

# Math 2270 - Syllabus

University of Utah

Fall 2012

## 1 Basic Information

**Instructor** - Patrick *Dylan* Zwick

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Phone - 801-651-8768

Office Hour - Thursdays, 9:40 AM to 10:30 AM.

Office - JWB Math Building Room 129

Webpage - <http://www.math.utah.edu/~zwick/>

**Meeting Time** - MTWF 9:40 AM - 10:30 AM

Meeting Location - JTB (James Talmage Building) Room 120

**Textbook** - *Introduction to Linear Algebra* by Gilbert Strang, 4th Edition

## 2 Course Objectives

The objective of this course is to teach you linear algebra! By the end of the semester you should have a firm understanding of the basic concepts in linear algebra. These include vectors and vector spaces, determinants, eigenvalues and eigenvectors, linear transformations, and how to solve systems of linear equations. By the final exam you should understand what all these concepts mean, and know how to use them to solve problems.

We'll also be learning about some of the many applications of linear algebra, and towards this end there will be a computer project component

to this class. The goal here is to give you some experience using linear algebra and mathematical programming software to solve simple problems.

### 3 Course Overview

This is the first in a two-semester sequence of classes designed for undergraduate math, science, and engineering majors who want to get a very firm understanding of linear algebra and differential equations. Math 2270, the first in the sequence, covers the linear algebra part.

We'll be working our way through most of Gilbert Strang's excellent textbook at the rate of approximately one section per lecture. We have four classes each week, and we'll get through most of the book. This class moves fast and we cover a lot of material, so please be prepared!

We'll be learning the foundations and important ideas behind linear algebra, along with how to work linear algebra problems. In the "real world" these problems come up *all the time*. So, it's important that you understand this material. We'll cover all the linear algebra you'll be expected to know for math 2280. Also, towards the end of the semester we'll cover some application topics like how linear algebra can be applied in the study of graphs, networks, and stochastic systems. We won't emphasize applications to differential equations too much, although there are many, because you'll see all those in math 2280.

As mentioned above, the textbook is excellent, and we'll be following it pretty closely. However, I will be writing up lecture notes, and these will be posted on the class website. I'll try to stay a few days ahead with my notes. You should download the lecture notes, print them out, and use them to follow along during class. If you can, try to read them before class. In these notes I won't include solutions to example problems. I'll just leave some blank space for you to write the solution down as I go over it. You have to have something to do during lecture! However, in case you can't be there, once the lecture is over I'll post lecture notes that include the worked example problems.

We'll have five computer projects for this class. These projects should all be pretty straightforward, and won't take too long. They're mostly designed to get your feet wet in the huge ocean of mathematical computing.

I'll be posting project descriptions for each of these the week before the project, so you can download and read through the project before we meet in the computer lab.

Please note that all the material for the class will be posted on the class webpage, along with announcements and review material. It's an important resource for this class, so please use it.

I'm looking forward to a good class. I hope you are too!

## 4 Homework, Projects, and Exams

### 4.1 Homework

We'll have weekly homework assignments. The assignments will be announced in class and posted online each Monday, and due the following Monday. A subset of these problems, usually two or three, will be graded each week by a grader.

I will be posting solutions to each homework assignment the Wednesday after it is due. I will usually not accept late homework, but I will definitely not accept late homework after the solutions have been posted. In calculating your final grade, I will drop your lowest homework score, so if extenuating circumstances come up and you can't get one of the homework assignments done, you'll be able to drop it.

### 4.2 Projects

One of the important goals of the class is to introduce you to mathematical programming and mathematical modeling software. Linear algebra is used all the time in mathematical modeling and computations, and figuring out efficient and innovative ways of doing linear algebra on a computer is an entire branch of mathematics in its own right! So, no linear algebra class would be complete without *some* exposure to this vast and important field. Towards that end we will have five small computer projects, all relating to topics we study. We'll spend one day of class time on each of these projects, and for each of them you'll be expected to hand in a writeup.

### **4.3 Exams**

We will have an in-class exam approximately every four weeks, and a comprehensive final exam at the end of the semester. In calculating your final grade I will drop your lowest exam score (of the four during the semester, not the final). So, if you need to miss one of the exams for any reason, or do particularly badly on one exam, it won't ruin your final grade.

### **4.4 Grades**

The grade breakdown for the class will be:

- Homework - 30%
- Computer Projects - 15%
- Exams - 30%
- Final - 25%

I already let you drop your lowest exam score. If you do better on the final than on your next lowest exam score, I'll replace the second lowest exam score with your final exam score, effectively dropping the second lowest exam and making the final worth 35%.

What percentage ranges will map to what grades is not predetermined, and will be decided based upon class scores and the difficulty of the exams. I guarantee that anything higher than a 93% will be an A.

## **5 Students with Disabilities**

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements and accommodations.

## 6 Schedule

Here is the tentative schedule for the class. Please note this schedule is not set in stone, and may change depending on the dynamics of the class.

**August 20th** - Introduction and Strang Section 1.1

**August 21st** - Strang Section 1.2

**August 22nd** - Strang Section 1.3

**August 24th** - No Class

**August 27th** - Strang Section 2.1

**August 28th** - Strang Section 2.1

**August 29th** - Strang Section 2.2

**August 31st** - Strang Section 2.3

**September 3rd** - **Labor Day** (No Class)

**September 4th** - Strang Section 2.4

**September 5th** - *Computer Lab 1*

**September 7th** - Strang Section 2.5

**September 10th** - Strang Section 2.6

**September 11th** - Strang Section 2.7

**September 12th** - Review

**September 14th** - *Exam 1*

**September 17th** - Strang Section 3.1

**September 18th** - Strang Section 3.2

**September 19th** - Strang Section 3.2

**September 21st** - *Computer Lab 2*

**September 24th** - Strang Section 3.3

**September 25th** - Strang Section 3.4

**September 26th** - Strang Section 3.5

**September 28th** - Strang Section 3.5

**October 1st** - Strang Section 3.6

**October 2nd** - Strang Section 4.1

**October 3rd** - Review

**October 5th** - *Exam 2*

**October 8th** - **Fall Break** (No Class All Week)

**October 15th** - Strang Section 4.1  
**October 16th** - Strang Section 4.2  
**October 17th** - Strang Section 4.3  
**October 19th** - *Computer Lab 3*

**October 22nd** - Strang Section 4.4  
**October 23rd** - Strang Section 4.4  
**October 24th** - Strang Section 5.1  
**October 26th** - Strang Section 5.2

**October 29th** - Strang Section 5.3  
**October 30th** - Strang Section 5.3  
**October 31st** - Review  
**November 2nd** - *Exam 3*

**November 5th** - Strang Section 6.1  
**November 6th** - Strang Section 6.2  
**November 7th** - Strang Section 6.4  
**November 9th** - Strang Section 6.5

**November 12th** - Strang Section 6.6  
**November 13th** - Strang Section 6.7  
**November 14th** - Strang Section 7.1  
**November 16th** - *Computer Lab 4*

**November 19th** - Strang Section 7.2  
**November 20th** - Review  
**November 21st** - *Exam 4*  
**November 23rd** - **Thanksgiving Break** (No Class)

**November 26th** - Strang Section 7.3  
**November 27th** - Strang Section 8.3  
**November 28th** - Strang Section 8.3  
**November 30th** - *Computer Lab 5*

**December 3rd** - Strang Section 8.2  
**December 4th** - Strang Section 8.2  
**December 5th** - Review

Final Exam is on Tuesday, December 11th from 8:00 AM to 10:00 AM.