

# Math 2270 Syllabus, Fall 2015

August 24, 2015

## 1 General Information

- **Course:** Linear Algebra (Math 2270, Section 002).
- **Description:** We will study vectors and matrices. At first, vectors and matrices look like arrays of numbers, but we'll learn to think about vectors as elements of a vector space and matrices as linear transformations. Some of the key concepts we'll study are linear combinations, orthogonality, determinants, eigenvalues, and eigenvectors. We'll see many applications of vectors and matrices, such as solving systems of linear equations and differential equations.
- **Prerequisites:** "C" or better in (MATH 2210 OR MATH 1260 OR MATH 1280 OR MATH 1321 OR MATH 1320).
- **Instructor:** Thomas Goller. You can call me "Thomas".
- **Course Webpage:** Google my name and follow the links. I will post all updates on the webpage, so check it frequently!
- **Time and Place:** M,W,F 12:55 – 1:45 PM in ST 208; T 12:55 – 1:45 PM in LCB 225.
- **Textbook:** *Linear Algebra and its Applications, Fifth Edition*; by David Lay, Steven Lay, and Judi McDonald; ISBN: 978-0321982384.
- **Quizzes:** Each Tuesday when there is no test, for a total of nine quizzes. Quiz problems will be based on the recommended homework problems posted the previous week. Quizzes are worth 7 points each, but the two lowest quiz scores will be dropped, for a total of  $7 \cdot 7 = 49$  regular points. There will be one bonus point that can be obtained by correctly solving the bonus problem on one of the nine quizzes (including a quiz that was otherwise dropped).
- **Homework:** Weekly sets of recommended problems to prepare you for the weekly quizzes and tests. Homework will *not* be submitted.

- **Tests:** Every third Tuesday, for a total of five tests. Tests will feature recommended homework problems from the previous week and all the material covered after the previous test. Each test is worth 50 points, for a total of  $5 \cdot 50 = 250$  points. No tests will be dropped.
- **Final Exam:** Friday, December 18, 1-3 PM in ST 208. Comprehensive. Similar in format to previous tests but roughly twice as long. Worth 200 points.
- **Grading:** 10% Quizzes (50 points), 50% Tests (250 points), 40% Final Exam (200 points). Every point on a quiz or test is worth the same 0.2% of your final grade, namely every 5 points earned constitute 1% of the final grade. I will do all of the grading for the course and try to return the work to you at the beginning of the next class. I'll assign letter grades relative to the class average, the distribution of scores, and my perception of how hard or easy the material was. I will report average scores for quizzes and tests as we proceed and give you a rough idea of how scores correspond to letter grades. The average letter grade will likely be around a B-.
- **Missing a Quiz or Test:** If you are going to miss a quiz, contact me before class on the Tuesday of that quiz. We can arrange for you to take the quiz early or possibly later Tuesday afternoon, though I am fairly busy Tuesday afternoons and would much rather give you the quiz early. If you are going to miss a test, we can arrange for you to take the test early or later that week. If you take the test later in the week, I will have to change the questions, so you should expect a slightly harder test. As in the case of quizzes, you must contact me before class on Tuesday if you want to take a test early or late.
- **Problem Sessions:** Mondays 4:45-6:15 PM and Thursdays 12:55-1:45 PM in rooms TBD. On Mondays we will discuss and solve problems from the previous week's list of recommended problems and I will answer questions about the upcoming quiz or test. On Thursdays we will focus on the material from Monday and Wednesday of that week, as well as general questions. Bring any questions you may have about the material and expect me to work through problems with you instead of presenting complete solutions.
- **Office Hours:** You can always talk to me right after class or e-mail me to set up an appointment. You can also just drop by my office, JWB 307, at the risk that I might be busy right at that moment.
- **ADA Statement:** The Americans with Disabilities Act requires that reasonable accommodations be provided for students with physical, cognitive, systemic learning, and psychiatric disabilities. Please contact me at the beginning of the semester to discuss any such accommodations that you may require for this course.
- **Disclaimer:** Please remember that things on this syllabus can change! I will hold you accountable for information that is communicated in class or posted on the course webpage. Be sure to check the course webpage frequently throughout the semester.

## 2 Study Tips

### Concepts vs. Computation

Linear algebra is heavily used in mathematics, engineering, and computing and will probably be much more relevant to you later in life than calculus. If you consult someone who uses linear algebra in his or her work, you will find that all the linear algebra computations are easily handled by a computer algebra system like Mathematica, Matlab, or even Wolfram Alpha online. We humans need to know the abstract theory of linear algebra so that we know when computer computations will be interesting and what those computations mean.

It is therefore critical that you try your best to understand the abstract concepts presented in my lectures and in the textbook. Many of the homework exercises will be computations, which are still extremely important because they will help you gain intuition about the abstract concepts. Whenever you encounter abstract concepts, try to give examples of that concept and think about what the concept is good for.

### Lecture

I will do my best to explain the concepts in the textbook as simply as possible and to convince you that linear algebra is easy and useful. Absorbing new concepts often takes longer than 50 minutes, so I encourage you to skim the section in the book before I lecture on that material. Try to get a feeling for the new definitions in the book by looking at the examples in the text and by coming up with your own examples.

### Textbook

The textbook is well-written and will be a useful supplement to the lectures. Skim the relevant section of the book before a lecture, focusing on examples demonstrating new definitions, and listen for the ‘key ideas’ that I will emphasize in lecture. Read the section more carefully after the lecture with those key ideas in mind.

### Quizzes and Tests

Work through all the recommended homework problems. Start them early so you have plenty of time to get help! Make sure you understand all the new definitions and results and be able to give examples of everything. You may notice that I emphasize certain concepts, results, or examples during lecture – these are especially likely to pop up on a quiz or test!

### Getting Help

In linear algebra, like in most math courses, the definitions build on each other quickly, and once you fall behind you will likely stay behind. Work hard from the beginning and come to office hours if you don’t understand something. The mathematics tutoring center is a great resource if you want additional help.