

Abstract Linear Algebra

Summer 2025

Instructor:	Katalin Berlow	Time:	2:00pm-4:00pm
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Website:	math.berkeley.edu/~katalin/110.html	Room:	Dwinelle 109

Course description: This is a proof-based continuation of linear algebra intended for students with prior exposure to linear algebra from a course such as MATH 54. We will focus on vector spaces, linear transformations, eigenvalues and diagonalization, inner products, Jordan normal form, and applications. The course will be divided into four parts:

Part 1: Matrices and Vector Spaces

Part 2: Linear Transformations

Part 3: Inner product spaces and Jordan Normal form

Part 4: Applications

Textbook: *Linear Algebra Done Right* by Sheldon Axler. Available for free: <https://linear.axler.net>

Prerequisites: Math 54 or equivalent required.

Office hours: Office hours come in two forms. Monday and Wednesday office hours are homework sessions. Feel free to stop by to work on your homework in groups with other students. I will be around to answer any questions about the homework or related mathematical content. Tuesday office hours are for administrative questions. This is the time to ask questions which are not directly math related such as asking for advice on how to do better in the course, discussing grades, absences, etc.

Mondays 11:00am-12:00pm Place: TBD

Tuesdays 4:00pm-5:00pm Place: TBD

Wednesdays 4:00pm-5:00pm Place: TBD

Lecture and Attendance: This course is twice the pace of a standard semester course, and missing lecture will result in falling behind. Attendance is required due to the accelerated pace of the course. Attendance will be taken in the form of *mini-quizzes*.

Mini Quizzes: In the first ten minutes of each lecture, there will be a brief mini-quiz consisting of two questions. This is mainly for attendance purposes so the questions should be fairly easy. You must stay for the full lecture to receive credit for the mini-quiz.

Long Quizzes: There will be three long quizzes during the course, marking the end of parts 1, 2, and 3. The dates for the long quizzes are: July 7th, July 21st, and August 4th. They will be during the first hour of lecture, and will cover the content from the previous two weeks.

Problem Sessions: Every two weeks, the Thursday lecture before each long quiz will be replaced with an in-class group problem session.

Homework: Homework will have two types: problem sets and polls. Problem sets will be due twice a week on weeks without a long quiz and once a week on those weeks with a long quiz. The problem sets will be turned in via gradescope. Please take the time to learn how to submit homework to gradescope properly as incorrectly submitted homework will not receive credit. There will also be three polls during the course so I can receive feedback on how to make the course a better experience for everyone. These polls will each count for one homework and will be graded on completion.

Final Exam: There will be a final exam. The final will be split into four parts, corresponding to the four parts of the course.

Late assignments and absences: Students will be allowed a 24-hour extension on two homework assignments. Any other late work will not be accepted. Regardless of attendance, the lowest two mini quizzes will automatically be dropped. Any missed long quizzes will be replaced by the corresponding section of the final. There will be no makeup mini quizzes or long quizzes.

Grading Scheme: Below is the grading scheme. The column “% each” refers to what percentage of the grade each assignment is worth. The column “% total” refers to the percentage of the grade that category of assignment is worth. If a student does better on the corresponding part of the final than they did on the long quiz, the grade for the long quiz will be replaced by the grade for that part of the final.

Assignment	How Many	% each	% total
Homework	15	1%	15%
Mini Quizzes	30	0.5%	15%
Long Quizzes	3	10 %	30 %
Final	1	40%	40%

Cheating: Use of any electronic devices during any quizzes or the final is not allowed. For your own sake, do not look up answers or use Chat GPT or other LLMs on the homework. I can't stop you from doing this, which is why the homework is so little of the grade. Mastering the homework on your own is the best preparation for exams.

Emails: If your question can be answered during (administrative) Tuesday office hours, please come talk to me then instead. I will not answer math questions through email, but there will be an ED Discussion page and office hours.

Accommodations: If you have any circumstances (including disability, medical, or personal) that may affect your ability to succeed in this course, please reach out early so we can make arrangements. If you have a registered accommodation through disability services, please send me an email so we can set up a time to discuss how we will implement your accommodations. I will need to be notified of accommodations for extra time at least 14 days in advance of any exam you need this for.

Other Info: All information about the course will be on the course website listed above.