

Syllabus

Math 244 - Linear Algebra

Spring 2009

Professor: Rafe Jones

Office Hours: Mon 9:30 - 11:00, Tues 3:00 - 4:00, Weds 10:30 - 12:00, or by appointment

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Course Web Site: <http://mathcs.holycross.edu/~rjones/Math244/>

Text: *A Course in Linear Algebra* by Damiano and Little (Holy Cross profs!)

Meeting times: MTR 2:00-2:50 in Swords 302

Course Content and Goals: Your favorite functions in calculus may well have been the simplest ones: linear functions. Linear functions appear everywhere in mathematics and in many other disciplines precisely because they are simple enough to be analyzed mathematically, but sophisticated enough to give useful models to many real-world phenomena. In this class we'll study generalized linear functions: instead of functions from \mathbb{R} to itself, as studied in calculus, our functions will involve higher-dimensional spaces. Such functions have a rich mathematical structure that has inspired many modern mathematical ideas. Understanding this structure has practical applications as well, such as being able to quickly solve systems of linear equations; these often appear in economics, computer science, engineering, and the physical sciences. Whether you choose to pursue pure math or any natural or social science, you will certainly use linear algebra.

In terms of the book, we will cover the first two chapters in depth, and then do large portions of chapters 3 and 4. A day-by-day course schedule is available on the course website.

Getting information and help: If you have questions about any organizational aspect of the course, the first place you should go is the course web page (URL given at the top of the page). It is a veritable treasure trove of course-related information, and will be updated frequently. Among the things you'll find there are this syllabus, homework assignments, class schedule, exam-related announcements, review tips, links to practice exams, and the meaning of life.

If you can't find the information you need quickly on the webpage, or have a mathematical question, don't hesitate to contact me. I will read emails until about 7 pm each night, and will respond to any messages you send me within 24 hours, provided that I am not traveling. For face-to-face discussions, stop by any time during my office hours, listed above. I'm also happy to see you outside of office hours, though I prefer you to make an appointment in advance. If you stop by outside of office hours without having made an appointment, I'm likely to be busy and not able to help you right then.

Finally, I may periodically need to contact the whole class via email, for instance to let you know that there are new materials on the website. I'll use your official Holy Cross email accounts (the ones that end in holycross.edu), so be sure that you check this account regularly.

Grading system:

Homework 15%

Project 5%

Midterm Exams 17.5%, 17.5%, 17.5%

Final Exam 27.5%

The exact cutoffs for each grade level will be determined only after the final. However, at any time during the course I will be happy to give you an assessment of where your grade stands.

Exams: The exam schedule is given below; please note these dates and plan accordingly. *Acceptable excuses for missing an exam include only emergencies and official university exercises (classes, labs, athletic competitions (not practices)). If at all possible, please notify me of such circumstances at least two weeks before the exam.* If you have any specific learning disabilities or special needs and require accommodations, please let me know early in the semester so that your learning needs may be appropriately met. You will need to contact Dr. Neil Lipsitz in Disability Services (Hogan 209, x3693) to obtain documentation of your disability.

Exam 1: Monday, February 16 (5:30-7:00 pm, location TBA)

Exam 2: Tuesday, March 17 (5:30-7:00 pm, location TBA)

Exam 3: Monday, April 20 (5:30-7:00 pm, location TBA)

Final Exam: 2:30–5:30pm on Thursday, May 7 (room TBA)

Project: There will be one collaborative project, which will be assigned towards the end of the course. You'll work in groups of two or three, and will turn in a paper describing your work on the project. The project is designed to help you develop your written communication and critical thinking skills. You'll be encouraged to be creative, and rewarded for pursuing extensions to the project questions.

Homework: **The homework exercises are the most critical component of your learning in this course.** The best way to cement your understanding of this subject is to work through a wide variety of problems, so it is vital that you do the homework. Moreover, the questions on exams will be very similar to the kinds of exercises given in the homework. As mentioned in the Course Goals section, two of the aims of this course are to help you sharpen your proof-writing skills and your problem-solving skills. Thus many of the homework problems will be different from the examples done in class or the text, and require original thought. On homework problems as well as exam problems, a correct solution to an exam problem consists of more than just writing the correct answer: you must have a clear and convincing argument explaining your answer.

Assignments are posted on the homework page of the course web site. *Late homework is not accepted.* Please staple your homework and write your name on the first page.

Learning often happens best when we are forced to explain our work or thinking to someone else. Sometimes just verbalizing your mathematical thoughts can deepen your understanding. So I encourage group working on the homework (groups of two or three tend to be most effective). However, you must still each write the problems up on your own. *Turning in homework that is identical or substantially identical to the work of another student constitutes plagiarism.* See the statement of academic integrity on the course website for more detail. Finally, if you work on or discuss the homework with another student, please make a note of that on your assignment and say with whom you worked.

Reading your textbook: Just as you would never come to a discussion of *Macbeth* without reading the play, you should never come to math class without reading your daily assignment. You should read your text with pencil in hand—if you are not writing while you read mathematics, you are not reading mathematics! Here are a few strategies to help the time you spend reading your textbook fruitful.

1. Try out the examples before reading the presented solutions.
2. Look for examples that go along with new definitions you encounter.

3. Look for non-examples that go along with new definitions you encounter. Ask yourself why your non-example violates one or more parts of the definition.
4. Commit important definitions to memory—this is a real time-saver as well as a good habit!

Attendance: Attendance is important to me and could make a difference in your final grade in borderline cases. Please make the effort to come to class on time. It is not easy to catch up in a mathematics course, where each lecture builds on the previous material. If you contact me ahead of time and the absence is excused, then I will make every effort to provide you with the information that you missed. Otherwise, it is your responsibility to get notes from one of your peers and to make sure that you understand the material.

How to do well in this class:

- *Attend class, read ahead, participate, and ask questions.* Class will significantly augment the material in the book (particularly in worked examples), and there will be lots of chances for you to participate. The more engaged you are in class, the better prepared you will be to understand the ideas and work problems. Also, you will get more out of class if you have begun to read the sections to be covered (available on the course schedule on the web). If you spend 20 minutes before each class getting a feel for the material to be covered, you will get much more out of class, and be much better prepared to do the homework well.
- *Do all the homework, and do it well.* The best way to learn math is by doing math. The homework is your chance to do math, and you will gain the most understanding by doing it well. This means that after you finish each problem, you should be able to explain the idea to your classmates, your friends, or your mom.
- *Work with your classmates.* The knowledge and abilities of your classmates are great assets. Learn to explain mathematics to your classmates. Math can be fun and rewarding when there are people around you who enjoy figuring out problems as much as you do. Take advantage of this opportunity and organize study groups.
- *Get extra help when you need it.* You have lots of options for getting extra help (see the section “Getting information and help”). Don’t hesitate to use them! In particular, please come talk to me if you’re feeling stuck.