DAWSON COLLEGE

Mathematics Department
Linear Algebra and Vector Geometry
201-SN4-RE Section 4
Fall 2026

Instructor:	Yann Lamontagne
Office:	7B.16
Office Hours and Encadrement:	Office hours are posted outside the office 7B.16 and on the website. If there is a time conflict with the posted office hours, then to schedule an in-person meeting send an e-mail with your availability.
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E-mail:	`ylamontagne@dawsoncollege.qc.ca`
Website:	`http://www.obeymath.org` The solutions to the evaluations as well as announcements and additional examples are posted on the website. The material of previously taught courses is also available.
Teacher Accessibility:	For assistance with class material, see me during my office hours. You can also communicate with me via email, under normal circumtances a reply can be expected within 48 hours.
Term Work:	*Term work is worth 25% or 50% of final grade, see Grading Policy.*

	Percent of term work grade:	*Tentative schedule:*
Test 1	50%	October 12th
Test 2	50%	December 4th

Important:

- Students who are absent for health-related reasons for a period of less than 5 days are required to declare their absences through a module on Omnivox, failure to do so will result in a grade of zero on the missed assessment. For absences longer than 4 days appropriate medical documentation is required. Unless alternative arrangements are approved by the teacher, students will be required to write a make-up assessment on December 10th (Study Day).

- Students who will be absent for any predictable reason on a test day must inform the instructor in writing within the first two weeks of the semester of their intent to be absent so that alternative arrangements can be made. The written notice must be given even when the exact date is not known until later.

- Please note that I do **not** use Omnivox MIO, and messages sent to MIO are unfortunately ignored.

DAWSON COLLEGE

MATHEMATICS DEPARTMENT
Science Program

Linear Algebra and Vector Geometry
201-SN4-RE

Course Objectives
Students will be provided with an introductory framework of linear algebra and vector geometry. Students will solve and characterize systems of linear equations using various techniques including matrix algebra.

Students will learn how to represent and manipulate vectors both algebraically and geometrically. Vectors will then be used to describe lines and planes in Euclidian Space, compute areas and volumes and determine distances between various geometric objects. Students will also begin making formal mathematical arguments in the form of basic proofs.

Students wishing to pursue the study of Linear Algebra may do so in the optional course called Linear Algebra II.

Course Competencies
For the student in the Science Program, this course contributes to the full achievement of the competency:

0M04: Analyze problems using linear algebra and vector geometry concepts.

1. Use the language of matrices.
2. Manipulate two- and three-dimensional geometric and algebraic vectors.
3. Represent lines and planes in the Euclidean space.
4. Use the methods of linear algebra and vector geometry in mathematical applications.
5. Apply linear algebra and vector geometry concepts to solve problems related to science.

Pre-requisites
Secondary V Mathematics (TS or SN).

Ponderation
2-2-2 (2 hours of lecture, 2 hours of labs, and 2 hours of work outside class for each 4 hours of class time)

Evaluation
The Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and effective evaluation of student learning and is therefore a crucial policy to read and understand. The policy describes the rights and obligations of students, faculty, departments, programs, and the College administration with regard to evaluation in all your courses, including grade reviews and resolution of academic grievance. ISEP is available on the Dawson website. https://www.dawsoncollege.qc.ca/governance/institutional-student-evaluation-policy/

Term Work
A minimum of 3 hours of in class testing is required.

Final Examination
The final examination will be a supervised, comprehensive examination held during the formal examination period.

Evaluation Policy

The grading scheme will be the best of:

- Option 1:
  - 50% term work
  - 50% final examination
- Option 2:
  - 25% term work
  - 75% final examination

In order to pass the course, students must obtain a final grade of at least 60%, calculated according to the evaluation scheme above.

Required Text and Materials

Elementary Linear Algebra (2nd Custom Edition based on Twelfth Edition) by H. Anton, C. Rorres and A. Kaul. (Instructions on how to obtain print copies will be provided by your teacher.)
Supplementary Problems for 201-SN4-RE:
https://www.dawsoncollege.qc.ca/mathematics/course-supplements/

References: *Linear Algebra with Applications*, by W. Keith. Nicholson. An open textbook available for free: https://lyryx.com/linear-algebra-applications/.

Calculators: Students are only permitted to use the Sharp EL-531** calculator during tests and examinations.

Teaching Methods

Lectures and problem sessions.

Attendance & Course Participation Requirements

Attendance is recommended for the successful completion of the course.

For additional information regarding attendance, students should refer to the Institutional Student Evaluation Policy (ISEP section IV-C).

Literacy Standards

Problem solving is an essential component of this course. Students will be expected to analyze problems stated in words, to present their solutions logically and coherently, and to display their answers in a form corresponding to the statement of the problem, including appropriate units of measurement. Marks will be deducted for work which is inadequate in these respects, even though the answers may be numerically correct.

Student Obligations

Everyone has the right to a safe and non-violent environment. Students are obliged to conduct themselves as stated in the Student Code of Conduct and in the ISEP section on the roles and responsibilities of students (ISEP section II-D).

1. Students have an obligation to arrive on time and remain in the classroom for the duration of scheduled classes and activities.
2. Students have an obligation to write tests and final examinations at the times scheduled by the teacher or the College. Students have an obligation to inform themselves of, and respect, College examination procedures.

3. Students have an obligation to show respectful behavior and appropriate classroom deportment. Should a student be disruptive and/or disrespectful, the teacher has the right to exclude the disruptive student from learning activities (classes) and may refer the case to the Director of Student Services under the Student Code of Conduct.
4. Electronic/communication devices (including cell phones, mp3 players, etc.) have the effect of disturbing the teacher and other students. All these devices must be turned off and put away. Students who do not observe these rules will be asked to leave the classroom.

Academic Integrity

Cheating in Examinations, Tests, and Quizzes: Cheating includes any dishonest or deceptive practice relative to formal final examinations, class tests, or quizzes. Such cheating is discoverable during or after the exercise in the evaluation process by the instructor. Such cheating includes, but is not limited to:

1. copying or attempting to copy another's work.
2. obtaining or attempting to obtain unauthorized assistance of any kind.
3. providing or attempting to provide unauthorized assistance of any kind.
4. using or possessing any unauthorized material or instruments which can be used as information storage and retrieval devices.
5. taking an examination, test, or quiz for someone else.
6. having someone take an examination, test, or quiz in one's place.

Unauthorized Communication: Unauthorized communication of any kind during an examination, test, or quiz is forbidden and subject to the same penalties as cheating.

Plagiarism on Assignments and the Comprehensive Examination: Plagiarism is the presentation or submission by a student of another person's assignments or Comprehensive Examination as his or her own. Students who permit their work to be copied are considered to be as guilty as the plagiarizer.

Penalties: Cheating and plagiarism are considered extremely serious academic offences. Action in response to an incident of cheating and plagiarism is within the authority of the teacher. Penalties may range from zero on a test, to failure in the course, to suspension or expulsion from the college.

According to ISEP, the teacher is required to report to the Sector Dean all cases of cheating and plagiarism affecting a student's grade. (See ISEP section V-A.)

Intensive Course Conflicts

If a student is attending an intensive course, the student must inform the teacher, in writing, within the first two weeks of class, of the specific dates of any anticipated absences.

It must be emphasized, however, that this College policy should not be interpreted to mean that a student can receive credit for work not performed. It is the student's responsibility to fulfill the requirements of the alternative arrangement. (ISEP Section IV-D)

Additional Help

The Mathematics Department and the College offer several services for assisting students outside of the classroom. The up-to-date list of such services is available on the department website: https://www.dawsoncollege.qc.ca/mathematics/additional-help/

Course Content & Tentative Schedule

CHAPTER 1 – SYSTEMS OF LINEAR EQUATIONS AND MATRICES (22 HOURS)	
§ 1.1	INTRODUCTION TO SYSTEMS OF LINEAR EQUATIONS #1 – 11 (odd), 12, 13 – 19 (odd), 21 – 24, TF(a) – (h)
§ 1.2	GAUSSIAN ELIMINATION #1 – 43, TF (a) – (i)
§ 1.3	MATRICES AND MATRIX OPERATIONS #1 – 19 (odd), 23 – 26, 29, 30, 32, 35, 36, TF(a) – (o)
§ 1.4	INVERSES; ALGEBRAIC PROPERTIES OF MATRICES #5 – 10, 15 – 18, 19 – 27 (odd), 31 – 50, TF(a) – (k)
HANDOUT	SUPPLEMENTARY PROBLEMS FOR 201-SN4-RE #1.1 – 1.9
§ 1.5	ELEMENTARY MATRICES AND A METHOD FOR FINDING A^{-1} #1 – 7 (odd), 9 – 33, TF(a) – (g)
§ 1.6	MORE ON LINEAR SYSTEMS AND INVERTIBLE MATRICES #1 – 9, 11, 13 – 23, TF(a) – (g)
§ 1.7	DIAGONAL, TRIANGULAR, AND SYMMETRIC MATRICES #1 – 23 (odd), 25 – 27, 29 – 32, 34, 36 – 39, 41 – 47, TF(a) – (m)
REVIEW	CHAPTER 1 – SUPPLEMENTARY EXERCISES #5, 9 – 15, 17 – 21, 24
CHAPTER 2 – DETERMINANTS (8 HOURS)	
§ 2.1	DETERMINANTS BY COFACTOR EXPANSION #1, 3, 5 – 41, TF(a) – (j)
§ 2.2	EVALUATING DETERMINANTS BY ROW REDUCTION #1, 3, 5 – 30, 33 – 34, TF(a) – (f)
§ 2.3	PROPERTIES OF DETERMINANTS, CRAMER'S RULE p.289 #3, 5, 7 – 39, TF(a) – (l)
HANDOUT	SUPPLEMENTARY PROBLEMS FOR 201-SN4-RE #2.1 – 2.9
REVIEW	CHAPTER 2 – SUPPLEMENTARY EXERCISES #16, 27 – 29, 31 – 33
CHAPTER 3 – EUCLIDEAN VECTOR SPACES (20 HOURS)	
§ 3.1	VECTORS IN 2-SPACE, 3-SPACE AND n-SPACE #1 – 15 (odd), 16, 17 – 23 (odd), 25, 27 – 29, TF(a) – (k)
§ 3.2	NORM, DOT PRODUCT, AND DISTANCE IN $\mathbb{R}^n$ #1 – 19 (odd), 24, 26, 27, 29, TF(a) – (j)
HANDOUT	SUPPLEMENTARY PROBLEMS FOR 201-SN4-RE #3.1 – 3.4
§ 3.3	ORTHOGONALITY #1 – 5 (odd), 7 – 34, 42, TF(a) – (g)
§ 3.4	THE GEOMETRY OF LINEAR SYSTEMS #1 – 19 (odd), 21, 22, TF(a) – (e)
§ 3.5	CROSS PRODUCT #1, 3 – 25 (odd), 26 – 30, 33 – 39, TF(a) – (f)
REVIEW	CHAPTER 3 – SUPPLEMENTARY EXERCISES
HANDOUT	SUPPLEMENTARY PROBLEMS FOR 201-SN4-RE (LINES) #4.1 – 4.11
HANDOUT	SUPPLEMENTARY PROBLEMS FOR 201-SN4-RE (PLANES) #5.1 – 5.17
CHAPTER 4 – GENERAL VECTOR SPACES (10 HOURS)	
§ 4.3	SPANNING SETS #1, 2, 7, 8, TF(a) – (c)
§ 4.4	LINEAR INDEPENDENCE #1ab, 2, 3, 7, 8, 9, 10, 11, 15, TF(a) – (e)
§ 4.5	COORDINATES AND BASIS #1, 2, 7, 11, 12, 13, 19ab
§ 4.6	DIMENSION #1 – 6, 7, 12, 15, 17