Department of Mathematics

Course outline

COURSE : **Applied Mathematics**

PROGRAM : 280.C0 Aircraft Maintenance

DISCIPLINE : 201 Mathematics

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

Teacher	**Office**	☎ **Extension**	⊠ **E-mail or Website**
Jonathan Bolduc	C-184	2559	Jonathan.bolduc@cegepmontpetit.ca
			Students usually use MIO

Office hours

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Morning					
Afternoon					

Coordinator	**Office**	☎ **Extension**	⊠ **E-mail**
Natasha Dufour	C-184	2803	natasha.dufour@cegepmontpetit.ca

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 (2nd 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

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 students' 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.

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 to practice these concepts, which will then be evaluated by a short quiz at the beginning of 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.

A student who cannot attend a specific lecture must ask other students in order 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 LEA (Omnivox). LEA 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.

6 COURSE PLAN

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
ACTIVITY PERIODE	**About 9 periods (Chapters 1)**	
1. 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 course pack and in WeBWorK after class.
ACTIVITY PERIODE	**About 17 periods (Chapters 2 and 3)**	
2. 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 course pack and in WeBWorK after class.
ACTIVITY PERIODE	**About 17 periods (Chapters 4 and 5)**	
3. Solve systems of linear equations with 2 or 3 unknowns and use them in context.	• Substitution, elimination and comparison methods; • Gauss method; • Geometrical interpretation.	Read the appropriate sections in the course pack before class. Solve all the exercises in the course pack and in WeBWorK after class.
4. 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 course pack and in WeBWorK after class.

LEARNING OBJECTIVE	CONTENT	PERSONAL STUDIES ACTIVITIES
ACTIVITY PERIODE	**About 18 periods (Chapter 6)**	
5. 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, moment, torque, works, etc.; • Cartesian coordinate system and space representation.	Read the appropriate sections in the course pack before class. Solve all the exercises in the course pack and in WeBWorK after class.
ACTIVITY PERIODE	**About 14 periods (Chapters 7 and 8)**	
5. 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 course pack and in WeBWorK after class.
4. Acquire Basic formulas of Geometry and Trigonometry and Use them compute areas and volumes of standard shapes.	• Compute areas and volumes of standard geometric shapes using the appropriate units and conversions.	Read the appropriate sections in the course pack before class. Solve all the exercises in the course pack.

Note: a more detailed schedule with all the dates of the lessons and evaluations will be available on LÉA.

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: Autres règles départementales, subsection 4.3.4 Exigences (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 (140 min)		3, 4 and 5		Week 10	25 %
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 %
Tests and/or quizzes**	Individual written quiz in class (sometimes accompanied by electronic online homework assignments).	To be determined		To be determined	15 %
				TOTAL	**100%**

* 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.

** The tests and/or quizzes are to be done individually during class. The professor will give the details one class before each activity. The quizzes and tests will count equally. There will be 8 quizzes and 4 tests for a total of 12 evaluations among which the two worst results for each student will be discarded. A student who cannot be present for one such evaluation will be given the grade zero "0" (there are no make-up quizzes or tests). Therefore, a student can miss 2 evaluations in the test/quiz category without being penalized. It is the responsibility of the student to contact the teacher if he or she must be absent for a long period of time. If the reason of the absence is recognized by the school, the teacher may decide to accommodate the student.

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).

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*, 2ᵉ édition. Chicoutimi : Gaëtan Morin, 1987, 421 p.

— GINGRAS, Michèle. *Mathématique d'appoint,* 2ᵉ 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. 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 inacceptable, 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 *Liens éclair*, Bibliothèques, « 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 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 .

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.