

**Faculty of Science Course Syllabus  
Department of *Mathematics and Statistics*  
MATH 1030--Matrix Theory and Linear Algebra I  
Summer 2019**

**Instructor(s):** Lin Jiu  
[Lin.Jiu@dal.ca](mailto:Lin.Jiu@dal.ca) (please mention "1030" in the subject line)  
 Chase 307

**Lectures:** Tuesdays and Thursdays 6:05--8:55 PM Dunn 117

**Office hours:** Mondays and Tuesdays 12:00--1:30 PM or by appointment

**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 vector operations, lines and planes in n-dimensional space, the qualitative and quantitative solution of linear systems, 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.
- Course website on Brightspace is accessed through [dal.brightspace.com](http://dal.brightspace.com)

**Course Assessment**

<i>Homework</i>	10%	<i>Online, accessed via Brightspace, weekly</i>
<i>Classwork</i>	10%	<i>During lectures, in class</i>
<i>Midterm I</i>	20%	<i>May 21<sup>st</sup>, 2019. 6:00--7:30 PM, Dunn 117</i>
<i>Midterm II</i>	20%	<i>June 6<sup>th</sup>, 2019. 6:00--7:30 PM, Dunn 117</i>
<i>Final exam</i>	40%	<i>June 20<sup>th</sup>, 2019. 6:00--9:00 PM, Dunn 117</i>

**Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale**

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 1–5pm on a first come, first served basis, free of charge. The Learning Centre also has large tables where you can work together.
2. You will also be given reading assignments from the textbook.
3. Calculators, textbooks, and notes are not allowed 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 always 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 and exams.

### Smartphone policy

I request that you refrain from the use of your smartphone during class. The main reasons are:

- It is distracting to those sitting near you.
- "Multitasking" doesn't work, as studies have shown; you'll do poorly at both tasks.
- Concentration is absolutely essential in mathematics. Without the ability to concentrate you will not be able to go beyond a certain relatively low level.
- Please consider your classes (not just this one) as opportunities to practice concentrating on just one task.

Thank you for your consideration.

### Course Content (dates are approximate)

May 7	1.1--1.3 Systems of linear equations, elementary operations.
May 9	1.4--1.5 Gaussian elimination and Gauss-Jordan elimination
May 14	1.6 Homogeneous system, 1.7 Uniqueness of reduced echelon form 2.1--2.3, Addition and scalar multiplication of vectors in $\mathbb{R}^n$
May 16	2.4--2.7 Linear combination, length, dot and cross products
May 21	Midterm I (covering all previous four lectures) 4.1--4.3 Definition, equality, addition and scalar multiplication of matrices
May 23	4.4--4.5, 4.7 Matrix multiplication, inverse and transpose
May 28	5.1--5.2 Span and linear independence
May 30	5.3--5.5 Subspaces and basis
June 4	6.1--6.2 Linear transformations
June 6	Midterm II (covering lectures from May 21 to May 30) 7.1, 7.3 Determinants of $2 \times 2$ and triangular matrices
June 11	7.2, 7.5 Calculation and properties of determinants
June 13	8.1--8.2 Eigenvectors and eigenvalues
June 18	8.4 Diagonalization

**Faculty of Science Course Syllabus (Section B)  
MATH 1030--Matrix Theory and Linear Algebra I**

**University Policies and Statements**

**This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate**

**Academic Integrity**

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

**Information:** [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

**Accessibility**

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

**Information:** [https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.html)

**Student Code of Conduct**

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

**Code:** [https://www.dal.ca/dept/university\\_secretariat/policies/student-life/code-of-student-conduct.html](https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

**Diversity and Inclusion – Culture of Respect**

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

**Statement:** <http://www.dal.ca/cultureofrespect.html>

**Recognition of Mi'kmaq Territory**

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) ([elders@dal.ca](mailto:elders@dal.ca)).

**Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Important Dates** in the Academic Year (including add/drop dates)

[https://www.dal.ca/academics/important\\_dates.html](https://www.dal.ca/academics/important_dates.html)

**University Grading Practices**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

**Missed or Late Academic Requirements due to Student Absence (policy)**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html](https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html)

**Student Resources and Support**

**Advising**

**General Advising** [https://www.dal.ca/campus\\_life/academic-support/advising.html](https://www.dal.ca/campus_life/academic-support/advising.html)

**Science Program Advisors:** <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

**Indigenous Student Centre:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Black Students Advising Centre:** [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:** [https://www.dal.ca/campus\\_life/international-centre/current-students.html](https://www.dal.ca/campus_life/international-centre/current-students.html)

## **Academic supports**

**Library:** <https://libraries.dal.ca/>

**Writing Centre:** [https://www.dal.ca/campus\\_life/academic-support/writing-and-study-skills.html](https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html)

**Studying for Success:** [https://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)

**Copyright Office:** <https://libraries.dal.ca/services/copyright-office.html>

**Fair Dealing Guidelines** <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

## **Other supports and services**

**Student Health & Wellness Centre:** [https://www.dal.ca/campus\\_life/health-and-wellness/services-support/student-health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html)

**Student Advocacy:** <https://dsu.ca/dsas>

**Ombudsperson:** [https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html)

## **Safety**

**Biosafety:** <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

**Chemical Safety:** <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

**Radiation Safety:** <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

**Scent-Free Program:** <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>