Math 54 Linear Algebra and Differential Equations (4 Units) Spring 2025

Arun Sharma

Email: asharma18 AT berkeley DOT edu

Phone: (510) 672 – 4043 (Emergencies only please!)

Course Website: https://www.ocf.berkeley.edu/~asharma/Math54 Homework assignments are posted here as will past quizzes, worksheets, review sheets, and exams with their solutions.

Office Hours: Monday 1:00 – 6:00 PM, Tuesday 2:00 – 5:00 PM, Wednesday 11:15 AM – 1:15 PM, and Friday 11:15 AM – 12:15 PM, all of these at the SLC Center (Cesar Chavez Atrium); Online: Tuesday/Sunday 8:00 – 10:00 PM, Thursday 9:00 – 10:00 PM all at this link: Zoom. If none of these are suitable for you, please email me, and we can set up a special time that works. Do not hesitate to do this, if you need help better to try to get it sooner rather than later!

Can also access the full office hours (GSIs included) in this calendar

Text: Lay/Lay/Mcdonald, **Linear Algebra and Differential Equations, Math 54, Second Custom Edition for UC Berkeley**

Prerequisites: Math 1B, Math 10B, or the equivalent.

Instruction: Lecture 1 meets MWF 9:00 – 10:00 AM in 150 Wheeler while Lecture 2 meets MWF 10:00 – 11:00 AM in 150 Wheeler, both alongside a discussion section on MWF at an appropriate time/place.

Lecture will involve familiarizing students with the fundamentals needed for the class along with explaining the most important concepts. Discussion will focus mostly on improving students' problem solving abilities via quizzes, examples, homework discussion, and worksheets.

Outside events (e.g. public health emergencies, campus safety directives, or temporary power outages) may require changes to the modes of engagement that will be available to students to complete the course requirements. If events occur at any point during the semester that require these changes, students will receive formal notification from the instructor. The details of the specific changes or adaptations made to the course will be communicated via email and, if possible, in-class announcements. Students may also receive an amended syllabus due to unavoidable changes that this will require.

bCourses will be students' main point of remote entry for class meetings, even if lectures, discussion sections, and office hours will be administered using third-party software, such as Zoom. Students will continue to use their CalNet ID login and berkeley.edu address to access content. In the event a student is required to download or update specific software for home use in order to access the course materials, or if students need specific technical assistance setting up their remote access, please use https://software.berkeley.edu/

Topics: Matrix arithmetic, vector spaces, inner product spaces, eigenvalues/eigenvectors, linear transformations, symmetric matrices. Ordinary differential equations, systems of linear differential equations, Fourier series.

Course Objectives: To gain a good understanding of the topics above, especially how they interrelate to each other, and being able to solve a variety of problems where these concepts could be presented in different ways.

Calculators: No calculators of any kind will be permitted on either quizzes or exams. It is strongly encouraged that students avoid using calculators on homework or anything else which pertains to studying for this class. There will not be questions which require extensive calculations on quizzes or exams.

Exams: The tentative schedule for exams is:

	Lecture 1	**Lecture 2**
Midterm 1 (Chapters 1 – 4.3)	Friday February 28	Friday February 28
Midterm 2 (Chapters 4.4 – 7.2)	Friday April 11	Friday April 11
Final Exam (cumulative)	Monday May 12 (7:00 – 10:00 PM)	Tuesday May 13 (3:00 – 6:00 PM)

Grading Policy

There will be weekly quizzes and homework with the quizzes counting for 15% of your overall grade and Homework for 10%. The three exams will constitute the other 75% of your grade according to one of the four following breakdowns – whichever one gives you the highest average:

	Option 1	Option 2	Option 3	Option 4
Midterm 1	20%	10%	20%	25%
Midterm 2	20%	20%	10%	25%
Final Exam	35%	45%	45%	25%

Since there are two different classes, the grading policy for each is potentially different since the quiz grading and exams won't be completely identical. So you will be governed by the grade cutoffs for the class you are enrolled in since that is the class you will have taken quizzes in. Understand that that holds even if due to emergency circumstances you end up taking one or more of the exams with one of the other classes since the quizzes tend to be the main reason that the classes might have slightly different cutoffs.

Note that taking the final exam is mandatory, and there almost certainly will not be a make-up final. But usually if you have to miss the final due to reasons out of your control, taking an incomplete is the forced, even if undesirable, option. Check the next section so you are clear about how those work.

Incompletes: Incompletes are given only in very rare circumstances where a student has a total physical inability to take the Final Exam – they are not given when a student has experienced prior hardship(s) which will then force them to take the Final Exam under less than "ideal" circumstances, that is the rule, please understand that! And also, regardless of what prior circumstances were, an Incomplete can only even be considered when the student's prior work in the class up to that point is of passing quality – this is a university/department rule, not negotiable!

When you take an Incomplete, there is a specific deadline by when you must "fill" the Incomplete, and you must adhere to that deadline as the Incomplete will almost never be extended. You will usually have to take the exam with a different instructor (who will obviously teach the class differently), and it's quite likely that you will have multiple Finals bunched together when you fill it due to the "extra" Final this will force upon you. Please plan accordingly for those issues as wanting to take/not take the exam with a specific instructor or having other Finals in close proximity as the one needed for your Incomplete – those will not be considered valid reasons to extend the Incomplete so please do not ask!

It is strongly encouraged that you only try for an Incomplete if there really is no other resort as they turn out badly pretty much every time. Because of the above issues: different instructor, too many Finals collectively, and a long layoff from having done/practiced the material, the vast majority of students perform far worse on the "replacement" Final that they take compared to their prior work in the class, most in fact end up getting a failing grade in the course at the end. So while that can often seem convenient in the moment, it usually is far more likely to turn out badly, only ask for that if there really is no other choice!

Quizzes: There will be quizzes given every week in discussion on Wednesday (aside from weeks of the midterms). Generally a given quiz will cover the material/sections of homework due on the Monday two days before. When computing a student's quiz average, the lowest quiz grade will be dropped.

Homework: There will be weekly homework assigned (as noted below) which generally must be submitted to gradescope by Monday 9:00 PM PST.

Attendance and Tardiness Policy: If you miss class for any reason, the burden is on you to make up the work and to make a decision whether you can continue in the course.

Late Work Policy: Generally students will only be able to hand in homeworks late or take make-up quizzes due to illness, personal emergency, or similar emergency circumstances. Please contact me or your GSI as soon as you are able so we can make appropriate arrangements for you to make up what you have missed in such situations. However, quizzes and exams will not be given online under any circumstances so please do not request that.

Safety and Emergency Preparedness: Our emergency evacuation assembly area is at the corner of Oxford and Bancroft.

In the event of an emergency please follow instructions from your instructor and staff. If the fire alarm is sounding, exit the building immediately. In the event of an earthquake, duck when

possible and hold in place, covering your head with your arms, a binder or your laptop. Then exit the building when the shaking stops. If you are in a wheelchair or need assistance descending stairs, proceed to the Designated Waiting Area for evacuation.

Emergency Numbers: Dial 911 from any phone, on or off campus.
UC Berkeley Police (from cell phone): 510-642-3333
City of Berkeley Police/Fire (from cell phone): 510-981-5911
Campus Emergency Information line: 800-705-9998

Disabled Students' Services: UC Berkeley is committed to creating a learning environment that meets the needs of its diverse student body including students with disabilities. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with me. If you have a disability, or think you may have a disability, you can work with the Disabled Students' Program (DSP) to request an official accommodation: https://dsp.berkeley.edu. If you have already been approved for accommodations through DSP, please meet with me so we can develop an implementation plan together.

Honor Code and Student Conduct:

Students are expected to conform to the UC Berkeley Honor Code which states: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others."

Reasonable Accommodation for Students' Religious Beliefs, Observations and Practices:

In compliance with Education code, Section 92640(a), it is the official policy of the University of California at Berkeley to permit any student to undergo a test or examination, without penalty, at a time when that activity would not violate the student's religious creed, unless administering the examination at an alternative time would impose an undue hardship which could not reasonably have been avoided.

End of Course Evaluations:

At the end of the semester students will be invited to participate in the Course Evaluation. Your candid feedback will help to plan for the future and make improvements.

    Evaluation invitations are emailed to students
    The identity of all respondents remains confidential.
    Evaluation results aren't shared with instructors until after final grades are due.