

MATH 15A: Applied Linear Algebra
Summer 2021

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Modality, Meetings, & Recitations:

This section will meet **online on Zoom** during the times scheduled by the registrar.

Learning Goals for Math 15a:

1. Identify and apply key ideas and skills of Linear Algebra to a broad range of scientific and economic problems
2. Hone your problem solving skills.
3. Develop and leverage a learning community for math.

Prerequisite:

MATH 5a and permission of the instructor, placement by examination, or any mathematics course numbered 10 or above.

Text:

Linear Algebra and Its Applications, by David Lay, 5th edition

LATTE:

All course materials for Math 15a will be available online on LATTE. Log in at <http://latte.brandeis.edu> using your Unet username and password.

Grades:

Your grade in the course will be based on the following

1. Homework (25% of your grade):

- Homework assignments will be collected once a week. It will be due every Thursday before class (2 pm Eastern Time)
- **No Late Homework will be accepted**, but your two lowest homework grades will be dropped.

2. Exercises (25% of your grade):

- Exercises will be given daily in class as part of the class
- Each exercise is due at 11:59 pm Eastern Time of the same day
- **No Late Exercises will be accepted**, but your two lowest exercises grades will be dropped.

3. Midterm (20 % of your grade)

4. Final (30 % of your grade)

Syllabus:

We will cover the following sections from our textbook this semester:

Note: Some topics may be added or omitted as time permits.

Section	Topic
1.1	System of Linear Equations
1.2	Row Reduction and Echelon Forms
1.3	Vector Equations
1.4	The Matrix Equation $Ax = b$
1.5	Solution sets of Linear Equations
1.6	Applications of Linear Systems
1.7	Linear Independence
1.8	Introduction to Linear Transformations
1.9	The Matrix of a Linear Transform
2.1	Matrix Operations
2.2	The Inverse of a Matrix
2.3	Characterization of Invertible Matrices
2.8	Subspaces of \mathbb{R}^n
3.1	Introduction to Determinants
3.2	Properties of Determinants
3.3	Cramer's Rule, Volume, and Linear Transformations
4.1	Vector Spaces and Subspaces
4.2	Null Spaces, Column Spaces, and Linear Transformations
4.3	Linearly Independent Sets; Bases
4.5	The Dimension of a Vector Space
4.6	Rank
4.7	Change of Basis
5.1	Eigenvectors and Eigenvalues
5.2	The Characteristic Equation
5.3	Diagonalization
5.4	Eigenvectors and Linear Transformations
5.5	Complex Eigenvalues
6.1	Inner Product, Length, and Orthogonality
6.2	Orthogonal Sets
6.2	Orthogonal Projections

Other Course Information

Calculators:

Calculators are **not** allowed during quizzes or Friday Assessments. You should have access to a scientific calculator for homework (you can use a free online one), but you do not need a graphing calculator.

Four-Credit Course:

Success in this 4 credit hour course is based on the expectation that students will spend a **minimum of 9 hours of study time per week** in preparation for class (readings, papers, discussion sections, preparation for exams, etc.).

Accommodations:

Brandeis seeks to welcome and include all students. If you are a student who needs accommodations as outlined in an accommodations letter, please talk with me and present your letter of accommodation as soon as you can. I want to support you.

In order to provide test accommodations, I need the letter more than 48 hours in advance. I want to provide your accommodations, but cannot do so retroactively. If you have questions about documenting a disability or requesting accommodations, please contact Student Accessibility Support (SAS) at 781.736.3470 or access@brandeis.edu

Academic Integrity:

You are expected to follow the University's policy on academic integrity, which is distributed annually as section 4 of the Rights and Responsibilities Handbook (see <http://www.brandeis.edu/studentaffairs/srcs/rr/index.html>). Instances of alleged dishonesty will be forwarded to the Department of Student Development and Conduct for possible referral to the Student Judicial System. Potential sanctions include failure in the course and suspension from the University. If you have any questions about how these policies apply to your conduct in this course, please ask.

Necessary Equipment and Available Resources:

Success in this online course will require a webcam with a microphone and internet access. If you need assistance with acquiring any of these items, contact emergencyfunds@brandeis.edu. *You will be required to have your camera ON and your mic OFF during class. All classes will be recorded.*

Many resources are available to help with the academic and non-academic factors that contribute to student success (finances, health, food supply, housing, mental health counseling, academic advising, physical and social activities, etc.). Please explore the links on the Support at Brandeis page <https://www.brandeis.edu/support/undergraduate-students/browse.html> to find out more about the resources that the University provides to help you and your classmates achieve success.

Timely communication:

Use your Brandeis email to reach out to me. I am usually able to respond quickly to most messages, within 24 hours, although during the weekends and over holidays it could take me longer. If I reach out to you, with a query or comment or in response to an email from you, I would appreciate it if you would acknowledge receipt of my message and/or respond with 24 hours, unless it is during weekend or over a holiday. Note that we will use your Brandeis email address, so you need to check it regularly.

All course announcements can be found in the [Course News & Announcements](#) page on Latte.