynchronous	Video / Questionnaire

		<ul style="list-style-type: none"> ○ Weather radar. ○ LSS and Stormscope. ○ SATCOM. 		
6	0265 # 3.1 and 5.1.	<ul style="list-style-type: none"> ● Removes and installs radios, noting their types, models, locations and serial numbers. <p>Learn the techniques of removal and installation of avionics (Allen key, chassis, DZUS).</p>	Asynchronous	Video / Questionnaire
7	0265 # 4.1, 4.2 and 5.1.	<p>Installation of antennas (on a metal plate or aircraft fuselage). Hazardous Products Knowledge Check (HPC). Learn antenna installation techniques and how to make the seal using PRC.</p>	Asynchronous	Web page to be defined / Questionnaire
8	0265 # 1.7.	<p>Basic principles of digital electronics (qualitative approach) : Logical states. Combinatorial logic gates. Sequential logic circuits. Encoding and decoding. Example of 7-segment BCD decoding. Aeronautic applications.</p>	Presential	Video/Powerpoint
9	0265 #1.1 à 1.3	<p>Verification of principles and characteristics of antennas and electromagnetic waves</p>	<p>Presential</p> <p><u>In the lab:</u></p> <ul style="list-style-type: none"> ○ Dimension of an antenna as a function of frequency. ○ Impedance matching. ○ Grounding of a Marconi antenna. <p>Verification of the VSWR in different situations.</p>	<p>Available teaching material</p> <p>Laboratory report</p>
10	0265 # 2.1, 2.2, 4.1, 4.2 and 5.1.	<p>Demonstration of how an EFIS system works.</p> <ul style="list-style-type: none"> ○ Analyse the functioning of the EFIS system. ○ Check the validity of the information displayed in relation to the simulated signals. <p>Check the possibilities of transferring images and information from one screen to another.</p>	Asynchronous	Video / Questionnaire
11	0265 # 4.1, 4.2, and 5.1.	<p>Operation of audio systems.</p>	Asynchronous	Video/Questionnaire
12 to 14	0265 # 2.1, 2.2, 3.1, 4.1, 4.2 and 5.1.	<p>Verification of communication, navigation, radionavigation and pulsed identification systems</p>	Presential (TBD)	Aircraft or scenarios / questionnaires

7 SUMMATIVE EVALUATION TERMS AND CONDITIONS

Theory

Evaluation method and description of the activity	Context of implementation	Objective(s) learning	Evaluation Criteria	Maturity (date)	Weighting (%)
Mini test 1.	10 question test on Moodle	0265 #1.1 and 1.2	Accuracy of results	Week 4	4 %
Review 1.	Written exam.	0265 # 1,1, 1.2, 1.3, 1.4, 1.5, 1.7	Accuracy of results	20 or 22 or 23 October 2020	18 %
Mini test 2.	10 question test on Moodle	0265 # 1.1, 1.2, 1.4, 1.5, 1.6	Accuracy of results	Week 10	4 %
Mini test 3.	10 question test on Moodle	0265 # 1.2, 1.4	Accuracy of results	Week 12	4%
Review 2.	Written exam.	All objectives	Accuracy of results	Week of common events	30%
				TOTAL	60 %

Practical

Evaluation method and description of the activity	Context of implementation and method of evaluation	Objective(s) learning	Evaluation Criteria	Deadline (date of submission of work or examination period)	Weighting (%)
Introduction to the course and reminder of security measures.	Questionnaire.	0265 # 2.1 and 5.1.	Conformity of literature searches. Adherence to and compliance with the manufacturer's standards, procedures and specifications and RAC. Compliance with health and safety standards. Compliance in the writing of work cards and reports.	Week 1	Formative
Familiarization with avionics systems installed in general and business aviation.	Questionnaire.	0265 # 1.2, 2.1 and 4.1.		Week 2	Formative
Test of radiotelephone operator's licence, aeronautical category.	Industry Canada Review.	0265 # 2.3.		During week 4	5 points.
Identification of aircraft antennas.	Questionnaire.	0265 # 2.1.		Week 5	Formative
Removes and installs radios, noting their types, models, locations and serial numbers.	Questionnaire.	0265 # 3.1 and 5.1.		week 6	4 points.
Antenna installation (PRC)	Questionnaire.	0265 # 4.1, 4.2 and 5.1.		Week 7	Formative

Evaluation method and description of the activity	Context of implementation and method of evaluation	Objective(s) learning	Evaluation Criteria	Deadline (date of submission of work or examination period)	Weighting (%)
Logical doors and scanning.	Questionnaire.	0265 # 1.7		Week 8	3 points.
Principles and characteristics of antennas and electromagnetic waves	Individual report.	0265 # 1.1 à 1.3		week 9	3 points.
Testing of EFIS systems on aircraft.	Questionnaire.	0265 # 2.1, 2.2, 4.1, 4.2 and 5.1.		week 10	Formative
Installation and verification of audio systems.	Questionnaire.	0265 # 2.1, 2.2, 4.1, 4.2 and 5.1		week 11	3 points.
Survey the locations of ELT beacons on different aircraft types and test one of them (Part 1, 1/4).	Questionnaire.	0265 # 2.1, 2.2, 4.1, 4.2 and 5.1.	Conformity of literature searches. Adherence to and compliance with the manufacturer's standards, procedures and specifications and RAC.	week 14	4 points.
Verification of radiocommunication systems (Part II, 2/4).	Questionnaire.	0265 # 2.1, 2.2, 3.1, 4.1, 4.2 and 5.1.	Compliance with health and safety standards.	week 14	6 points.
Verification of radionavigation systems (3/4).	Questionnaire.	0265 # 2.1, 2.2, 3.1, 4.1, 4.2 and 5.1.	Compliance in the writing of work cards and reports.	week 14	6 points.
Verification of pulsed radionavigation and identification systems (4/4).	Team report, test sheets and work cards.	0265 # 2.1, 2.2, 3.1, 4.1, 4.2 and 5.1.		week 14	6 points.
				TOTAL	40 %

8 REQUIRED MATERIAL

Safety equipment (goggles, smock, shoes)

9 MEDIAGRAPHY

Canadian Aviation Regulations: available on the Transport Canada Internet site (<http://www.tc.gc.ca/aviationcivile/ServReg/Affaires/RAC/menu.htm>).

10 CONDITIONS FOR SUCCESS IN THE COURSE

Pass mark

The pass mark for the course is 60% (PIEA, article 5.1m).

(2) Attendance at Summative Evaluations

Attendance at summative evaluation activities is mandatory (AMAP, Section 5.2.5.1).

(3) Handover of the work

Work required by a professor must be submitted at the date, place and time set. **Penalties** for late submission are established **according to departmental rules** (IBSP, Article 5.2.5.2).

In case of delay the penalties are:

- See the "Departmental Rules" section at <http://guideena.cegepmontpetit.ca/regles-des-departements/>.

(4) Physical presentation of the work

The student must respect the "*Standards for the Physical Presentation of Written Work*" adopted by the CEGEP. Failure to comply with these standards may delay acceptance of the work or affect the grade awarded. These standards can be found *in the Cégep's* documentation centres in the "**Methodology**" section of the Cégep's **Links Flash, Libraries** at www.cegepmontpetit.ca/normes.

Departmental penalties for non-compliance with the standards for the physical presentation of work (ALARP, Article 5.3.2) are :

- See the "Departmental Rules" section at <http://guideena.cegepmontpetit.ca/regles-des-departements/>.

11 HOW TO PARTICIPATE IN THE COURSE

Laboratory Safety and Use of Premises:

The occupation of laboratory space and the use of laboratory equipment by students must be under the supervision of a professor or technician, unless otherwise specified.

Any student whose behaviour in the laboratory poses a risk to others present will, after warning by the professor, be excluded from the laboratory until the case is reviewed by the professor and the Avionics Department course coordinator.

12 DEPARTMENTAL RULES

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

<http://guideena.cegepmontpetit.ca/regles-des-departements/>.

13 INSTITUTIONAL POLICIES AND RULES

All students enrolled at Cégep Édouard-Montpetit must read and comply with the content of some institutional policies and regulations. In particular, the *Institutional Policy for the Evaluation of Student Learning* (IEPL), the *Institutional Policy for the French Language* (PILF), the *Policy for a Study and Work Environment Free of Harassment and Violence* (PPMÉTEHV), the *Conditions of Admission and Academic Development*, and the *Procedure for Handling Student Complaints in Educational Relations*.

The full text of these policies and regulations is available on the Cégep's website at the following address: <http://www.cegepmontpetit.ca/ena/a-propos-de-l-ecole/reglements-et-politiques>. In the event of any discrepancy between texts appearing elsewhere and the full text, the latter is the only legal and applied version.

14 THE CENTRE FOR ADAPTED SERVICES - FOR STUDENTS WITH DISABILITIES

Students with a professional diagnosis (motor, neurological, organic, sensory, learning, mental health, autism spectrum disorder or other limitations) or with a temporary medical condition may apply for accommodations.

To access this service, send your diagnosis either by MIO to "Service, CSA-ENA" or by email to servicesadaptesena@cegepmontpetit.ca.

If you already have an accommodation plan with the CSA, you are invited to contact your teacher at the beginning of the session to discuss the accommodation measures determined by the CSA.

15 ANNEX

Résumé de la prestation du cours – session Automne 2020

Cours : 280-5B4 Theory
Enseignants : Benoit Desruisseaux

Date de début du cours : Semaine du 24 août 2020

Disponibility:

Journée	Plage	Lieu
Monday	12h - 13h	Teams
Tuesday	15h - 16h	Teams

Résumé de la prestation des cours :

Week	Date	Description	Type of prestation	Platforms used
1	25 août	Course Presentation & Cockpit	Presential	Magistral/Powerpoint
2	1 ^{er} septembre	Fundamentals of radio communications.	Presential	Magistral/Powerpoint
3	8 septembre	Fundamentals of radio communications.	Presential	Magistral/Powerpoint
4	15 septembre	Quiz #1 week #1 to #3 + Radio Transmitter Basic Circuits	Presential	Magistral/Powerpoint
5	22 septembre	Modulation	Presential	Magistral/Powerpoint
6	6 octobre	Digital Circuit	Presential	Magistral/Powerpoint
7	13 octobre	Audio systems, Aeronautical comm part I & ELT	Presential	Magistral/Powerpoint
EC	20, 22 ou 23 octobre	Mid session exam from week #1 to #6	Presential	Written Exam
8	27 octobre	Audio systems, Aeronautical comm part I & ELT	Presential	Magistral/Powerpoint
9	3 novembre	GPS + XPDR, TCAS, ADS-B	Presential	Magistral/Powerpoint
10	10 novembre	Quiz #2 week #7 to #9 + GPS + XPDR, TCAS, ADS-B	Presential	Magistral/Powerpoint
11	24 novembre	Radio nav	Presential	Magistral/Powerpoint

12	1 décembre	Radio nav	Presential	Magistral/Powerpoint
13	8 décembre	Quiz #3 week #10 to #12 Integrated avionics and Aeronautical comm part II	Presential	Magistral/Powerpoint
14	OFF	Common exam following week	NA	N/A
EC	18-22-23 décembre	All subjects of the session	Presential	Written Exam

Résumé de la prestation du cours – session Automne 2020

Course : 280-5B4 LAB
 Teacher : Benoit Desruisseaux

Beginning of the session : week of August 24th, 2020

Disponibility:

Day	Time	where
Monday	12h - 13h & 15h-16h	Teams
Friday	12h - 13h & 15h-16h	Teams

Résumé de la prestation des cours :

Week	Date	Description	Type of prestation	Platforms used
1	24 - 28 août	Course Presentation & Safety presentation + GPU	Presential Asynchronous	Video/ Powerpoint
2	31 aout – 4 sept	Familiarization with avionics systems installed in general and business aviation	Asynchronous	Video/ Powerpoint
3	11 – 14 sept	Radio licence preparation	Presential	Video/ Powerpoint
4	18-21 septembre	Radio licence exam	Presential	Written exam
5	25-28 sept	Antenna identification	Presential	Video/ Powerpoint
6	5-9 oct	Remove/install radio	Asynchronous	Video/ Powerpoint
7	16-19 oct	Antenna installation	Asynchronous	Video/ Powerpoint
8	26-30 oct	Digital	Presential	Video/ Powerpoint
9	2-6 nov	Standing wave ratio	Presential	Portable cockpit
10	9-13 nov	EFIS demo	Asynchronous	Video/ Powerpoint
11	20-23 nov	ICS demo	Asynchronous	Video/ Powerpoint
12	27-30 nov	Verification of communication, navigation, radionavigation and pulsed identification systems	Presential	Aircraft
13	4-7 déc	Verification of communication, navigation, radionavigation and pulsed identification systems	Presential	Aircraft
14	11-14 déc	Verification of communication, navigation, radionavigation and pulsed identification systems	Presential	Aircraft