

COURSE OUTLINE

COURSE: **Mathematics for Aircraft Maintenance**

PROGRAM: 280.C0 Aircraft Maintenance

DISCIPLINE: 201-Mathematics

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

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

OFFICE HOURS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

Coordinator(s)	Office	☎ Extension	✉ email or website
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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).
- The 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 in order to avoid such an outcome.
- The 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

Each lecture consists of alternatively lecturing by the teacher and of student's work on exercises given by the teacher. Lecturing is used to introduce theoretical concepts and to provide examples to grasp completely 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.

The personal work of the student, outside the classroom, consists in completing the exercises the teacher suggested during the exercises periods and in studying the concepts introduced during the lectures. Passing the course depends mainly on the student's individual work. The student should take advantage of the teacher's office hours. The student who cannot be present for a specific lecture must ask other students in order to know 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 deposit documents pertinent to the course.

MATHEMATICS HELP CENTRE (CAM)

The CAM is located in C-123, a room at the entrance of the library. It is open at all times to allow individual work. According to a schedule posted near the door of the room, mathematics teachers are available to answer your mathematical questions. The student should learn how to take advantage of this resource. This service is officially given in French although some professors may answer in English.

6 SYLLABUS

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
ACTIVITY PERIODE	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 • Solving exponential and logarithmic equations • Applying exponential and logarithmic models • Logarithmic scales. 	Exercises on page 32 (notebook 1) # 1 to 13 Watch the video set #1 and do the WebWork homework for quiz 1.
ACTIVITY PERIODE	About 5 periods (chapter 1)	ACTIVITY PERIODE
2. To model using algebraic equations of scatter diagrams of points obtained experimentally	<ul style="list-style-type: none"> • Linear, quadratic, exponential, logarithmic, and conic models • Method of least squares • Regression • Interpolation et extrapolation 	Exercises on page 34 (notebook 1) #14 to 27
ACTIVITY PERIODE	About 8 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. • Applying these methods to concrete physical models: speed, acceleration, distance, consumption, power, energy input and output 	Exercises on page 66 (notebook 1) #1 to 10 Watch the video set #2 and do the WebWork homework for quiz 2.
ACTIVITY PERIODE	About 31 periods (chapter 3)	ACTIVITY PERIODE
4. To acquire and apply an intuitive concept of derivatives	<ul style="list-style-type: none"> • Instantaneous rate of change • Intuitive concept of derivatives at one point • Calculate and evaluate the derivative of simple functions • Use the concept of derivatives in modeling concrete situations: maximum, minimum, growth, decrease, study of behavior graphed on a curve, optimization, related rates 	Exercises on page 122 (notebook 1) #1 to 29 Watch the video set #3 and do the WebWork homework for quiz 3. Exercises on page 33 (notebook 2) #1 to 29 Watch the video set #4 and do the WebWork homework for quiz 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"> • Finding an exact solution • Finding an approximate solution (using a calculator efficiently, error calculation) • Finding all solutions for a system of inequalities with 2 unknowns • Using geometric interpretation to solve inequalities with 1 or 2 unknowns 	
ACTIVITY PERIODE	About 21 periods	
7. To learn the sigma (Σ) notation acquire and apply the basic concept numerical series 8. To acquire and apply the basic concept of integrals	<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 • Calculation and evaluation of integrals of simple functions • Use of integrals in modeling concrete situations (speed, surface calculations, problems involving rate of change, etc.) 	Exercises on page 94 (notebook 2) #1 to 13 Watch the video set #5 and do the WebWork homework for quiz 5.

7 SYNTHESIS OF SUMMATIVE EVALUATION METHODS

Description of Evaluation Activity	Context	Learning objectives	Evaluation Criteria	Due Date*	Weighting (%)
Written Exam 1	Individual written exam where the student solves questions similar to those studied in class. (The duration is 2 periods and a half)	1, 2 and 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 a written form (PIEA, 5.1j).	Week 5	25 %
Written Exam 2		4, 5 and 6		Week 11	25 %
Final Written Exam	Individual cumulative written exam where the student solves questions similar to those studied in class. (The duration is 3 periods)	All		End of semester	35 %
Excel Laboratory (2 during the semester)	Individual homework on MS Excel.	To be determined		To be determined	7 %
Test** (3 during the semester)	Short individual written evaluation. (The duration is about 20 minutes)	To be determined		To be determined	3 %
Quiz** (5 during the semester)	Short individual written evaluation. (The duration is about 10 minutes)	To be determined		To be determined	5 %
				TOTAL	100

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

** Tests and quizzes have an individual weight of 1% and are given at the beginning of class. The preparation for those evaluations is given at least one class in advance and may include exercises inside the notebook, homework on the WebWork platform or watching videos.

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 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), 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 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 web site 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 responsibility to be present at all his classes. By present, we mean:

1. Present during the entire class period from the beginning until the end. Students who leave before the end will be marked absent.
2. Work exclusively on the math course material.

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

In class, it is forbidden to have a conversation with classmates even during the exercises period. Students cannot use any social media technology device (cell phone, computer, tablet ...) 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.

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

The full text of these policies and regulations is accessible on the Cégep web site at the following address: <http://www.cegepmontpetit.ca/ena/a-propos-de-l-ecole/reglements-et-politiques>. If there is a disparity between shortened versions of the text and the full text, the full text will be applied and will be considered the official version for legal purposes.

14 APPENDIX

No appendix