
M341 (56140)

Linear Algebra and Matrix Theory, Fall 2012

Course syllabus (last revised: 11/26/2012)

Instructor: Ravi Srinivasan

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Office: RLM 11.164

Office hours: TW 3:30-4:30

Lecture: TTh 11-12:30, RLM 5.122

Class website: <http://www.ma.utexas.edu/users/rav/M341/>

Required texts:

``Elementary Linear Algebra, 4th ed.`` by Andrilli & Hecker (ISBN 0120586215)

Prerequisites and degree relevance:

M408D or the equivalent, with a grade of at least C, or consent of instructor. (Credit may not be received for both M341 and M340L. Majors with a 'math' advising code must register for this rather than for M340L; majors without a 'math' advising code must register for M340L. Math majors must make a grade of at least C in M341.)

Course description and content:

The emphasis in this course is on understanding the concepts and learning to use the tools of linear algebra and matrices. Significant time will be dedicated to rigorous statements and proofs. The fundamental concepts and tools of the subject covered include matrices, linear equations, determinants and eigenvalues, vector spaces and bases, and linear transformations.

Notice:

The University of Texas provides appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-6441 TTY. If you plan on using accommodations, you need to notify your instructors early in the semester.

Important dates:

Tue., Sep. 04, 2012 -- Last day of official add/drop period

Fri., Sep. 14, 2012 -- Last day to drop a course for possible refund (can only Q-drop after this date)

Tue., Nov. 06, 2012 -- Last day to change status to or from a pass/fail basis

Grading:

Grades will be determined from weekly homework/quizzes, midterms, and the final exam (see below). Course grades will be computed on a +/- basis according to a scheme at least as

generous as this (rounded to the closest integer):

A : 92-100
A-: 90-91
B+: 88-89
B : 82-87
B-: 80-81
C+: 78-79
C : 72-77
C-: 70-71
D+: 68-69
D : 62-67
D-: 60-61
F : < 60

1. Homework: 20%

Homework assignments will be posted on the class website, and will be due approximately every other lecture. Late homework will **not** be accepted. The purpose of the HW is to learn the material and you are encouraged to discuss and work together on these problems, including during office hours. Learn to correctly and consistently derive the answer (without a calculator) in order to better prepare for exams. Do not restrict yourself to HW problems, but use them as a basis for trying other questions as well. Only a select set of questions will be graded, and you will get a minimal amount of credit simply for handing in your complete HW solutions.

The two lowest HW grades will be dropped to allow for missed lectures, illness, emergencies, etc. Even if you do not hand in HW solutions, make sure to complete the assigned problems in order to prepare for exams.

2. Midterm exams: 45%

There will be two 75-minute midterms given in regular class times on the following dates (subject to change):

2a. Midterm #1: 20%

Thursday, Oct. 04, 2012

2b. Midterm #2 (not comprehensive): 25%

Tuesday, Nov. 13, 2012

3. Final exam (comprehensive): 35%

Wednesday, Dec. 12, 7pm-10pm (officially assigned date/time), TBA

Exam policy:

A valid photo ID must be available to be checked at all exams. Calculators, books, and notes are not permitted during quizzes, midterms, and the final exam.

Make-up exams ****will not**** be given so please remember the appropriate exam dates. In extraordinary circumstances ONLY, the final exam score will compensate for a missing midterm exam. This includes illness, observance of a religious holiday, or a university-related absence ***with two weeks advance notice.*** Proper documentation (such as a doctor's note) is required in all cases.

Some tips:

- Ask questions: In lecture, office hours, and by e-mail. Don't be shy--if you have a question it's likely someone else does as well. Class participation makes lectures more interesting and fun for both you and me.
- Do the homework: No one can learn mathematics without working examples themselves. The most important driver of success in virtually every math course is doing practice exercises carefully and completely.
- Read the text: To get the most benefit from the lectures and problem sessions, you should read relevant sections of the text as they are covered in class. The supplementary texts listed can also be useful references at particular times in the course.
- Come to office hours: Office hours offer valuable opportunities to reinforce concepts, clarify confusing issues, work more examples, and get individualized feedback.
- Study together: You are encouraged to study together with your peers enrolled in the class. Get to know your classmates, and make arrangements to share notes in case you miss class due to illness.
- Learn to work problems without a calculator: You may use a calculator on homework problems but not during quizzes or exams. In any case, a calculator will not be useful for the vast majority of problems encountered during the semester.
- Be honest: Any academic dishonesty will be severely penalized.

Tentative course calendar (subject to change):

===== PART I: Introduction and matrix operations =====

--Week 01--

Topics: Vectors (1.1)

Th 08/30 First lecture

--Week 02--

Topics: Dot product (1.2), proof techniques (1.3)

Tu 09/04

Th 09/06 HW1 due

--Week 03--

Topics: Proof techniques (cont'd), matrix operations (1.4-1.5)

Tu 09/11

Th 09/13 HW2 due

--Week 04--

Topics: Gaussian elimination (2.1), reduced row echelon form (2.2)

Tu 09/18

Th 09/20 HW3 due

--Week 05--

Topics: Equivalent systems (2.3), matrix inverses (2.4), introduction to determinants (3.1)

Tu 09/25

Th 09/27 HW4 due

===== PART II: Eigenvalues, vector spaces, and bases =====

--Week 06--

Topics: Properties of determinant (3.2-3.3)

Tu 10/02 HW5 due

Th 10/04 **MIDTERM #1** (on Part I)

--Week 07--

Topics: Eigenvalues and diagonalization (3.4)

Tu 10/09

Th 10/11 HW6 due

--Week 08--

Topics: Vector spaces (4.1), subspaces (4.2)

Tu 10/16

Th 10/18 HW7 due

--Week 09--

Topics: Span (4.3), linear independence (4.4)

Tu 10/23

Th 10/25 HW8 due

--Week 10--

Topics: Linear independence (cont'd), basis and dimension (4.5)

Tu 10/30

Th 11/01 HW9 due

--Week 11--

Topics: Constructing bases (4.6)

Tu 11/06

Th 11/08 HW10 due

===== PART III: Linear transformations =====

--Week 12--

Topics: Coordinatization (4.7)

Tu 11/13 **MIDTERM #2** (on Part II)

Th 11/15

--Week 13--

Topics: Linear transformations (5.1)

Tu 11/20 HW11 due

Th 11/22 Thanksgiving break -- no lecture

--Week 14--

Topics: Matrix of a linear transformation (5.2), dimension theorem (5.3), kernel and range (5.4)

Tu 11/27

Th 11/29

--Week 15--

Topics: Isomorphism (5.5), diagonalization (5.6)

Tu 12/04 HW12 due

Th 12/06 Last lecture

--Finals week--

Tu 12/11 HW13 due

We 12/12 ****FINAL EXAM**** 7pm-10pm, TBA