Mathematics 54, Spring 2010

TuTh 3:30pm-5:00pm, Room 1 Pimental

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.

Professor John Lott
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Office hours: Tuesday 12.30-1:30, Wednesday 2:00-3:00, Thursday 12.30-1:30
Course webpage:

http://math.berkeley.edu/~lott/math54.html

Enrollment questions: There are presently sixteen discussion sections. (The last one was added on Friday, Jan. 15.) Students on the wait list should look for an open section. If you cannot find one to fit your schedule then you can write to Barbara Peavy, peavy@math.berkeley.edu. (I cannot help you with enrollment issues.) Students with questions about Concurrent Enrollment can also write to Barbara Peavy.

You MUST attend the section for which you are registered. If you are enrolled and wish to switch sections then you can do so yourself on TeleBears. However, you cannot switch into a full section.

If you cannot get into the class, or get a discussion section at a feasible time, please keep in mind that Math 54 will be offered in the Summer Session.

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.

Textbooks: David Lay, Linear Algebra and Its Applications, 3rd edition
Nagle, Saff and Snider, *Fundamentals of Differential Equations and Boundary Value Problems*
For both you can get the paperback Berkeley editions.

Class meetings and sections: The class meets in 1 Pimental during 3:30-5:00 pm on Tuesdays and Thursdays. 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 the two midterms and the final. All discussion sections meet MWF.

Section	Time	Place	Instructor
201	8am	7 EVANS	G. Melvin
202	8am	87 EVANS	B. Preskill
203	3pm	246 DWINELLE	A. Gupta

204	9am	5 EVANS	J. Erhard
205	10am	5 EVANS	J. Erhard
206	11am	5 EVANS	S. McDougal
207	12pm	81 EVANS	C.H. Lee
208	1pm	7 EVANS	A. Gupta
209	2pm	81 EVANS	S. McDougal
210	2pm	246 DWINELLE	G. Melvin
211	4pm	5 EVANS	M. Gagliardi
212	5pm	5 EVANS	M. Gagliardi
213	6pm	230D STEPHENS	S. Bi
214	10am	2301 TOLMAN	S. Dyatlov
215	9am	285 CORY	B. Preskill
216	?	? ?	S. McDougal

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... 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 pi, e, and the square root of two should be left as is, not approximated by decimals. Expressions which can obviously simplied, such as 32/64 or the square root of 9, should be simplied. 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	February 25, in class	up to and including Lay, Ch. 4.4
Midterm # 2	April 1, in class	up to and including Lay, Ch. 6.5
Final Exam	May 14, 7-10pm, 100 Haas Pavilion	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 and quizzes each count 10%, each midterm counts 20% and the final counts for 40%. The overall score is determined by the weighted average of the five subscores.

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, the grade distribution for Math 54 in recent years was roughly as follows: 25% A, 35%B, 25%C and 15% D/F. Just make sure that you stay focused and you will get a good grade.

VERY IMPORTANT

In computing the homework subscore, the lowest three weekly homeworks will be dropped. In computing the total quiz subscore, the lowest two quizzes will be dropped. If you miss the first midterm then the grade for the second midterm will count double. If you miss the second midterm then the grade for the final will count for 60%. If you miss both midterms or the final, then you will fail the class. There will be **no** makeup exams or 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. 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 and quizzes:

There will be a quiz given each Friday in the discussion sections, except for Jan. 22, Feb. 26 and April 2. The quiz will be on the material that's on the homework which is collected that week.

Homework for the Tuesday class is due on the following Monday, and for the Thursday class it is due on the following Wednesday.   (The homework due on Monday, Feb. 15, can be handed in on Wednesday, Feb. 17.) There will be **no** make-up quizzes and late homework will not be accepted. Collaboration on homework is encouraged, but you need to write up your own solutions.

The GSI for your section will pick 2-3 problems every week and assign a "Pass/Fail" grade to these randomly chosen problems.

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 there means 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 20**: Friday, May 14, 7-10pm.
- The last day to drop the class is Friday, Feb. 19.

Daily schedule and homework:

Following is the list of daily 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	1/19	**Lay, Ch. 1.1,1.2**	**1.1:** Odds 1-15, 20, 28; **1.2:**Odds 1-15, 23-26,30
2	1/21	**Lay, Ch. 1.3,1.4**	**1.3:** Odds 1-15, 22,25; **1.4:**1,5,7,9,11,17,18,29,34
3	1/26	**Lay, Ch. 1.5,1.7**	**1.5:** 1,5,9,14,24,29-32; **1.7:**1,5,11,17,21,22,23,33-36
4	1/28	**Lay, Ch. 1.8,1.9**	**1.8:**1,3,9,15,16,19,21,33,36; **1.9:**Odds 1-17,23,24
5	2/2	**Lay, Ch. 2.1,2.2**	**2.1:** 1,3,7,11,15,23,24,27; **2.2:** Odds 1-15, 21,38
6	2/4	**Lay, Ch. 2.3,2.8**	**2.3:**1,3,7,11,13,15,19,21,24,30; **2.8:** Odds 1-17, 21, 23
7	2/9	**Lay, Ch. 2.9,3.1**	**2.9:** Odds 1-15, 19, 21,23, 24; **3.1:** 1,5,9,13,19-22, 41
8	2/11	**Lay, Ch. 3.2,3.3**	**3.2:**1,3,5,7,11,19,21,27,31,33-35; **3.3:**Odds 1-11,21,25,32
9	2/16	**Lay, Ch. 4.1,4.2**	**4.1:** Odds 1-15, 24,27,32; **4.2:**1,3,5,7,9,23,25,30
10	2/18	**Lay, Ch. 4.3,4.4**	**4.3:** Odds 1-15, 21,32,33; **4.4:** Odds 1-15, 19,27
11	2/23	**Lay, Ch. 4.5,4.6**	**4.5:** Odds 1-21, 26,27; **4.6:** Odds 1-17, 23,33
12	2/25	**Midterm 1, up to and including Lay, Ch. 4.4**	
13	3/2	**Lay, Ch. 4.7**	**4.7:** Odds 1-13
14	3/4	**Lay, Ch. 5.1,5.2**	**5.1:**1,5,7,9,13,17,21; **5.2:**3,9,11,15,19,21
15	3/9	**Lay, Ch. 5.3,5.4**	**5.3:** 1,3,5,7,11,17,21; **5.4:** Odds 1-13
16	3/11	**Lay, Ch. 5.5,6.1**	**5.5:** 1,3,7,13,15; **6.1:** Odds 1-15,19,22,24
17	3/16	**Lay, Ch. 6.2,6.3**	**6.2:** 1,5,7,9,11,13,15,23; **6.3:** 1,3,9,11,17,21

18	3/18	**Lay, Ch. 6.4,6.5**	**6.4:** 1,3,5,9,17; **6.5:** 1,3,9,11,17
19	3/30	**Lay, Ch. 6.7,7.1**	**6.7:** Odds 1-17; **7.1:** Odds 1-17, 25
20	4/1	**Midterm 2, up to and including Lay, Ch. 6.5**	
21	4/6	**NS&S, Ch. 4.2,4.3**	**4.2:** 3,5,10,13,15,27,29,34; **4.3:**1,3,21,24,29(a)
22	4/8	**NS&S, Ch. 4.4,4.5**	**4.4:** 3,5,7,11,13,21,27,29,31,33; **4.5:**1,3,5,9,11,13,21,27,31
23	4/13	**NS&S, Ch. 6.1,6.2**	**6.1:** Odds 1-13,15,19,23,27; **6.2:**Odds 1-11,17,19,25
24	4/15	**NS&S, Ch. 9.1,9.4**	**9.1:** Odds 1-13; **9.4:**Odds 1-9,13,16,17,19,21,25,27
25	4/20	**NS&S, Ch. 9.5,9.6**	**9.5:** Odds 13-21,31,33,35; **9.6:**Odds 1-7,13,19
26	4/22	**NS&S, Ch. 10.1-2**	**10.2** :1,3,5,9,11,12,15,21,23
27	4/27	**NS&S, Ch. 10.3**	**10.3:** Odds 1-11;17,19,26,27,31
28	4/29	**NS&S, Ch. 10.4,10.5**	**10.4:** 1,3,5,7,11,17,19; **10.5:**1,3,7,9,15,17
29	5/4	**Optional Question/Review Session**: **Lay**	
30	5/6	**Optional Question/Review Session: NS&S**	
--	5/14	**Final Exam, 7-10pm**	Location TBA

Some words of advice:

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 will do well in this class.

Additional help:

I encourage you to check out the Student Learning Center (SLC). They have many resources for Math 54 students. You can get drop-in tutoring there Monday-Thursday, 10-4, starting the third week of the semester. They also conduct a study group and exam reviews.

Special accomodations:

Efforts will be made to accomodate 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 accomodations 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.

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.