

Summer 2006  
(3 week)

**22M:033**  
Engineering Math III: Matrix Algebra

M T W Th F  
9:00 – 11:50 a.m.  
Room 221 MLH

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Web pages  
ICON  
or  
<http://www.math.uiowa.edu/~jsimon>  
(See link on that page to our course.)

**Catalog Description:** *Applications, computers for matrix calculations; matrix, vector arithmetic; linear independence, basis, subspace (in  $\mathbb{R}^2$ ,  $\mathbb{R}^3$ ); systems of equations, matrix reduction; rank, dimension; determinants, applications; eigenvalues, eigenvectors; diagonalization, principal axis theorem.*

**Philosophy:**

1. I am teaching this course because I requested it. I enjoy math and teaching, and hope you will find our time together worthwhile.
2. We will confront some big ideas and useful methods for describing and analyzing our world. If you put in the effort to really master the material, it will help you later: You will work with matrices in Engineering Math IV and V, other science and engineering courses, perhaps even in the “real world”.
3. This course does a semester of work in 3 weeks. If you get behind, there is no time to “catch up”. **In addition to attending the class, I think you need to allow at least 2 hours per day for HW and studying.**
4. This is a course for Engineering students. I plan to emphasize understanding and using the ideas, with few, if any, rigorous proofs.
5. The course assumes you have passed 22M:031 (Engineering Math I) and are an Engineering student. I will try to aim the course at this level, not higher and not lower.
6. The Math Lab only supports first year courses; so for M033, you’re on your own. I strongly recommend study groups. Your “buddies” also can give you notes if you miss a class.
7. I believe your goal in this course should be “mastery”: so I expect to pick exam questions that focus on the basics of the course, rather than the most complicated examples. At the same time, I will ask for good work on the exams. In particular, I plan to give very few, if any, final grades of “D”: a student should either pass the course in a confident way, or take it again.
8. Whether or not we cover some specific item in class, whether or not we work examples of every kind of problem in a chapter, **you are responsible** for every idea, technique, formula, method, approach, paradigm, and problem that is presented in class or the assigned text sections.

**Text:** *Linear Algebra for Engineers and Scientists* by K. Hardy.  
(The supplement by K & K is bundled free with the text; I do not plan to refer to it.)

**Syllabus:** We will cover most of Chapters 1-4 and half of Ch. 6. Chapter 5 is useful for your future math courses, but I plan to leave that to you to read independently. Please see the attached/posted day-by-day Schedule.

**Exams and Grading:** The course is not curved. Every student gets a grade that represents my estimate of the extent to which you have learned the material of the course. I do use (+/-) grades.

Your grade will be based on 3 one-hour exams, given in-class each Friday.  
Exam 1(30%), Exam 2(30%), and Exam 3(40%).

Students whose scores improve throughout the course and/or who participate well in class discussions may get final grades slightly higher than their exact averages would earn.

I plan to assign homework each day. Homework will not be collected, so doing homework regularly is a measure of your maturity as a student. Exams will be based on “lectures” [I try to *teach*, not “lecture] and text. I may change the way questions are asked in order to make grading clearer, but the ideas in the Exam problems will be taken almost entirely from the assigned HW problems and class/text illustrative examples.

You are welcome to use computers/calculators for HW, and I will help you learn how to do matrix calculations via Matlab. *However, exams are “closed-book” and no calculators.*

To request a make-up for a missed exam, you must provide a written statement of the reason for your missed work, including the name, address, and phone number of a health professional, minister, or other appropriate individual who can verify your circumstances. Religious holiday, significant illness, personal emergency, and official University activities are the usual reasons for excusing missed work. Given our short “semester”, make-ups will require serious justification.

Any forms of academic cheating will be dealt with as harshly as University rules permit. Play fair.

**Routines of the course:** The class meets each day for 2 hours. In addition, I expect to have some (all optional) problem/review sessions and one or two (also optional) sessions in the computer lab.

**Office hours:** 11-11:30 each day. Also I check email frequently.

**Special notes:** (1) This Course Description represents my current expectations, and is subject to changes that may be announced in class through the semester. (2) If you wish to contact the Mathematics Department Chair, his office is in 14MLH; to make an appointment, call 335-0708 or see the Department Secretary in 14C MLH. (3) Please inform me immediately if you have a disability that requires special arrangements. Students needing special accommodations should have documentation from the Student Disability Services office. (4) This course is given in the College of Liberal Arts and Sciences; University policies for students enrolled in one college taking courses offered in another may be found at <http://www.uiowa.edu/~provost/deos/crossenroll.doc>.