Course Description for Math 5710, Fall 1999
Introduction to Applied Mathematics

July 24, 1999

The title of this course is a little overenthusiastic. Applied Mathematics is a huge field which encompasses activities such as modeling (contructing mathematical structures which in some sense bear on natural phenomena), and a multitude of methods for getting information, either qualitative or quantitative, out of the mathematical models.

This course is a bit more modest in scope. It is better described as a systematic exploration of a group of very basic methods that people use to solve, or at least to understand, problems arising from mathematical models. At the same time, the relevance to the natural world will often be brought out, although the actual process of modeling will not be pursued very seriously.

The text will be G. Strang, *Introduction to Applied Mathematics*. You may be wondering what you will need to know as prerequisites for the course. The main thing, other than multivariate calculus, is the concept of matrix and vector, and familiarity with how to manipulate them (multiply, add, and take transposes, for example). It is also important that you understand the concept of linear dependence/independence of a sets of vectors. Read Section 1.1 now; you should know the terminology the author uses there, or at least be able to find it out quickly. Also read Section 1.2 for Friday. You should know about complex numbers also, but nothing especially deep will be needed.

There is a heavy emphasis on linear algebra. Beyond that we see several themes which recur in the course. They involve unifying principles, in the sense that the course draws connections between concepts which otherwise might appear unrelated. The most important themes that I can see are connections between:

- Applied mathematics and Geometry

- Analysis in different applied contexts
- Matrices and differential equations (discrete and continuous analysis)
- Optimization and analysis

There will be others as well.

About the mechanics of the course: Homework will be assigned each class period. It will be listed on the "Schedule" handout, of which you have the first version. This schedule will be updated several times during the semester. Generally one of the homework problems, denoted by an asterisk " * ", will be handed in on the following Monday (or Wednesday in case of holiday), so that on a typical Monday, you will give me three problems from the book which I will usually look at and grade.

In the middle of the semester (Oct. 11) there will be a written 50-minute exam, and of course the 2-hour final will occur at the end of the semester.

Your course grade will be determined as follows:

Final: 50%
Midterm: 25%
Homework: 25%

My office is Math 130. Office hours (at least tentatively) will be:

After class until 12:30; Fridays 1:30-2:20

Let me know if neither of these times works for you and I'll adjust them. In any case, you can make special appointments.

My telephone is 581-6819, but the safest way to reach me is email (`fife@math.utah.edu`).

Please put your own email address at the top of your first homework assignment.

Paul Fife