

**MATH 1104A Linear Algebra for Engineering or Science, Fall 2021  
(Course outline, subject to change, updated September 2, 2021)**

**Instructor:** Şaban Alaca

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**Textbook:** Linear Algebra and its Applications (with MyLab Access Code), Sixth Edition, David C. Lay, Steven R. Lay, and Judi J. McDonald.

E-Textbook with MyLab Access Code can be purchased directly from the publisher (Pearson) either as a bundle or separately. Links to purchase options from the publisher will be posted on the course Brightspace page. E-Textbook with MyLab Access Code can also be purchased from the university bookstore. You might wish to compare pricing at both places before making your purchase.

**Prerequisite:** Ontario Grade 12 Mathematics: Advanced Functions, or MATH 0005, or equivalent, or permission of the School.

**Calendar description:** Systems of linear equations, matrix algebra, determinants, invertible matrix theorem, Cramer's rule. Vector space  $\mathbb{R}^n$ , subspaces, bases. Eigenvalues, diagonalization. Linear transformations, kernel, range. Complex numbers (including De Moivre's theorem). Inner product spaces and orthogonality. Applications.

**Lectures** (online via Zoom): Mondays and Wednesdays 11:35am -12:55pm. Lectures begin on Wednesday September 8, 2021, and end on Friday December 10, 2021.

**Tutorials:** Mondays 3:35-4:25pm. There will be online problem-solving sessions during the tutorial hours. There might also be in-person tutorial sessions, depending on the number of students registered for the in-person tutorial. Tutorials start on September 20, 2021.

**Office hours** (online via Zoom): Wednesdays 1:00pm-1:50pm (subject to change)

**Class conduct:** Students are expected to always behave in a professional manner. Disrupting a class is an Instructional Offence (see University Calendar). Please adhere to the same standards of behaviour online that you follow in a real classroom.

**Evaluation:**

Five written assignments (each worth 10%, to be submitted via Brightspace): 50%.

Five online quizzes (each worth 3%, hosted on MyLab): 15%

Online final exam (hosted on MyLab): 35%

**Online final exam:** There will be a 3-hour online final exam scheduled during the usual exam period. It is the responsibility of each student to be available at the time of the final examination.

## **Important notes:**

- Lectures will be online via Zoom during the scheduled class times. Lecture notes will be posted on Brightspace in advance. Students are expected to study the assigned pages of the lecture notes and the relevant sections of the textbook before each class. During online lecture times, you will have an opportunity to ask your questions. The classes are not a substitute for studying the lecture notes and the relevant sections of the textbook by yourself prior to each class.
- Instructions on how to join the Zoom sessions will be posted on Brightspace.
- More details for lectures, tutorials and office hours will be posted on Brightspace.
- Be sure that you know the academic integrity standards at Carleton which can be found at <https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy.pdf>
- Please use your Carleton e-mail account for all course related e-mails.
- You are responsible for keeping up with information announced during the lectures and tutorials, or sent to your Carleton e-mail account, or announced on Brightspace.
- All materials created for this course (including lecture notes, tutorials, assignments, quizzes, and tests) are the intellectual property of the instructor, Şaban Alaca. They are intended for personal use only and may not be reproduced or redistributed without prior written consent of the instructor.

### MATH 1104A Lecture Schedule

Dates	Sections	Important Dates	Topics
Sep 8	1.1		Systems of Linear Equations
Sep 13, 15	1.2 1.3, 1.4		Row Reduction and Echelon Forms Vector Equations, The Matrix Equation $\mathbf{Ax} = \mathbf{b}$
Sep 20, 22	1.5 1.7	Assignment 1	Solution Sets of Linear Systems Linear Independence
Sep 27, 29	1.6, 1.10 1.8, 1.9	Quiz 1	Applications of Linear Systems Introduction to Linear Transformations The Matrix of a Linear Transformation
Oct 4, 6	2.1, 2.2	Assignment 2	Matrix Operations, The Inverse of a Matrix,
Oct 13	2.3		Characterizations of Invertible Matrices
Oct 18, 20	2.8	Quiz 2	Subspaces of $\mathbf{R}^n$
Oct 25--29			FALL BREAK (NO CLASSES)
Nov 1, 3	2.9	Assignment 3	Dimension of a Subspace Rank of a Matrix
Nov 8, 10	3.1 3.2 3.3	Quiz 3	Introduction to Determinants Properties of Determinants Cramer's Rule
Nov 15, 17	5.1 5.2 5.3	Assignment 4	Eigenvectors and Eigenvalues The Characteristic Equation Diagonalization
Nov 22, 24	Appendix B Lecture Notes	Quiz 4	Complex Numbers
Nov 29, Dec 1	5.5 6.1	Assignment 5	Complex Eigenvalues Inner Product, Length and Orthogonality
Dec 6, 8, 10	6.2 6.3	Quiz 5	Orthogonal Sets Orthogonal Projections

Each quiz and assignment will be released on Sunday at 11pm and will be due on the following Sunday at 11pm (Ottawa time).

## Policies:

**Academic accommodation:** You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Academic accommodations for students with disabilities:** The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or <https://carleton.ca/pmc/> for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test requiring accommodation. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. For the deadline to request accommodations for the formally-scheduled exams, visit the PMC website <https://carleton.ca/pmc/>

**Religious obligations and/or accommodation for pregnancy:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the student guide at <https://carleton.ca/equity/accommodation/academic/students/>

## Teaching assistants:

Section	Teaching Assistant	Email: @cmail.carleton.ca
A1	Lubna Almadi	lubnaalmadi@cmail.carleton.ca
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