Course Syllabus

Navigation Tips

- See the **Course Schedule** for a weekly outline.
- See the **Course Summary** below for a list of due dates (use the link at the top right of this page to "jump to today"). *All times listed are Pacific Time. If you prefer, you can set your own time zone to display throughout bCourses.*
- **Enrollment issues or other questions about math courses?** Please contact the registrar or the Math Department Undergraduate Advising Team.
- **Question that might be useful for other students to hear?** Please ask on Ed Discussion! (Ed Discussion is linked in course navigation on the left.)

Course Description

Basic linear algebra; matrix arithmetic and determinants. Vector spaces; inner product spaces. Eigenvalues and eigenvectors; linear transformations, symmetric matrices. Linear ordinary differential equations (ODE); systems of linear ODE. Fourier series.

Prerequisites

Math 1B or equivalent preparation.

Class number

22137

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Required Text

Lay and Nagle, Saff & Snider, *Linear Algebra and Differential Equations,* combined Berkeley custom edition.

Textbook at Cal student store

We will cover the following sections of the textbook:

Part 1: Linear algebra (Lay)

- Chapter 1: Linear equations in linear algebraSections 1.1-1.5, 1.7-1.9
- Chapter 2: Matrix algebraSections 2.1-2.3
- Chapter 3: DeterminantsSections 3.1-3.3
- Chapter 4: Vector spacesSections 4.1-4.7
- Chapter 5: Eigenvalues and eigenvectorsSections 5.1-5.5 and Appendix B
- Chapter 6: Orthogonality and least squaresSections 6.1-6.7
- Chapter 7: Symmetric matrices and quadratic formsSections 7.1-7.2, 7.4

Part 2: Differential Equations (NS&S)

- Chapter 4: Linear second-order ODESections 4.2-4.5
- Chapter 9: Systems of linear ODESections 9.1, 9.4-9.6
- Chapter 10: Fourier Series, application to PDESections 10.3, 10.4

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Exams, Quizzes, and Homework

Exams

Midterm 1: covers material up to and including Lay Ch. 2.3.

Midterm 2: covers material up to and including Lay Ch. 6.4.

Final Exam: covers material from the entire course.

Quizzes

There will be quizzes each week. They will be modeled on the sample quizzes contained in the modules.

Homework

Each week contains homework. You are encouraged to discuss ideas with other students. However, you must write and submit your solutions independently.

Gradescope

Gradescope will be used for submission of the homework, some of the quizzes, and parts of the midterms and final exam. All Gradescope assignments are linked in bCourses. For instructions on how to scan and upload on Gradescope, see this video on submitting PDF homework and this handout with recommended scanning apps.

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Grading

Grading policy: Based on homework (5%), quizzes (20%), two midterms and the final exam (75%).

We will drop your three lowest quiz scores and your three lowest homework scores.

Each midterm will be worth 25% and the final exam will be worth 50% = 2 x 25%. Of these four 25% scores, we will drop the lowest and keep your best three to arrive at 75%.

Example: Alice's scores are Midterm 1: 90, Midterm 2: 82, Final exam: 94. So her four 25% scores are 90, 82, 94, 94. We will drop 82 and average 90, 94, 94 to arrive at 92 2/3.

Example: Bob's scores are Midterm 1: 91, Midterm 2: 93, Final exam 88. So his four 25% scores are 91, 93, 88, 88. We will drop one 88 and average 91, 93, 88 to arrive at 90 2/3.

Final grades will roughly follow historical distributions as recorded at berkeleytime.

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Course Policies

Academic honesty: You are expected to rely on your own knowledge and ability, and not use unauthorized materials or represent the work of others as your own. Protect your integrity and follow the honor code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others."

There will be no make-up exams or quizzes. No late homework will be accepted.

Grades of Incomplete will be granted only for dire medical or personal emergencies that cause you to miss the final, and only if your work up to that point has been satisfactory.

Students with Disabilities

If you require course accommodations due to a physical, emotional, or learning disability, contact UC Berkeley's Disabled Students' Program (DSP). Notify the instructors and GSI through course email of the accommodations you would like to use.

UC Berkeley is committed to providing robust educational experiences for all learners. With this goal in mind, we have activated the ALLY tool for this course. You will now be able to download content in a format that best fits your learning preference. PDF, HTML, EPUB, and MP3 are now available for most content items. For more information visit the alternative formats link or watch the video entitled, "Ally in bCourses."

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Useful Resources

- The university's return to campus page has updated information on Covid protocols.
- The Student Technology Equity Program (STEP) offers computers and internet access to students in need.
- The Berkeley Disabled Students' Program: Student Resources has links to many useful resources.
- Counseling and Psychological Services (CAPS) are available at the Tang Center and remotely.
- The PATH to Care Center assists students who experience sexual harassment or sexual violence.
- The UC Berkeley Food Pantry distributes food to students who need it.

Academic Resources

Some previous Math 54 course web pages:

- David Nadler's Fall 2017 Math 54.
- Nikhil Srivastava's Fall 2016 Math 54.
- David Nadler's Fall 2015 Math 54.

- David Nadler's Fall 2014 Math 54.
- Katrin Wehrheim's's Fall 2014 Math 54.
- Alberto Grunbaum's Fall 2013 Math 54.
- Alberto Grunbaum's Fall 2012 Math 54.
- Maciej Zworski's Spring 2012 Math 54.
- Olga Holtz's Fall 2010 Math 54.
- Peyam Tabrizian's Math 54 web page.
- George Melvin's Math 54 webpage.

Study help and tutoring:

- Study groups, reviews, and drop-in tutoring for Math 54 at the Student Learning Center.
- Math department list of tutors.

Some previous Math 54 exams:

- Math department archive
- Tau Beta Pi archive

Math 54 Worksheets

Some online linear algebra:

- J. Strom, K. Astrom, and T. Akenine-Moller, Immersive Linear Algebra, "The world's first linear algebra book with fully interactive figures." (Thanks to Alven Wang for the link.)
- 3Blue1Brown, Essence of Linear Algebra, youtube videos. (Thanks to Carly de Frondeville for the link.)