Math 2270-1

Notes of 8/19/19

- Go over the syllabus

- Our home page is **www.math.utah.edu/~pa/2270**

Textbook and MyLab

- The textbook is David Lay et al, Linear Algebra and Its Applications, Pearson Publishers, fifth edition, ISBN-13: 978-0321982384, ISBN-10: 9780321982384. The retail price for a hard copy alone is about $150. However, we are getting access to an electronic version of the text through Pearson's MyLab Math, at much reduced rate. We will also be using that software for home work assignments.

- The electronic version of the textbook also has some interactive Figures and Examples.

- You may also find Gil Strang's lecture series helpful. There is a link on our home page. The series has been watched by millions of people.

- You access MyLab through Canvas. Instructions are available on our home page.

- There will be weekly home work assignments opening Monday morning one minute after midnight, and closing on the next Monday, one minute before midnight.

- The problems will be taken from the text-book, and will closely accompany our class work.

- Here is an excerpt from our syllabus:

How to Succeed in this Class

- **Promise:** If you follow the suggestions in this section you will **save time** and **understand** the subject more **deeply and more effectively**.

- Mathematics in general, and Linear Algebra in particular, is **hierarchical**. Everything we do in an organized class like this is a small extension of what we did previously, often the day before. If you understand what we did yesterday you will **easily understand** what we do today. If you do not, what we do today will be confusing, and making sense of it will be **difficult and time consuming**.

- Read the relevant section in the textbook before each class. After class make sure you understand what we did in class.

- Pay careful attention to the precise language we will develop in this class. If you don't understand a word or phrase, **stop**, go back and review that word or phrase before going on. If you don't understand the language you can't effectively think about the subject, and you won't understand it.

- Do the home work problems corresponding to a certain textbook section after we cover the topic in class, and before you attend the next class.

- Nowadays most linear algebra problems are solved by computer. We need to understand linear algebra so that we can tell computers what to do, and to understand what they are doing. So this class is focused on understanding concepts, facts, properties, and connections. We will do some (small) computations to deepen our understanding, and it's in the nature of computer graded home work that much of it is computational. However, you want to concentrate your attention on the concepts, rather than acquiring computational facility.

- You will often need to read my or you notes, or the textbook, **repeatedly** before you understand what's happening.

- **Come to class.** I will cover much more verbally than what is written in the notes.

- I recommend that you form a **study group** with one or two class mates and meet on a regular basis to study together and to work on the home work together. The purpose of the home work is to help you understand the subject, so you should organize your team work so that every member of your group understands fully what is happening in each problem.

- **Seek help!** Talk with your class mates, ask tutors in the math center, and don't hesitate to contact me with your queries.

Linear Algebra

- One one level, Linear Algebra is the mathematics of matrices and vectors.

- You are familiar with vectors from Math 2210.

- Simply speaking, vectors are rows or columns of numbers.

- Matrices are rectangular arrays of numbers.

- However, more deeply and fundamentally, matrices describe linear functions between vector spaces.

- In my field, numerical analysis, i.e., the mathematics of computer algorithms, Linear Algebra is as central and fundamental as Calculus. (The third major ingredient of pursuing numerical analysis is computing expertise and ability.)

- Linear Algebra is also cool, beautiful, and comprehensible!

- Hopefully you'll agree by the end of the semester!

Linear Systems

- Example 1: You buy a pot and a lid for $11. The store owner tells you that the pot by itself costs $10 more than the lid by itself. How much does the pot cost by itself?

- Steady State Heat Distribution in a Plate.