

## COURSE OUTLINE

**COURSE:** **Mathematics for Aircraft Maintenance**

**PROGRAM:** 280.C0 Aircraft Maintenance

**DISCIPLINE:** 201-Mathematics

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

<b>Instructor</b>	<b>Office</b>	<b>☎ Extension</b>	<b>✉ email</b>
Jonathan Bolduc	C-184	2559	<a href="mailto:jonathan.bolduc@cegepmontpetit.ca">jonathan.bolduc@cegepmontpetit.ca</a> or MIO

### OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

<b>Coordinator(s)</b>	<b>Office</b>	<b>☎ Extension</b>	<b>✉ email</b>
Natasha Dufour	C-184	2803	<a href="mailto:natasha.dufour@cegepmontpetit.ca">natasha.dufour@cegepmontpetit.ca</a>

## 1 PLACE OF THE COURSE IN THE STUDENT'S CURRICULUM

- The course 201-2A5-EM is a compulsory course of the program Aircraft Maintenance Technology (280.CO).
- This course has 201-1A5-EM as an absolute prerequisite.
- Failing this course could have **serious** consequences on the student's curriculum. Hence, the student should use all means necessary to avoid such an outcome.
- A student wishing to attend university or to deepen their knowledge of mathematics can register in calculus courses (Math NYA and Math NYB) offered in French at ÉNA as part of their complementary general curriculum.
- 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.

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

- To master the scientific basics and those of the working function

## 3 MINISTERIAL OBJECTIVE (CODE AND STATEMENT)

025S To model and interpret mathematical results as they apply to aircraft maintenance.

## 4 TERMINAL COURSE OBJECTIVE

- To use techniques from calculus in order to model and interpret mathematical results as they apply to aircraft maintenance.

## 5 INSTRUCTIONAL GUIDANCES

During each class, there are, alternately, lectures and work done by the students on the exercises proposed by the teacher. The lectures are used to present the theoretical concepts and the examples allowing the student to understand these concepts. These presentations will occasionally take advantage of the possibilities offered by the Internet and specialized mathematical software, Moodle and Excel. The class often begins with a period of "warm-up" exercises on the material covered in the previous lesson. In addition, part of the theory can be presented using videos that the student must watch outside of class periods, to prepare for their next class.

The personal work of the student outside of class periods is used to complete the exercises proposed by the professor during the practical periods and to study the subjects presented during the theoretical presentations. The success of the course is mainly based on the individual work of the student. The latter is strongly encouraged to take advantage of the availability periods of the professor at his office or at the study center. The student who must be absent from a class must find out from other students what was done or said during his/her absence, make up for the accumulated delay as quickly as possible and contact the professor, if necessary.

The student must regularly consult the LÉA environment in the Cégep's Omnivox platform. This environment is used by the students and the teacher as a messaging system to communicate with each other. The teacher can also use it to deposit documents relating to the course.

**Support for academic success:**

- **Availability of the teacher:** Students are strongly encouraged to come to their teacher's office during their hours of availability as soon as they experience difficulties or if they simply want to check their understanding of the material and improve the presentation of their solutions.
- **Mathematics study center:** The study center is located on each side of the corridor leading to the library. The section dedicated to mathematics is on the left side, in room C123. This work room, furnished with worktables and whiteboards, is open all day and students can use it to work, individually or in teams, on their math lessons. Teachers are available to answer questions at different times of the day, according to a schedule that is displayed at the entrance to the room. It is an important resource that you must know how to take advantage of.
- **My Success website (in French):** My Success is a website that accompanies students throughout their studies at Cégep Édouard-Montpetit and the École nationale d'aérotechnique. This site is an important reference platform for all students and the information available there is updated regularly. <https://mareussite.cegepmontpetit.ca/ena/>
- **Moodle website of the mathematics department (in French):** On this page, students will find all the useful information concerning the mathematics department. The Math Resources section contains a section on the basics. <https://maths.cegepmontpetit.ca/course/view.php?id=31>
- **PAIRE (Teachers Helping with Inclusion and Student Success):** PAIREs are teachers who are available to support students in their studies. They will be able to support you in your academic or personal difficulties. You will find the list of PAIRE teachers by clicking on the following link (in French): <https://mareussite.cegepmontpetit.ca/ena/mes-ressources/soutien-aux-apprentissages/paire-ena/>
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**6 SYLLABUS**

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
<b>ACTIVITY PERIOD</b>	<b>About 10 periods (chapter 1)</b>	
1. To acquire basic concepts of exponential and logarithmic functions.	<ul style="list-style-type: none"><li>• Properties of exponential functions and logarithms;</li><li>• Solution of exponential and logarithmic equations;</li><li>• Applications of exponential and logarithmic models;</li><li>• Logarithmic scales.</li></ul>	2 WeBWorK assignments Exercises from chapter 1
<b>ACTIVITY PERIOD</b>	<b>About 5 periods (chapter 1)</b>	
2. To model using algebraic equations of scatter diagrams of points obtained experimentally	<ul style="list-style-type: none"><li>• Linear, quadratic, exponential, and logarithmic models;</li><li>• Method of least squares;</li><li>• Regression;</li><li>• Interpolation and extrapolation.</li></ul>	1 Excel laboratory
<b>ACTIVITY PERIOD</b>	<b>About 10 periods (chapter 2)</b>	

3. To acquire an intuitive concept of limits	<ul style="list-style-type: none"> <li>Variation, rate of change, slope of a secant line;</li> <li>Intuitive concept of infinitely small variations;</li> <li>Intuitive concept of limit;</li> <li>Simple calculation of limits by successive approximations;</li> <li>Use of the limit concept in approximate calculations of the slopes of tangents, of surfaces, of volumes, etc.;</li> <li>Applications to concrete physical models: speed, acceleration, distance, consumption, power, energy input and output.</li> </ul>	2 WeBWork assignments 1 Excel laboratory Exercises from chapter 2
<b>ACTIVITY PERIOD</b>	<b>About 25 periods (chapters 3 and 4)</b>	
4. To acquire and apply an intuitive concept of derivatives	<ul style="list-style-type: none"> <li>Instantaneous rate of change;</li> <li>Intuitive concept of the derivative at one point;</li> <li>Computation and evaluations of the derivative of simple functions;</li> <li>Uses of the concept of derivatives in modeling concrete situations: maximum, minimum, growth, decrease, study of behavior graphed on a curve, optimization, related rates.</li> </ul>	3 WeBWork assignments 1 Excel laboratory Exercises from chapters 3 and 4

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
5. To solve algebraic, transcendental and trigonometric equations.  6. To solve algebraic inequalities.	<ul style="list-style-type: none"> <li>Exact solutions;</li> <li>Approximate solutions (using a calculator efficiently, error calculation).</li> <li>Solutions of a system of inequalities with two unknowns;</li> <li>Geometric interpretation and inequalities with one or two unknowns.</li> </ul>	
<b>ACTIVITY PERIOD</b>	<b>About 15 periods (chapter 5)</b>	
7. To acquire and apply the basic concept of integrals  8. To learn the sigma ( $\Sigma$ ) notation acquire and apply the basic concept numerical series	<ul style="list-style-type: none"> <li>Intuitive concept of the primitive and the integral;</li> <li>Computation and evaluation of integrals of simple functions;</li> <li>Use of integrals in modeling concrete situations (speed, surface calculations, problems involving rate of change, etc.).</li> <li>Sigma (<math>\Sigma</math>) notation.</li> <li>Particular series (Harmonic series, geometric and p-series)</li> <li>Calculation of partial sums for geometric series</li> </ul>	3 WeBWork assignments 1 Excel laboratory Exercises from chapter 5

**Note: a more detailed schedule (for each lesson) will be available on the course's LÉA platform.**

## 7 SYNTHESIS OF SUMMATIVE EVALUATION METHODS

Description of Evaluation Activity	Context	Learning Objectives	Evaluation Criteria	Due Date*	Weighting (%)
Written Exam 1 (140 min)	Individual written exams at the school (if possible) where the student solves questions similar to those studied in class.	1-2-3	Look at section 12: <i>Autres règles départementales</i> , subsection 4.3.4 <i>Exigences</i> (In French)  If other evaluation criteria are to be used, they will be presented to the student one week before the evaluation date in written form (PIEA, 5.1j).	Week 5	18 %
Written Exam 2 (140 min)		4-5		Week 10	22 %
Final Written Exam (180 min)	Individual cumulative written exam at the school (if possible) where the student solves questions similar to those studied in class.	1 to 7		Week 14	35 %
4 Excel assignments (homeworks)	Individual homework on Excel.	1 to 7		Dates available on LÉA	10 %
10 WeBWork assignments**	Individual homework on Moodle.	1 to 7		Dates available on LÉA	15 %
				<b>TOTAL</b>	<b>100 %</b>

\* The exams' dates are approximate and may be modified by the professor. If that happened, the professor will communicate the new date a week before the exam.

\*\* The assignments all have the same weighting for a total of 15%. The student is responsible for providing all their answers in the WeBWork assignment as well as the details of their calculations. Any delay as well as the omission to submit the details of the calculations when submitting an assignment will result in a score of 0.

Students who are caught cheating during any evaluation activity will be given the grade of zero ("0").

The professor will keep all the copies of the marked exams after they have been consulted by the students. It will be possible to consult them again at the teacher's office.

## 8 REQUIRED MATERIAL

- Notebook 1: COOP text number 5604.
- Notebook 2: COOP test number 5606.
- Calculator: Sharp EL-531 (**it is the only calculator allowed during exams at ÉNA**)

## 9 MEDIAGRAPHY

- ANDERSEN, John G. *Technical shop mathematics*, 2<sup>nd</sup> Edition. Industrial Press Inc, 1983, 525 p.
- COLIN, Michèle et LAVOIE, Paul. *Mathématiques pour les techniques de l'industrie*, 2<sup>e</sup> édition. Chicoutimi : Gaëtan Morin, 1987, 421 p.
- GINGRAS, Michèle. *Mathématique d'appoint*, 2<sup>e</sup> édition. Montréal : Les éditions HRW, 1999, 328 p.
- LACOMBE, Réal, *Mathématiques appliquées*. CEMEQ, 1996.

- ROSS, André. *Mathématiques appliquées aux technologies du bâtiment et du territoire*. Sainte-Foy : Le Griffon D'Argile, 2000, 428 p.
- ROSS, André. *Modèles mathématiques pour les techniques industrielles*. Sainte-Foy: Le Griffon D'Argile, 1998, 438 p.
- SMITH, Robert & PETERSON, John C. *Introductory Technical Mathematics*, 5<sup>th</sup> Edition. Thomson Delmar Learning, 2007, 858 p.
- SMITH, Robert. *Mathematics for Machine Technology*, 4<sup>th</sup> Edition. Delmar Publishers, 1999, 483 p.

## 10 REQUIREMENTS TO PASS THE COURSE

### 1. Passing Mark

The passing mark for this course is 60% (PIEA, article 5.1m).

### 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 out in the course outline (PIEA 5.2.5.1). 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). In that case, arrangements will be made between the instructor(s) and the student to make up for the activity.

### 3. Submitting Assignments

All assignments must be submitted by the date, hour and location designated by the instructor(s). Late assignments will not be accepted and hence the student will receive a mark of zero (0) for the assignment.

### 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 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 in the documentation center on the Cégep website [www.cegepmontpetit.ca/normes](http://www.cegepmontpetit.ca/normes) under the heading « **Méthodologie** ».

#### Departmental regulations on the presentation of written work (In French)

Les **pénalités départementales** concernant le non-respect des normes de présentation matérielle des travaux (PIEA, article 5.3.2) sont :

Pour tous les travaux pour lesquels la contribution de l'étudiant ou de l'étudiante est complètement originale (travail manuscrit ou informatisé créé à partir de pages vierges), les normes applicables contenues dans le document « Normes de présentation matérielle des travaux écrits » du Cégep Édouard-Montpetit doivent être respectées.

Pour tous les travaux pour lesquels la contribution de l'étudiant ou de l'étudiante est complètement originale (travail manuscrit ou informatisé créé à partir de pages vierges), si le barème d'évaluation n'accorde pas de points a priori pour le respect des normes de présentation, le non-respect des normes sera pénalisé par le refus du travail ou par une déduction allant jusqu'à cinq pour cent (5 %) de la note maximale du travail.

Pour tous les travaux pour lesquels la contribution de l'étudiant ou de l'étudiante est complètement originale (travail manuscrit ou informatisé créé à partir de pages vierges) et dont la pondération pour la note finale du cours est d'au moins dix pour cent (10%), un minimum de cinq pour cent (5 %) de la note maximale du travail est accordé au respect des normes de présentation.

Pour tous les travaux pour lesquels la contribution de l'étudiant ou de l'étudiante est partiellement originale et manuscrite (questionnaire troué à compléter, par exemple), les normes de typographie contenues dans le document Normes de présentation matérielle des travaux écrits du Cégep Édouard-Montpetit ne s'appliquent pas. Le professeur ou la professeure doit s'assurer que le canevas du travail respecte les normes de présentation applicables.

## 11 METHODS OF COURSE PARTICIPATION

It is the student's responsibility to attend all lectures, meaning:

1. the student is in class for the entire lecture, from the beginning until the end. Students who leave before a lecture is over will be marked absent,
2. the student works exclusively on the math course material.

From experience, we know that there is a close relationship between lecture attendance and passing the course.

In class, it is forbidden to have a conversation with classmates, unless specified by the instructor (e.g., during some exercise periods). Students cannot use any social media technology device (cell phone, computer, tablet, etc.) during class time unless specifically authorized by the professor.

## 12 OTHER DEPARTMENTAL REGULATIONS (IN FRENCH)

### 4.3 Modalités d'évaluation

#### 4.3.1 Modes d'évaluation

Dans chacun des cours de mathématiques, les activités d'évaluation prennent l'une ou l'autre ou plusieurs des formes suivantes :

- a) Contrôles ou examens périodiques écrits ;
- b) Examen final de synthèse écrit ;
- c) Devoirs, tests, laboratoires ou travaux écrits à réaliser individuellement ou en équipe ;
- d) Exposés oraux filmés avec images et sons ;

Toute autre forme d'évaluation doit préalablement être approuvée par le Département.

#### 4.3.4 Exigences

Le Département a convenu des exigences suivantes relatives aux examens :

- a) L'étudiant ou l'étudiante peut s'attendre à devoir répondre à :
  - des problèmes d'application ;
  - des questions théoriques (définitions, propriétés, lois, énoncés de théorèmes, démonstrations) ;
  - des questions de compréhension ou de synthèse ;
  - des questions calculatoires.
- b) L'étudiant ou l'étudiante devra démontrer son habileté(e) à choisir lui-même ou elle-même et à utiliser correctement différentes méthodes vues au cours.
- c) Les solutions présentées doivent faire preuve de clarté et de rigueur. L'étudiant ou l'étudiante pourra être pénalisé(e) pour une présentation désordonnée, incohérente ou imprécise d'une solution.
- d) Le symbolisme mathématique doit être utilisé adéquatement en tout temps. Une utilisation non pertinente ou inexacte d'un symbole ou d'une notation pourra entraîner une pénalité.
- e) À moins de consignes contraires, toutes les solutions doivent être détaillées. Les étapes essentielles doivent apparaître sur papier, et dans l'ordre approprié. Même lorsque la réponse finale est exacte, l'étudiant ou l'étudiante pourra perdre des points si des étapes importantes de la démarche exigée sont manquantes.
- f) Dans les problèmes à contexte concret, une réponse claire faisant référence au contexte du problème doit être énoncée.

#### 4.3.11 Reprise d'examen

Au Département de mathématiques, il n'y a pas de reprise d'examen.

**Translation of point 4.3.11: The Department of Mathematics doesn't allow students to redo exams.**

### **13 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), *Politique institutionnelle de la langue française* (PILF), *Politique pour un milieu d'études et de travail exempt de harcèlement et de violence* (PPMÉTEHV), *Conditions d'admission et cheminement scolaire*, *Procédure concernant le traitement des plaintes étudiantes dans le cadre des relations pédagogiques*.

The full text of these policies and regulations can be found on the Cégep website 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 THE ADAPTED SERVICES CENTER - FOR STUDENTS WITH DISABILITIES**

Students with a professional diagnosis (motor, neurological, organic, sensory limitations, learning disabilities, mental health disabilities, autism spectrum disorder or others) or with a temporary medical condition can apply for appropriate measures.

To access this service, send your diagnosis either by MIO to "Service, CSA" or by email to [servicesadaptes@cegepmontpetit.ca](mailto:servicesadaptes@cegepmontpetit.ca).

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

### **15 APPENDIX**

No appendix.