Department of Mathematics and Statistics
Concordia University

MATH 252
Linear Algebra II
Winter 2026

Instructor*: _____

Office/Tel No.: _____

Office Hours: _____

*Students should get the above information from their instructor during class time. The instructor is the person to contact should there be any questions about the course.

Office Hours: The instructor will announce in class the hours when help will be available to discuss and clarify the material of the course. Note that, if a student misses a lecture, the instructor will not use office hours to make up for the student's missed class. Office hours are to clarify and better assimilate the material of the course that the student tried first to understand from the lecture or textbook in an individual study.

Recommended Text: *Linear Algebra Done Wrong*, by Sergei Treil. Available for free online at: https://www.math.brown.edu/~treil/papers/LADW/LADW_2025_08-25.pdf.

Assignments: Given weekly. Every student can get one automatic two-day extension by emailing me before the deadline. Otherwise, no late assignment is accepted.

Midterm Break: No classes between March 2 and March 8, 2026.

Test: There will be one midterm in the sixth week. There will be no make-up test.

Final Exam: The final examination will be three hours long. It covers material from the entire course.

PLEASE NOTE: Students are responsible for finding out the date and time of the final exam once the schedule is posted by the Examination Office. Any conflicts or problems with the scheduling of the final exam must be reported directly to the Examination Office, **not** to your instructor. It is the Department's policy and the Examination Office's policy **that students are to be available until the end of the final exam period. Conflicts due to travel plans will not be accommodated.**

Final Grade: The final grade will be based on the higher of (a) or (b) below:
a) 20% for the assignments, 30% for the midterm, and 50% for the final.
b) 20% for the assignments, and 80% for the final.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Calculators: Only calculators approved by the Department (with a sticker attached as proof of approval) are permitted for the class test and final examination. For a list of Approved calculators see http://www.concordia.ca/artsci/math-stats/services.html

Prerequisite: MATH 251: in particular, the notions of Vector spaces over **R** or **C,** matrix of a linear transformation, change of coordinate matrix, etc. will be assumed as familiar to the student and not reviewed. For the student interested in reviewing those topics, they are covered in Chapter 1 and Section 2.8 of the suggested reference.

Week	Section	Topics
1		Complex numbers
	4.1	Eigenvalues and Eigenvectors
2	4.2	Diagonalization
3	5.1	Standard Inner product
	5.2	Orthogonality. Orthogonal/normal bases.
	5.3	Projections and Gram-Schmidt process
4	5.4	Least squares
	5.5	The adjoint of a Linear Operator
5	5.6	Isometries: unitary and orthogonal matrices
	5.7	Rigid motions in $\mathbf{R}^n$
6		**Review**
		Midterm Test
7	6.1	Schur triangular representation
	6.2	Normal and Self-Adjoint Operators
	6.3	Positive definite operators
8	6.3	Singular values decompositions
	6.4	Applications of SVD
9	7.1	Quadratic forms
	7.2	Diagonalization of Quadratic Forms
	7.4	Positive definite forms and Sylvester criterion

10	9.1	The Cayley-Hamilton Theorem The minimal polynomial
11	9.4 - 9.5	Jordan Canonical Form
12		**REVIEW**

Student Services
You may wish to access the many services available to you as a Concordia student. An overview of these resources can be found here: https://www.concordia.ca/students/services.html

ChatGPT and similar generative AI products
The use of generative artificial intelligence tools or apps for assignments in this course, including tools like ChatGPT and other AI writing or coding assistants, is prohibited**.** You are encouraged to discuss assigned problems with classmates, but the submitted work must be your own.

Academic Integrity and the Academic Code of Conduct
This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: https://www.concordia.ca/conduct/academic-integrity.html" *[Undergraduate Calendar, Sec 17.10.2]*

Behaviour
All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the Code of Rights and Responsibilities which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Intellectual Property
Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances
In the event of extraordinary circumstances and pursuant to the Academic Regulations the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.