MATH 4310 – FALL 2016 – GENERAL INFORMATION

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Lectures. TR 10:10–11:25am in 406 Malott.

The Course. Linear algebra is a major component in the foundation of many areas of modern mathematics, and has applications across the social and physical sciences and in engineering. You have seen in calculus how to use the derivative to approximate a differentiable function with a linear one. In linear algebra, we analyze linear functions and study their applications.

This may be the first 4000–level course for some of you. The biggest difference you will find between this and a 3000–level course is that we will not begin with an introduction to proofs, I assume that you have some familiarity with proofs. I expect careful attention to detail on your part. You should prepare for class by reading the textbook ahead of time; I welcome your questions in class about the text. You should stop me in class if you do not understand something I have explained. Finally, you should spend significant time making sure that your homework solutions are clear and well written.

Textbook. The course text book is *Advanced Linear Algebra, Second Edition*, by Bruce Cooperstein. It is available at the bookstore and on Amazon. I will supplement the book with extra examples and exercises. I expect we will spend two or three lectures per chapter, spelling out most of the details. We should cover most of the book and will discuss parts of the remaining chapters and applications, as time permits.

There are many other good linear algebra resources out there. Whenever you feel stuck or confused with our text, please feel free to consult alternative treatments. Reading multiple accounts of one topic is often helpful. Some other texts you might consult include

(1) Axler, *Linear algebra done right*. Second edition. Undergraduate Texts in Mathematics. Springer-Verlag, New York, 1997. This one is available online through the library catalogue.
(2) Friedberg, Insel and Spence, *Linear algebra*. Fourth edition. Prentice Hall, Inc., Upper Saddle River, NJ, 2003.
(3) Hoffman and Kunze, *Linear algebra.* Second edition Prentice-Hall, Inc., Englewood Cliffs, N.J. 1971.

These books are on reserve at the Mathematics Library on the fourth floor of Malott.

Warning: There will be some correlation between our text and the lectures, but we will cover material that is not in the book, and we may do some things differently. *What matters for the exams is what material is covered in lectures and in the homework!*

Academic integrity. As always, you are expected to abide by the Cornell Code of Academic Integrity. This states, "A Cornell student's submission of work for academic credit indicates that the work s the student's own. All outside assistance should be acknowledged, and the student's academic position truthfully reported at all times."

Homework. There will be ten homework assignments over the course of the semester, and each one will have two components: first a typical set of **exercises** including a few numerical problems and a few proofs; and second an **extended glossary** or a **journal entry**. Assignments will be handed out on Thursday, and will be due the following Thursday in class. All handouts will be available on the web at

http://www.math.cornell.edu/∼tsh/4310-F16.html

No late homework will be accepted, but I will drop your two lowest exercises grades and your lowest glossary grade when I compute your final homework grade.

Extended glossaries need a bit more explanation. For these, you should give a definition of the **term of the week**, give an example and a non-example (different from those given in the book), and state and prove a theorem that uses the term. I expect these should be a page or two long, depending on how small your writing is. You may LaTeX your glossaries if you wish! More information will appear on the course website. These should be written formally – so that we could cut and paste them into a textbook. By the end of the semester, you will have a compendium of important terms and examples.

You may work together on your assignments, and you are encouraged to do so. However, you must write up your final solutions **by yourself**. Your work must be written neatly and legibly. Proofs should be written in complete English sentences. Your homework score will be determined not only by the correctness of the responses, but also by the quality of the writing.

Journal entries. An important component of upper level math classes is allowing yourself to pause and reflect on the material we have covered, ponder its significance, and identify what you understand and what may still be confusing for you. Journals are a way for you to do that, as well as for you to give me feedback about the course, how it's going for you, and what's generally on your mind about Cornell and the Math Department (the Good, the Bad and the Ugly all welcome!).

Find a notebook that we will pass back and forth (even a bluebook will do!), and write your name and attach a photo of yourself on the cover. For each week with a journal entry, I would like you to write me a paragraph or two. I expect entries mostly to be about math: excitement about a new connection you've seen between this class and something else you're working on, something that came up in class that is still not resolved for you, general questions, and so forth. I welcome other entries, too, and for your first entry, I'd really like to hear about why you are considering this course and what you hope to get out of it, and maybe a short "mathematical biography" of yourself. I'll try to return the journals on Monday, so you get quick feedback. These entries will be graded for completion.

Resources. In addition to our office hours, you are encouraged to visit the Math Support Center in 256 Malott for additional help with homework and course material. Not all tutors there are comfortable with Math 4310, but several of the upperclassmen know a lot of mathematics and are very good at explaining it. Google "Cornell Math Support Center" to find the updated website (I think it's changing soon) with hours.

Exams. There will be two prelims and a final exam. The first prelim and final will be a timed in-class exam. I have not yet decided whether the second prelim will be take-home, in-class, or a combination. For in-class exams, you will not be allowed to consult any books or notes, nor use a calculator.

The prelims will take place on **Thursday, October 6, 2016** and **Thursday, November 10, 2016** in class.

The final exam will be scheduled by the registrar in mid-September.

Warning: There will be no make-up exams, except in extreme circumstances. In the rare case that a make-up exam is granted, it will probably be an oral examination.

Grading policy. The course components will be weighted as follows:

Homework – 30%
Prelims – 15% each, so 30% total
Final – 40%

If you have questions about homework, exams, or grades, please come talk to me during my office hours or send me email.