DALHOUSIE UNIVERSITY

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 (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

Course Assessment

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

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

DALHOUSIE UNIVERSITY

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. You need to pass the final to pass the course.
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 mulitplication of matrices
May 23	4.4--4.5, 4.7 Matrix multiplication, inverse and transpose +Theorem 4.64
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 and 6.4 its properties
June 6	Midterm II (covering lectures from May 21 to May 30) 7.1, 7.3 Determinants of 2×2, 3×3 and triangular matrices 7.4 Determinants and row operations
June 11	7.2, 7.5, Calculation and properties of determinants with 7.6 Application: A formula for the inverse of a matrix
June 13	8.1--8.2 Eigenvectors and eigenvalues
June 18	8.4 Diagonalization & 8.5 Matrix powers

DALHOUSIE UNIVERSITY

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

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

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

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).

Information: 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

University Grading Practices
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

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

DALHOUSIE UNIVERSITY

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

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: 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

Studying for Success: 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

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

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