# DALHOUSIE UNIVERSITY

## Faculty of Science Course Syllabus
## Department of Mathematics & Statistics
Math 1030, Matrix Theory and Linear Algebra I
Winter 2020

**Instructor:**   Prof. Keith Taylor, Chase 123
Email: keith.taylor@dal.ca  (please mention Math 1030 in the subject line)
Office hours: Mondays, 1:00-2:30pm, Thursdays, 10:30-noon.

**Lectures**:   MWF 8:35-9:25, LSC – C242

**Tutorials**:   10 Tutorials, 50 minutes each

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### Course Description
*This course is a self-contained introduction to Matrix Theory and Linear Algebra. Topics include: subspaces, linear transformations, determinants, eigenvalues and eigenvectors, systems of linear equations.*

### Course Prerequisites
*Nova Scotia advanced Mathematics 11 or 12*

### Course Objectives/Learning Outcomes
*Students will learn the basic concepts of linear algebra, including the qualitative and quantitative 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

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|---|---|---|
| *Quizzes* | *5%* | *In each tutorial.* |
| *Homework* | *15%* | *Online, accessed via Brightspace.* |
| *Midterm 1* | *20%* | *Tuesday, February 4, 7:15-9:15pm, Room McCain, Auditorium 2* |
| *Midterm 2* | *20%* | *Tuesday, March 10, 7:15-9:15pm, Room McCain, Auditorium 2* |
| *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 the week of January 13. Reading assignments will be given and will be tested in the quizzes.*

**Conversion of numerical grades to Final Letter Grades follows the <u>Dalhousie Common Grade Scale</u>**

| | | | | |
|---|---|---|---|---|
| A+ (90-100) | B+ (77-79) | C+ (65-69) | D | (50-54) |
| A  (85-89) | B  (73-76) | C  (60-64) | F | (<50) |
| A- (80-84) | B- (70-72) | C- (55-59) | | |

## 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. Tutors are available Monday–Friday 12–5pm on a first come, first served basis, free of charge. The Learning Centre also has large tables where you can work together. During the study break, Feb. 17-21, the hours are Tuesday–Friday 1–4pm. The Learning Centre is closed on the holidays.*
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 such as a medical doctor's note. 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 such as a medical doctor's note.*
6. *Student Declaration of Absence forms will be accepted for missed homework and quizzes, but not midterms or the final exam. To miss a midterm or final exam, you must have a doctor's note signed by a medical professional.*
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)

- Jan. 6-10      1.1-1.2, Systems of linear equations
- Jan. 13-17      1.3-1.5, Systems of linear equations
- Jan. 20-24      1.6-1.8, Systems of linear equations, other fields
- Jan. 27-31      2.1-2.5, Vectors in $R^n$
- Feb. 3-6      2.6-2.7, Dot product, projection, cross product
  - Feb. 4      First midterm test in evening
  - Feb. 7      Friday, is Munro Day, no class
- Feb. 10-14      4.1-4.9, Matrix arithmetic, inverses
- Feb. 17-21      Study Break, no classes
- Feb. 24-28      5.1-5.2, Span and linear independence
- Mar. 2-6      5.3-5.5, Subspaces and basis
  - Mar. 5      Second midterm test in evening
- Mar. 9-13      6.1-6.4, Linear transformations
- Mar. 16-20      7.1-7.5, Determinants
- Mar. 23-27      8.1-8.4, Eigenvalues, eigenvectors, diagonalization
- Mar. 30-Apr 3      8.5-8.9, Additional applications
- Apr. 6      Review

**University Policies and Statements** *See Brightspace for Part B of this syllabus for these Policies.*