

Mathematics 54, Fall 2018

MWF 1-2, VLSB 2050

Syllabus: Basic linear algebra; matrix arithmetic and determinants. Vector spaces; inner product spaces. Eigenvalues and eigenvectors; linear transformations. Homogeneous ordinary differential equations; second-order differential equations with constant coefficients. Fourier series and partial differential equations.

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Course webpage:

<http://math.berkeley.edu/~lott/math542018.html>

Course postings: The syllabus can always be found at this page:

<https://math.berkeley.edu/~lott/math54syllabus2018.html>

Any lecture displays, homework solutions or test solutions will be posted on the class bcourses page :

<https://bcourses.berkeley.edu>

Do you have a question that might be useful for other students to hear? Ask it on Piazza! You will be enrolled automatically, but the signup link is

<http://piazza.com/berkeley/fall2018/math54>

(Your use of Piazza for this class is completely voluntary. No important announcements will be made through Piazza. Postings are anonymous to your classmates but not to me. Posting homework answers is not allowed.

)

Enrollment questions: You MUST attend the section for which you are registered.

I have no control over enrollment issues. There are presently sixteen discussion sections. Students on the wait list should look for an open section. If you are on the wait list then I recommend coming to class, finding a discussion section with free seats in its classroom, handing in the homework there and taking the quizzes there. Because some students will leave the class, some openings may arise, but there is no guarantee. Also, keep checking for openings in various sections.

If you are enrolled in a section, but would like to switch into a different section which is not full, then you can do so yourself on CalCentral. Select the "Options" link on CalCentral on the My Academics page of the Class Enrollment card under the "Class Adjustment" section. You will not be dropped from the primary component (lecture, etc) if you select this option. You can only do this if you are enrolled but not on the waitlist. *Do NOT use "Swap" to switch discussion sections!* If you wish to switch discussion sections and

the semester has already begun, it is also a good idea to check-in with your old and new Graduate Student Instructors (GSIs) to make sure that any scores you have already received can be transferred to the new GSI.

If you are enrolled in a section but would like to switch into a different section which is full, and you know somebody in the other section who would like to switch into yours, then this can be arranged if both you and the other person go together to see Thomas Brown in 965 Evans.

You can send further enrollment questions to enrollment@math.berkeley.edu

Prerequisites: 1A-1B or equivalent. Note: calculus courses at most institutions either have no differential equations, or less than Berkeley's Math 1B. Transfer students who have taken such a course need to learn that differential equations material (Stewart, Calculus: Early Transcendentals, 5th Ed., Ch.s 9 and 17) on their own, by approximately the 10th week of Math 54.

Textbook: Math 54, Linear Algebra and Differential Equations, Custom Edition, University of California, Berkeley, Pearson Publishing

This consists of selected chapters from two books:

``Linear Algebra and its Applications'', 5th edition, by Lay, Lay and McDonald, and

``Fundamentals of Differential Equations'', 9th edition, by Nagle, Saff and Snider

The custom edition mentioned above is at a reduced price. You don't want to buy the two books individually. If you already bought an earlier edition of the book then you're probably OK, but you should be aware that some of the exercise numbers may be different. You'll have to get the homework problems from the current edition.

Class meetings and sections: The class meets in VLSB 2050 during 1-2pm on Mondays, Wednesdays and Fridays. If you take this course you are expected to attend lectures, enroll in and attend one of the discussion sections listed below, do the homework each week, and take quizzes, the two midterms and the final. All discussion sections meet TuTh.

Section	Time	Place	Instructor
301	8am	110 BARKER	E. Bain
302	8am	205 DWINELLE	M. Adnane
303	12:30pm	5 EVANS	E. Bain
304	8am	258 DWINELLE	S. Sadoughi
305	11am	85 EVANS	M. Hassen
306	11am	179 STANLEY	M. Hlavacek
307	11am	70 EVANS	S. Sadoughi
308	12:30pm	285 CORY	J. Lin
309	12:30pm	105 LATIMER	M. Hassen
310	12:30pm	179 DWINELLE	M. Hlavacek
311	3:30pm	102 LATIMER	J. Lin

312	3:30pm	87 EVANS	L. Wang
313	3:30pm	285 CORY	G. Massas
314	5pm	81 EVANS	L. Wang
315	5pm	85 EVANS	M. Adnane
316	5pm	87 EVANS	G. Massas

You can attend the office hours of any of the GSIs. They are:

Mostafa Adnane, F4-6, 840 Evans

Emily Bain, M4-6, 828 Evans

Mubarek Hassen, TuTh10-11, 868 Evans

Max Hlavacek, M11-2 and W2-3, 1044 Evans

Jeffmin Lin, MW4-5, 941 Evans

Guillaume Massas, WF2-3, 836 Evans

Saghi Sadoughi, TuTh10-11, 816 Evans

Luya Wang, M11-12 and M2-3, 828 Evans

Exams:

Exams are "closed book": No notes, books, or calculators permitted. For midterm and final exams, bring pencils/pens/erasers. Exam books and blank scratch paper are NOT needed or permitted. All work will be done in booklets provided by me. Scratchwork can be done in that booklet, either on a blank page provided at the end of the booklet, or on backs of any pages.

In general, you are not required to simplify arithmetic expressions which arise on exams. Do not multiply out or divide out expressions involving decimals. $7/9$ is a better answer than $0.77777\dots$ with infinitely many dots, while a rounded approximation such as 0.77 is not equal to $7/9$ and thus would not be completely correct. Expressions such as π , e , and the square root of two should be left as is, not approximated by decimals. Expressions which can obviously be simplified, such as $32/64$ or the square root of 9, should be simplified. Algebraic expressions should be simplified where possible.

You should understand the statements of the theorems. You are not required to memorize the proofs. There may be exam questions in which you are asked to prove something.

For some exam problems, boxes will be provided in which answers are to be written. This is done in order to eliminate miscommunication and facilitate grading. Please write your final answer in the box in order to receive full credit.

Partial credit will be given where appropriate.

Grades for exams or quizzes can only be changed if there is a clear error on the part of the grader, such as adding up marks incorrectly or forgetting to grade a question. If you write a correct answer for a problem but your reasoning is incorrect or nonexistent then you will not get credit for it.

Nobody should be too surprised if many of the problems on the midterms and/or the final are similar to those in the homework. It follows that a good way to prepare for these exams is to attempt every problem in the homework assignment every single week. You will be motivated to do this in a way that is explained below.

Exam	Date	Material covered
Midterm # 1	September 28, in class	up to and including Lay, Ch. 4.4
Midterm # 2	October 26, in class	up to and including Lay, Ch. 6.7
Final Exam	December 12, 7-10pm, Location TBA	Lay+NS&S

Grading:

At the end of the term you will have five subscores, one for each of the following: homework, quizzes, the two midterms and the final exam.

Homework: 8%. 14 assignments, 2 lowest scores dropped.

Quizzes: 12%, 11 quizzes, 2 lowest scores dropped.

2 Midterms: 20% each

Final: 40%

Your quiz score, your homework score, your first midterm score, your second midterm score and your final score will be individually curved. **After that, you can replace your lowest midterm score with your final score.** I will do this for you automatically.

The grading will be based on a curve. However, I retain the right to determine what grade corresponds to the middle of the curve. (This can be to your advantage; if everyone does perfectly then I will be very happy to give everyone an A+.) As a guideline, in recent years the average grade for Math 16B was a B. The grade distribution was roughly as follows: 25% A, 35% B, 25% C and 15% D/F.

Just stay focused during the class and you should get a good grade.

Very important:

In computing the homework subscore, the lowest two homeworks will be dropped. In computing the total quiz subscore, the lowest two quizzes will be dropped.

You can replace your lowest midterm score with your final score.

There will be **no** makeup exams or quizzes.

Before computing the grades, each exam (the two midterms and the final) will be separately curved. In addition, the total homework scores and total quiz scores will be curved within each section, so that all of the sections have the same average homework scores and quiz scores. This will be done to ensure fairness, as some GSIs may grade more easily or more harshly than others, and may give easier or harder quizzes.

Grades of I (incomplete) are permitted only in exceptional circumstances such as serious illness, and are

subject to university regulations, which require that one have kept up with coursework until such circumstances had arisen, and maintained a passing grade on work completed. Incompletes will rarely be given for nonmedical reasons. To make up an incomplete, one ordinarily takes the final exam for another Math 54 class, taught by a different instructor, at the end of a subsequent semester.

Homework:

The homework assignments for the material covered in class on a given week will be due the next Thursday in the discussion section. Late homework assignments will not be accepted. (Your GSI determines what "late" means.) We will grade one problem on each assignment for 1 point, and give another point for attempting all the problems. (Unfortunately, the homework grading has to be cursory because we do not have graders assigned to this class.) Collaboration on homework is encouraged, but you need to write up your own solutions. The lowest two homework scores will be dropped.

Quizzes:

There will be a quiz each Thursday in the discussion section, except for August 23, September 27 and October 25. Quizzes will be written by your GSI. They will test your understanding of the lecture material and the homework assignments. Most of the quiz questions will be on material since the last quiz, including the homework assignment that you hand in that day. Up to one quiz question may be drawn from earlier assignments, to make sure that you are remembering what you've learned. The lowest two quiz scores will be dropped.

General information concerning the syllabus:

1. You are requested to do the assigned reading *before* each lecture. Note that mathematical texts are not meant to be read like novels: very often you will come across passages that must be read many times before they make sense to you. In fact, you may find yourself stuck on *one sentence* for 30 minutes or longer. This does not happen often, but when it does, don't be unduly alarmed. Being stuck means that there is probably a gap in your understanding. Just be glad you find this out now instead of during an exam.
2. Never fall behind in this course, either in the reading assignments or in the homework assignments. Mathematics has the peculiar characteristic that each step is built on the preceding one, so the failure to understand one step would likely mean the failure to understand all the steps that follow.
3. Problem sets get rather heavy at times. This is intentional. Sometimes there is simply no substitute for repetitive drills.
4. Any necessary announcements will be made in class and/or on bspace.

Things to know:

- Do not take this class if you have a conflict in the final exam schedule (check the "exam group numbers" of your classes in the [Schedule of Classes](#)). This class is in **exam group 12**: Wednesday, December 12, 7-10pm.
- The last day to drop the class is September 12.

Weekly schedule and homework:

Following is the list of weekly topics and homework assignments. The lectures do not cover all the course material, so you also need to read and understand the sections from the book. Reading ahead of the lectures should help a lot.

I cannot promise that I am going to cover all topics with the same level of detail. You are responsible for all of the material in the sections listed below.

Reading the book CAREFULLY (there is no other way to read mathematics or science) is necessary to master this material. A good approach is to try to explain the material to your friends: only then will you realize that this is good for you, too. I encourage you to form discussion groups.

	Date	Content	Homework Assignment
1	8/22,8/24	<u>Lay, Ch.</u> <u>1.1,1.2, 1.3</u>	1.1: 1,5,7,13,15,20,28; 1.2: 1,5,7,11,15,23,26,30; 1.3: 1,5,7,11,15,22,25
2	8/27,8/29,8/31	<u>Lay, Ch.</u> <u>1.4,1.5,1.7,1.8</u>	1.4: 1,5,7,9,11,17,18,29; 1.5: 1,5,9,14,24,29; 1.7: 1,5,11,17,21,23,33,36; 1.8: 1,3,9,15,19,21,33,36
3	9/5,9/7	<u>Lay, Ch.</u> <u>1.9,2.1,2.2</u>	1.9: 1,5,9,15,23,24; 2.1: 1,3,7,11,15,23,27; 2.2: 1,5,9,13,21,38
4	9/10,9/12,9/14	<u>Lay, Ch.</u> <u>2.3,3.1,3.2,3.3</u>	2.3: 1,3,7,11,13,15,19,30; 3.1: 1,5,9,13,19,21,41; 3.2: 1,3,5,7,11,19,21,27,31,33-35; 3.3: 3,7,13,21,32
5	9/17,9/19,9/21	<u>Lay, Ch.</u> <u>4.1,4.2,4.3,4.4</u>	4.1: 1,3,9,13,24,32; 4.2: 1,3,5,7,9,23,25; 4.3: 3,7,13,15,21,32; 4.4: 1,3,7,15,19,27
6	9/24,9/26	<u>Lay, Ch.</u> <u>4.5,4.6,4.7</u>	4.5: 3,7,11,15,26,27; 4.6: 1,5,9,15,22,33; 4.7: 3,5,9,11,13
7	10/1,10/3,10/5	<u>Lay, Ch.</u> <u>5.1,5.2,5.3,5.4</u>	5.1: 1,5,7,9,13,17,21; 5.2: 3,9,11,15,19,21; 5.3: 1,3,5,7,11,17,21; 5.4: 3,5,7,15
8	10/8,10/10,10/12	<u>Lay, Ch.</u> <u>5.5,6.1,6.2,6.3</u>	5.5: 1,3,7,13,15; 6.1: 1,5,7,19,22,24; 6.2: 5,7,9,13,15,23; 6.3: 1,3,9,11,17,21
9	10/15,10/17,10/19	<u>Lay, Ch.</u> <u>6.4,6.5,6.7</u>	6.4: 1,3,5,9,17; 6.5: 1,3,9,11,17; 6.7: 1,5,7,11,16
10	10/22,10/24	<u>Lay, Ch.</u> <u>7.1,7.4</u>	7.1: 3,5,9,17,25; 7.4: 1,3,5,7,9,23,25,30
11	10/29,10/31,11/2	<u>NSS, Ch.</u> <u>4.2,4.3,4.4</u>	4.2: 3,5,10,13,27,34; 4.3: 1,3,21,24,29(b); 4.4: 3,5,7,13,21,27,31,33
12	11/5,11/7,11/9	<u>NSS, Ch.</u> <u>4.5,4.6,9.4</u>	4.5: 1(b),3,5,9,21,27,33; 4.6: 1,3,9,11; 9.4: 3,7,13,16,19,23,27
13	11/14,11/16,11/19	<u>NSS, Ch.</u> <u>9.5,9.6,9.7</u>	9.5: 13,17,21,31,35; 9.6: 3,9,13,19; 9.7: 3,5,13,15,21

14	11/26,11/28,11/30	NSS, Ch. 10.3,10.4	10.3: 1,5,7,11,17,19,26,27; 10.4: 1,3,5,11,17,19
--	12/12	Final Exam, 7-10pm	Location TBA

Classroom conduct:

Please do not use electronic devices (smartphones, iPads, laptops) during class.

Some words of advice:

The class will be much easier for you if you try to understand the material, rather than depending just on memorization. The exams will test both your ability to perform computations and your understanding of the material.

The material in this class is, for most students taking 54, the bread and butter for many other classes to come later. We will cover many topics in the semester and the pace will be VERY DEMANDING.

Some of you may find the first few weeks rather easy and may be tempted to drop the ball. BAD IDEA. A few lectures later, you will find yourselves lost. Stay focused from day one and you should do well in this class.

You can replace your lowest midterm score with your final score. Because of this, you may be tempted to blow off one of the midterms and plan to make it up on the final. Bad idea. THIS NEVER WORKS. You will want to keep up at all times.

Additional help:

I encourage you to check out the [Student Learning Center](#) (SLC). They have [resources for Math 54 students](#). You can get drop-in tutoring there Monday-Thursday, 10-4, starting the third week of the semester.

Special accommodations:

Efforts will be made to accommodate students with special needs. Students requiring special examination arrangements or note takers should please consult the DSP office and notify their GSIs. I should be notified by DSP within two weeks of the beginning of classes, so that appropriate accommodations can be arranged in time.

Flu statement:

Do not go to class, discussion section or office hours if you feel sick. You don't want to infect your fellow

students, just as you don't want them to infect you. If you do have a fever, wait until your body temperature returns to normal for at least 24 hours before you go out.

Academic Honesty Policy:

Collaboration on the homework assignments is welcome. (This is a good way to learn the material.) So is the consultation of other sources, such as other textbooks. However, each student has to write up and hand in their own set of solutions.

Some professors don't care if students cheat. I care. Any evidence of cheating on an exam or quiz will result in a score of zero (0). Cheating on the final exam results in an F for the course. Cheating includes but is not limited to bringing notes or written or electronic materials into an exam or quiz, copying off of another person's exam or quiz, allowing someone to copy off of your exam or quiz, and having someone take an exam or quiz for you. Incidences of cheating will be reported to Student Judicial Affairs, which may administer additional punishment.