Faculty of Science Course Syllabus
Math 1030, Matrix Theory and Linear Algebra I
Fall 2024

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years

----

Instructor:	Prof. Peter Selinger, Chase 303
	Email: selinger@dal.ca (please mention "1030" on the subject line)
Lectures:	TTh 11:35–12:55, Chemistry 125
Tutorials:	10 Tutorials, 50 minutes each
Office hours:	Tuesdays 1:30-2:30, Chase 303

_____

Course Description
This course is a self-contained introduction to Matrix Theory and Linear Algebra. Topics include: systems of linear equations, vectors in $\mathbb{R}^n$, matrices, spans, linear independence, bases, dimension, linear transformations in $\mathbb{R}^n$, determinants, eigenvalues and eigenvectors, diagonalization, applications.

Course Prerequisites
Nova Scotia advanced Mathematics 11 or 12 (or equivalent)

Course Objectives/Learning Outcomes
Students will learn the basic concepts of linear algebra, including the qualitative and quantitavite solution of linear systems, vector operations, matrix operations and matrix algebra, rank and determinant, linear transformations, eigenvalues and eigenvectors, linear independence and dependence, subspaces and spanning sets, bases and dimension.

Course Materials
- *Textbook: "Matrix Theory and Linear Algebra" by Peter Selinger. This is an open textbook available for free download on Brightspace. You can also order a printed copy from Lulu.com.*
- *Course website on Brightspace is accessed through dal.brightspace.com*
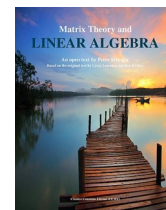
Course Assessment

Quizzes	*5%*	*In the tutorials.*
Homework	*15%*	*Online, accessed via Brightspace.*
Midterm 1	*20%*	*Friday, October 4, 6-8pm, McCain Auditorium 2 (Ondaatje Hall)*
Midterm 2	*20%*	*Thursday, November 7, 7-9pm, Rowe 1028*
Final Exam	*40%*	*3 hours – Scheduled by the Registrar. Must pass final exam to pass the course.*

Other course requirements
Tutorial attendance is mandatory. Tutorials start on September 16. Reading assignments will be given and will be tested in the quizzes.

Conversion of numerical grades follows the <u>Dalhousie Common Grade Scale</u>

A+ [90-100]	**B+** [77-80)	**C+** [65-70)	**D** [50-55)
A [85-90)	**B** [73-77)	**C** [60-65)	**F** [0-50)
A- [80-85)	**B-** [70-73)	**C-** [55-60)	

University Policies and Statements

See Brightspace for "University Policies and Statements" and "Student Resources and Support".

Course Policies

1. Students can get help with this course in the Mathematics Learning Centre which is located in Room 119 on the 1st floor of the Chase Building. The Learning Centre operates in-person and remotely. Support is available, free of charge, Monday through Friday from 11:30am-4:30pm and 6:30-7:30pm, until Dec. 17. The Learning Centre also has large tables where you can work together. To access the online support and see the latest schedule, register for the Brightspace ``course'' at https://www.dal.ca/faculty/science/math-stats/about/learning-centre.html.
2. You will also be given reading assignments from the textbook.
3. Calculators, textbooks, and notes are not permitted for Midterm Tests or the Final Examination.
4. Late homework will not be accepted except with the instructor's prior permission.
5. A missed midterm cannot be written at another time. If you miss the midterm without prior permission, then it will count as a 0. Exceptions are made in two cases: (1) if you obtain the instructor's prior permission to miss a midterm, or (2) if you have an officially valid excuse. In these cases, the weight of the missed midterm will be shifted to the final exam (e.g., the final exam will then count 60% instead of 40%). There is no make-up option for the final exam except in cases of an officially valid excuse.
6. Student Declaration of Absence forms will be accepted for missed homework and quizzes.
7. Students are encouraged to study in groups, but each student must complete their own online homework, quizzes, and exams.

Course Content (dates are approximate)

Date	Content
September 2–6	1.1–1.2 Systems of linear equations
September 9–13	1.3–1.5 Systems of linear equations
September 16–20	1.6–1.8 Systems of linear equations, fields SEPTEMBER 16 – TUTORIALS START
September 23–27	2.1–2.5 Vectors in R^n
Sept 30 – Oct 4	2.6–2.7 Dot product, projections, cross product SEPTEMBER 30, MONDAY – TRUTH AND RECONCILIATION DAY OCTOBER 2 – LAST DAY TO DROP WITHOUT "W" OCTOBER 4, FRIDAY – MONDAY TUTORIALS HELD IN LIEU OF TRUTH AND RECONCILIATION DAY OCTOBER 4, FRIDAY – FIRST MIDTERM, 6–8pm, ONDAATJE HALL
October 7–11	4.1–4.9 Matrix arithmetic, inverses
October 14–18	5.1-5.2 Span and linear independence OCTOBER 14, MONDAY – THANKSGIVING DAY, UNIVERSITY CLOSED OCTOBER 18, FRIDAY – MONDAY TUTORIALS HELD IN LIEU OF THANKSGIVING
October 21–25	5.3–5.5 Subspaces and basis
Oct 28 – Nov 1	6.1–6.4 Linear transformations OCTOBER 31 – LAST DAY TO DROP WITH "W"
November 4–8	7.1–7.5 Determinants NOVEMBER 7, THURSDAY – SECOND MIDTERM, 7–9pm, ROWE 128
November 11–15	STUDY BREAK (NO CLASS)
November 18–22	8.1–8.4 Eigenvectors and eigenvalues, diagonalization
November 25–29	8.5–8.9 Applications, Review NOVEMBER 28 – LAST CLASS NOVEMBER 29 – LAST DAY OF TUTORIALS