

## Course Outline

COURSE : **Applied Mathematics**

PROGRAM : 280.C0 Aircraft Maintenance

DISCIPLINE : 201 Mathematics

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

Teacher(s)	Office	☎ extension	✉ e-mail or website
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					10:00 to 12:00
Afternoon		1:00 to 3:00			
Other					

**All office hours will be done on the Zoom platform. You must make an appointment by MIO.**

Coordinator(s)	Office	☎ extension	✉ e-mail
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 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(S) AND COMPETENCIES**

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

Live lessons will be given online on the Zoom platform according to the schedule you have received. You will receive an invitation by MIO before each meeting. All you have to do is click on the invitation link to join the meeting at the date and time specified in the invitation.

Lessons recordings will be available online (on YouTube) for those unable to attend (the link to the recordings will be posted on LÉA). We obviously encourage you to be as present as possible on Zoom. The teacher reserves the right to take attendance during live lessons and to register absences on the Omnivox platform. Each live lesson period may include lectures and exercises proposed by the teacher.

Some concepts will be covered by online videos that the students must watch before coming to class. There will be online homework assignments to be completed also before class.

The personal work of the student, outside the classroom, is essential and consists in completing the preparatory work (videos and online homework), 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.

The student should ask questions related to the course material on the course forum on LÉA. Personal questions should be directed to the teacher through the MIO platform. The student who must be absent from a class must watch the recording of the class and catch up with the accumulated delay as soon as possible and contact the teacher, if necessary.

The student must regularly consult the LÉA and Moodle environments in the Cégep's Omnivox platform. The MIO environment and the forum will be used by the students and the teacher to communicate with each other. The teacher can also use LÉA and Moodle to deposit course documents.

### STUDY CENTER

The Study Center in its usual form will be closed for the semester. On the other hand, a virtual study center is being developed in Teams. You can find resources there and also a forum where you can ask your questions. Teachers will answer your questions every day (not necessarily in real time) and, if necessary, can contact you to find solutions to your problems.

However, your teacher remains the best person to ask your questions to, he is the person best suited to help you!

## 6 COURSE PLAN

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
<b>ACTIVITY PERIODE</b>	<b>About 9 periods (Chapters 1)</b>	
Apply basic algebraic knowledge.	Algebraic expressions: combining like terms, solving for an unknown, fractions, common denominator; Applications of algebraic formulas used in aerospace; Solving linear and quadratic equations and solving practical problems involving these types of equations.	Read the appropriate sections in the course pack before class. Solve all the exercises in the notes and in WebWork after class.
<b>ACTIVITY PERIODE</b>	<b>About 17 periods (Chapters 2 and 3)</b>	
Carry on calculations on physical quantities.	Efficient use of a calculator; Arithmetic operations: rounding, error computations and significant digits; Using units from various systems of weights and measurements: imperial, American, metric; Conversion of physical quantities (dimension, velocity, area, volume) from one system to another.	Read the appropriate sections in the course pack before class. Solve all the exercises in the notes and in WebWork after class.
<b>ACTIVITY PERIODE</b>	<b>About 17 periods (Chapters 4 and 5)</b>	
Solve systems of linear equations with 2 unknowns and use them in context.	Substitution, elimination and comparison methods; Geometrical interpretation.	Read the appropriate sections in the course pack before class. Solve all the exercises in the notes and in WebWork after class.
Acquire basic concepts of geometry and trigonometry and use them to solve practical problems.	Units of angular measure, conversions, arc length, angles and chords in a circle; Pythagorean Theorem, trigonometric circle, trigonometric ratios of the right triangle; Study of triangles other than right triangles: law of sines and law of cosines. 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; Applications: bending, layout of rivets on a circle, etc.	Read the appropriate sections in the course pack before class. Solve all the exercises in the notes and in WebWork after class.

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
<b>ACTIVITY PERIODE</b>	<b>About 18 periods (Chapter 6)</b>	
Apply basic concepts and operations of geometric and algebraic vectors in the plane and in space.	Vectors: notation, direction, magnitude; Vector addition; Polar and Cartesian notations; Scalar product, projections, vector product, linear combination, vector decomposition along given directions; Applications: velocity, acceleration, force, , works, etc.; Cartesian coordinate system and space representation.	Read the appropriate sections in the course pack before class. Solve all the exercises in the notes and in WebWork after class.
<b>ACTIVITY PERIODE</b>	<b>About 14 periods (Chapters 7 and 8)</b>	
Apply basic concepts and operations of geometric and algebraic vectors in the plane and in space.	Complex numbers seen as applications of vectors in the plane: geometric representation, modulus, argument, conjugate, operations, rectangular notation, polar notation; Applications to electrical circuits.	Read the appropriate sections in the course pack before class. Solve all the exercises in the notes and in WebWork after class.

Week	LEARNING OBJECTIVE	CONTENT	OPERATING MODE AND LEARNING ACTIVITIES	TECHNOLOGICAL RESOURCES AND TOOLS
1	1	Algebra review	Online lessons on Zoom.	Zoom and Moodle
2	1	Algebra review	<b>Exam 1 at the school.</b>	Zoom and Moodle
3	2	Arithmetic of Physical Quantities	Online lessons on Zoom.	Zoom and Moodle
4	2	Arithmetic of Physical Quantities	Online lessons on Zoom.	Zoom and Moodle
5	2	Arithmetic of Physical Quantities	<b>Exam 2 at the school</b>	Zoom and Moodle
6	3 and 4	Equations and Trigonometry	Online lessons on Zoom.	Zoom and Moodle
7	3 and 4	Equations and Trigonometry	Online lessons on Zoom.	Zoom and Moodle
8	3 and 4	Equations and Trigonometry	Online lessons on Zoom.	Zoom and Moodle
9	3 and 4	Equations and Trigonometry	<b>Exam 3 at the school</b>	Zoom and Moodle
10	5	Vectors	Online lessons on Zoom.	Zoom and Moodle
11	5	Vectors	Online lessons on Zoom.	Zoom and Moodle
12	5	Vectors	<b>Exam 4 at the school</b>	Zoom and Moodle
13	5	Complex Numbers	Online lessons on Zoom.	Zoom and Moodle
14	all	Revision activity	Online lessons on Zoom.	Zoom and Moodle
15	all	all	<b>Final exam at the school</b>	Zoom and Moodle

**Note:** a more detailed and frequently updated version of the calendar will be posted on LÉA.

## 7 SYNTHESIS OF SUMMATIVE EVALUATION METHODS

Description of Evaluation Activity	Context	Learning objectives	Evaluation Criteria	Date*	Weighting (%)
Written Exam 1 (50 min)	Individual exam where the student solves questions similar to those studied in class. No allowed material except the calculator.	1	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 2	5 %
Written Exam 2 (140 min)		2		Week 5	19 %
Written Exam 3 (140 min)		3 and 4		Week 9	19 %
Written Exam 4 (140 min)		5		Week 12	20 %
Final Written Exam (180 min)	Individual cumulative exam where the student solves questions similar to those studied in class. No allowed material except the calculator.  You must be present at the school for the exam.	All		Last week of class	30 %
WeBWork assignment**	Electronic online homework assignments.  You can do your WeBWork assignments at home.	To be determined		To be determined	7 %
				<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.

\*\* There will be 7 WeBWork assignments during the semester worth 1% each. The student must watch a series of videos before completing the assignment on the webwork platform. The due date of each of the WeBWork assignment will be posted on LÉA. The student must complete the assignment in full and have all the correct answers to get the 1% of each assignment.

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

The professor will keep the marked exams at his office. The student can make an appointment to consult his copy of the exam or come to consult it during the periods provided for this purpose.

## 8 REQUIRED MATERIAL

- Course notes (available on the LÉA platform).

- 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 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 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 <http://rmsh.cegepmontpetit.ca/normes-de-presentation-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 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 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 appendices