

## Course outline

COURSE : **Applied Mathematics**

PROGRAM : 280.C0 Aircraft Maintenance

DISCIPLINE : 201 Mathematics

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

<b>Teacher</b>	<b>Office</b>	 <b>Extension</b>	 <b>E-mail or Website</b>
Jonathan Bolduc	C-184	2559	<a href="mailto:Jonathan.bolduc@cegepmontpetit.ca">Jonathan.bolduc@cegepmontpetit.ca</a>

Students usually use MIO

### Office hours

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

<b>Coordinator</b>	<b>Office</b>	 <b>Extension</b>	 <b>E-mail</b>
Natasha Dufour	C-184	2803	<a href="mailto:natasha.dufour@cegepmontpetit.ca">natasha.dufour@cegepmontpetit.ca</a>

## 1 CONTEXTE OF THIS COURSE IN THE PROGRAM

- The course 201-1A5-EM is a compulsory course of the program Aircraft Maintenance Technology (280.C0).
- This course is a prerequisite for the mathematics course 201-2A5-EM (2<sup>nd</sup> term).
- 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.
- This course aims to enable the student to efficiently use certain mathematical concepts, to perform applied calculations and review and apply notions from high school mathematics. To achieve this goal, mathematical modelling, problem solving, and interpretation of results will be key components of the course.
- The student wishing to attend university or to deepen their knowledge of mathematics can register in calculus courses (Math NYA and 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(S) AND COMPETENCIES

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

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

- At the end of the course, the student will be able to model, to calculate and to interpret mathematical results as they apply to aircraft maintenance.

## 5 TEACHING AND LEARNING STRATEGIES

Each lecture consists of alternatively lecturing by the teacher and the work of the students 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, is essential and consists in completing the preparatory work, finishing the exercises the teacher suggested during class 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 as soon as they don't fully understand a topic.

A student who cannot attend a specific lecture must ask other students to know what was done and said during the lecture. It is the student's responsibility to catch up as soon as possible and contact the teacher if necessary.

Students must regularly log on the school's site LÉA (Omnivox). LÉA will be used by the students and the teacher as main communication tool between each other outside of class. The teacher may also use it to provide additional documents relevant to the course.

- STUDY CENTER : The study center is located on each side of the corridor leading to the library. The math center section is on the left-hand side at 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 mathematics problems. Teachers are available to answer questions at different times of the day, according to a schedule that is posted at the entrance to the room. 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.

- "Ma réussite" website (in French): this website accompanies students throughout their studies at Cégep Édouard-Montpetit and the École nationale d'aérotechnique. It is an important reference platform for all students and the information disseminated 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 review of the basics. <https://maths.cegepmontpetit.ca/course/view.php?id=31>

- PAIRE (Profs Aidants à l'Inclusion et à la Réussite Étudiante): PAIREs are teachers who are available to support students in their college career. They will be able to support you in your academic or personal difficulties. You will find the list of PAIRE by clicking on the following link (in French): <https://mareussite.cegepmontpetit.ca/ena/mes-ressources/soutien-aux-apprentissages/paire-ena/>

## 6 COURSE PLAN

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
<b>ACTIVITY PERIODE</b>	<b>About 9 periods (Chapters 1)</b>	
1. Apply basic algebraic knowledge.	<ul style="list-style-type: none"> <li>Algebraic expressions: combining like terms, solving for an unknown, fractions, common denominator;</li> <li>Applications of algebraic formulas used in aerospace;</li> <li>Solving linear and quadratic equations and solving practical problems involving these types of equations.</li> </ul>	Read the appropriate sections in the notes before and/or after class. Solve all the remaining exercises in the notes after class. Watch suggested videos on LÉA before class.
<b>ACTIVITY PERIODE</b>	<b>About 17 periods (Chapters 2 and 3)</b>	
2. Carry on calculations on physical quantities.	<ul style="list-style-type: none"> <li>Efficient use of a calculator;</li> <li>Arithmetic operations: rounding, error computations and significant digits;</li> <li>Using units from various systems of weights and measurements: imperial, American, metric;</li> <li>Conversion of physical quantities (dimension, velocity, area, volume) from one system to another.</li> </ul>	Read the appropriate sections in the notes before and/or after class. Solve all the remaining exercises in the notes after class. Watch suggested videos on LÉA before class.
<b>ACTIVITY PERIODE</b>	<b>About 17 periods (Chapters 4 and 5)</b>	
3. Solve systems of linear equations with 2 or 3 unknowns and use them in context.	<ul style="list-style-type: none"> <li>Substitution, elimination and comparison methods;</li> <li>Gauss method;</li> <li>Geometrical interpretation.</li> </ul>	Read the appropriate sections in the notes before and/or after class. Solve all the remaining exercises in the notes after class. Watch suggested videos on LÉA before class.
4. Acquire basic concepts of geometry and trigonometry and use them to solve practical problems.	<ul style="list-style-type: none"> <li>Units of angular measure, conversions, arc length, angles and chords in a circle;</li> <li>Pythagorean Theorem, trigonometric circle, trigonometric ratios of the right triangle;</li> <li>Study of triangles other than right triangles: law of sines and law of cosines.</li> <li>Review of concepts and theorems of plane geometry: parallel and secant line, bisector, median, right bisector, altitude, tangent line to a circle and tangent circles;</li> <li>Applications: bending, layout of rivets on a circle, etc.</li> </ul>	Read the appropriate sections in the notes before and/or after class. Solve all the remaining exercises in the notes after class. Watch suggested videos on LÉA before class.

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
<b>ACTIVITY PERIODE</b>	<b>About 18 periods (Chapter 6)</b>	
5. Apply basic concepts and operations of geometric and algebraic vectors in the plane and in space.	<ul style="list-style-type: none"> <li>• Vectors: notation, direction, magnitude;</li> <li>• Vector addition;</li> <li>• Polar and Cartesian notations;</li> <li>• Scalar product, projections, vector product, linear combination, vector decomposition along given directions;</li> <li>• Applications: velocity, acceleration, force, moment, torque, works, etc.;</li> <li>• Cartesian coordinate system and space representation.</li> </ul>	Read the appropriate sections in the notes before and/or after class. Solve all the remaining exercises in the notes after class. Watch suggested videos on LÉA before class.
<b>ACTIVITY PERIODE</b>	<b>About 14 periods (Chapters 7 and 8)</b>	
5. Apply basic concepts and operations of geometric and algebraic vectors in the plane and in space.	<ul style="list-style-type: none"> <li>• Complex numbers seen as applications of vectors in the plane: geometric representation, modulus, argument, conjugate, operations, rectangular notation, polar notation;</li> <li>• Applications to electrical circuits.</li> </ul>	Read the appropriate sections in the notes before and/or after class. Solve all the remaining exercises in the notes after class. Watch suggested videos on LÉA before class.
4. Acquire Basic formulas of Geometry and Trigonometry and Use them compute areas and volumes of standard shapes.	<ul style="list-style-type: none"> <li>• Calculate areas and volumes of standard geometric shapes using the appropriate units and conversions.</li> </ul>	Read the appropriate sections in the notes before and/or after class. Solve all the remaining exercises in the notes after class. Watch suggested videos on LÉA before class.

**Note:** a more detailed schedule with all the dates of the lessons and evaluations will be available on LÉA. A paper version will also be given in class.

## 7 SYNTHESIS OF SUMMATIVE EVALUATION METHODS

Description of Evaluation Activity	Context	Learning objectives	Evaluation Criteria	Date*	Weighting (%)
Written Exam 1 (140 min)	Individual exam where the student solves questions similar to those studied in class.	1 and 2	Look at section 12: <i>Autres règles départementales, subsection 4.3.4 Exigences (In French)</i>  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 (140 min)		3, 4 and 5		Week 10	28 %
Final Written Exam (180 min)	Individual cumulative exam where the student solves questions similar to those studied in class.	All		Last week of class	35 %
Paper activities	Team or individual evaluations to do in class and finish at home.	All		To be handed over before each exam	12 %
				<b>TOTAL</b>	<b>100%</b>

\* The dates of the exams are approximate and may be modified by the professor. The professor will confirm the exact date at least a week before each exam.

Students who are caught cheating during any evaluation activity will be given the grade 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 then keep the marked exams. At all times students can consult their exam copy during the professor's office hours.

## 8 REQUIRED MATERIAL

- COOP course packs number: 5614 and 5615.
- Calculator: Sharp EL-531 (it is the only calculator allowed during exams at ÉNA).
- Three duo-tangs: with fasteners for perforated sheets of paper (those with pockets only will not be accepted).
- Perforated sheets of paper: they can be lined, squared or plain white.

## 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 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 ÉNA 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 (in French) <http://rms.h.cegepmontpetit.ca/normes-de-presentacion-materielle-des-travaux-ecrits-du-cegep/>.

#### 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 students' responsibility to attend all their classes. By attending, we mean:

1. being present during the entire class period from the beginning until the end. Students who leave before the end might be marked (partially) absent.
2. working exclusively on the course material and not on other classes material.

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

During class, conversation with classmates, use of cell phones, lateness or other disruptive behavior will not be tolerated. The use of a cell phone, a computer, a tablet, or any electronic device is not allowed in class.

## 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(e) 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(e) devra démontrer son habileté 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(e) 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(e) 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 (in French): <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. For more informations, please consult <https://mareussite.cegepmontpetit.ca/ena/mes-ressources/soutien-aux-apprentissages/centre-de-services-adaptes/>.

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.