

COURSE OUTLINE

COURSE: **Mathematics for Aircraft Maintenance**

PROGRAM: 280.C0 Aircraft Maintenance

DISCIPLINE: 201-Mathematics

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

<u>Instructor</u>	<u>Office</u>	<u>☎ Extension</u>	<u>✉ email</u>
Jonathan Bolduc	C-184	2559	jonathan.bolduc@cegepmontpetit.ca

OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

<u>Coordinator(s)</u>	<u>Office</u>	<u>☎ Extension</u>	<u>✉ email</u>
Natasha Dufour	C-184	2803	natasha.dufour@cegepmontpetit.ca

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.

TRANSPORTS 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.CO) and Avionics (280.D0) according to Transport Canada requirements. The application of Transport Canada policies regarding absences is available on the college website and in the student agenda under the heading « Privilèges accordés par Transports Canada ».

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

Each lecture alternates between lectures by the teacher and work by the students on exercises given by the teacher. Lecturing is used to introduce theoretical concepts and to provide examples, so students grasp these concepts. If the opportunity arises, the teacher may take advantage of the possibilities offered by Internet and specialized software for mathematics. A lecture often starts with a short period in which the student is asked to work on exercises on concepts introduced in the previous lecture.

Outside of the classroom, the personal work of the student consists of completing the exercises the teacher

suggested during the exercise periods and studying the concepts introduced during the lectures. Passing the course depends mainly on the student's individual work. Students should take advantage of the teacher's office hours. A student who cannot be present for a specific lecture must ask other students what was done and said during the lecture. Furthermore, the student must catch up with the other students as soon as possible and contact the teacher if necessary.

The student must log on the school's site LEA (*Omnivox*). LEA will be used by the students and the teacher as an electronic bulletin board to communicate between each other. The teacher may also use it to distribute pertinent documents.

MATHEMATICS STUDY CENTER (CEM)

The study center is located on each side of the corridor leading to the library. The section of the center dedicated to mathematics is on the left at room C-123. This work room, furnished with work tables and whiteboards, is open all day and students can use it to work, individually or in teams, on their mathematics homework. Teachers are available to answer questions at different times of the day according to a schedule that is posted at the entrance of the room. Students should take advantage of this resource....

6 SYLLABUS

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
ACTIVITY PERIOD	About 10 periods (chapter 1)	
1. To acquire basic concepts of exponential and logarithmic functions.	<ul style="list-style-type: none"> • Properties of exponential functions and logarithms; • Solution of exponential and logarithmic equations; • Applications of exponential and logarithmic models; • Logarithmic scales. 	Page 32 (notebook 1), exercises 1 to 13
ACTIVITY PERIOD	About 3 periods (chapter 1)	
2. To model using algebraic equations of scatter diagrams of points obtained experimentally	<ul style="list-style-type: none"> • Linear, quadratic, exponential, and logarithmic models; • Method of least squares; • Regression; • Interpolation and extrapolation. 	<i>Excel</i> assignment
ACTIVITY PERIOD	About 10 periods (chapter 2)	
3. To acquire an intuitive concept of limits	<ul style="list-style-type: none"> • Variation, rate of change, slope of a secant line; • Intuitive concept of infinitely small variations; • Intuitive concept of limit; • Simple calculation of limits by successive approximations; • Use of the limit concept in approximate calculations of the slopes of tangents, of surfaces, of volumes, etc.; • Applications to concrete physical models: speed, acceleration, distance, consumption, power, energy input and output. 	Page 66 (notebook 1), exercises 1 to 10 <i>Excel</i> assignment

ACTIVITY PERIOD	About 30 periods (chapters 3 and 4)	
4. To acquire and apply an intuitive concept of derivatives	<ul style="list-style-type: none"> • Instantaneous rate of change; • Intuitive concept of the derivative at one point; • Computation and evaluations of the derivative of simple functions; • Uses of the concept of derivatives in modeling concrete situations: maximum, minimum, growth, decrease, study of behavior graphed on a curve, optimization, related rates. 	<p>Page 122 (notebook 1), exercises 1 to 29</p> <p>Page 33 (notebook 2), exercises 1 to 29</p> <p><i>Excel assignments</i></p>

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
<p>5. To solve algebraic, transcendental and trigonometric equations.</p> <p>6. To solve algebraic inequalities.</p>	<ul style="list-style-type: none"> • Exact solutions; • Approximate solutions (using a calculator efficiently, error calculation). • Solutions of a system of inequalities with two unknowns; • Geometric interpretation and inequalities with one or two unknowns. 	
ACTIVITY PERIOD	About 22 periods (chapter 5)	
<p>7. To learn the sigma (Σ) notation acquire and apply the basic concept numerical series</p> <p>8. To acquire and apply the basic concept of integrals</p>	<ul style="list-style-type: none"> • Sigma (Σ) notation. • Particular series (Harmonic series, geometric and p-series) • Calculation of partial sums for geometric series • Intuitive concept of the primitive and the integral; • Computation and evaluation of integrals of simple functions; • Use of integrals in modeling concrete situations (speed, surface calculations, problems involving rate of change, etc.). 	<p>Page 94 (notebook 2), exercises 1 to 13</p> <p><i>Excel assignment</i></p>

7 SYNTHESIS OF SUMMATIVE EVALUATION METHODS

Description of Evaluation Activity	Context	Learning Objectives	Evaluation Criteria	Due Date*	Weighting (%)
Written Exam 1	Individual written exams where the student solves questions similar to those studied in class. The duration of each exam is about one period.	1 and 2	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 3	11 %
Written Exam 2		3		Week 5	11 %
Written Exam 3		4, 5, and 6		Week 8	11 %
Written Exam 4		4, 5, and 6		Week 11	11 %
Written Exam 5		7-8		Week 14	11 %
Final Written Exam	Individual cumulative written exam where the student solves questions similar to those studied in class. The exam's duration is three hours.	All		End of semester	30 %
Excel assignments (5 in total)	Individual homework on Excel.	All		To be determined	15 %
				TOTAL	100 %

* 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.

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

The professor will bring the marked exams in class and make a short overview of the solutions to the exam questions. The professor will keep all the marked exams.

8 REQUIRED MATERIAL

- Notebook 1: COOP text number 5604.
- Notebook 2: COOP text number to be determined later.
- Calculator: Sharp EL-531 (it is the only calculator allowed during exams at ÉNA)

9 MEDIAGRAPHY

- ANDERSEN, John G. *Technical shop mathematics*, 2nd Edition. Industrial Press Inc, 1983, 525 p.
- COLIN, Michèle et LAVOIE, Paul. *Mathématiques pour les techniques de l'industrie*, 2^e édition. Chicoutimi : Gaëtan Morin, 1987, 421 p.
- GINGRAS, Michèle. *Mathématique d'appoint*, 2^e 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*, 5th Edition. Thomson Delmar Learning, 2007, 858 p.
- SMITH, Robert. *Mathematics for Machine Technology*, 4th 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 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 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 devra démontrer son habileté à choisir lui-même et à utiliser correctement différentes méthodes vues au cours.
- c) Les solutions présentées doivent faire preuve de clarté et de rigueur. L'étudiant pourra être pénalisé 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 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 APPENDIX

No appendix.