MATHEMATICS 2270
Introduction to Linear Algebra
Spring semester 2007

Time: Tu-Th 4:20–6:00pm JTB 130

Instructor: Professor Grant B. Gustafson[1], JWB 113, 581-6879.

Office Hours: JWB 113, MWF 8:45-10:15am, Tu-Th 3:15-4:15 Other times will appear on my door card. From computers, read the door card link at the course web site.

Telephone: 581-6879. Please use email whenever possible.

Email and web site: `ggustaf@math.utah.edu` `http://www.math.utah.edu/~gustafso/`

Texts:

Linear Algebra with Applications, 2nd edition, by Otto Bretcher, Prentice-Hall 2001 (the required text).

Student Solution Manual, for Otto Bretcher's text *Linear Algebra with Applications*, 2nd edition.

WWW documents for 2270, by GB Gustafson, at web site `www.math.utah.edu/~gustafso`. All are pdf or text documents that can be printed from `mozilla` or `MS explorer` web browsers.

Prerequisites

Math 1210 and 1220 or the equivalent (Calculus I and II). This is first-year Calculus, with a very brief introduction to linear differential equations. The old Math courses 111-112-113 of 1997-98 fulfill the requirement. In addition, background is required in planar curves, velocity and acceleration vectors from Physics 2210 or Math 2210 (Calculus III), or their equivalent courses.

A passive knowledge of `maple` is assumed. Persons without the passive knowledge of `maple` and `unix` may attend one of the *tutorials* on the subject offered during the first two weeks of the term. The instructor for these tutorials is Angie Gardiner, 585-9478, `gardiner@math.utah.edu`. Angie's web page is `www.math.utah.edu/ugrad/tutoring.html`. Her office is MC 155A in building LCB.

Persons without computer training and no maple experience can survive for the first three weeks with a graphing calculator and Microsoft's `Excel` or the MathWork's `matlab`. Free software exists for PC Intel hardware to duplicate most of matlab's functionality. Only matlab has a licensed maple engine, and this is the main reason why matlab provides a route through the course, without learning a lot of maple details.

Tutoring

The Math Department Tutoring Center is located in LCB, and it is open for free tutoring from 8 a.m. to 8 p.m. on M-Th, and from 8 a.m. to 6 p.m. on Friday. Some, but not all of the math

[1]Pronunciation: In the phrase *Gust of Wind* change *Wind* to *Sun*

tutors welcome questions from Math 2270 students. To see the times and specialities of various tutors, consult the web address `www.math.utah.edu/ugrad/tutoring.html`.

Course material and requirements

This course is an introduction to linear algebra for mathematics majors and science majors. Chapters 1-9 in the Bretcher text plus class notes and `www` documents will make up the course material. If you study in isolation, then please know that some topics are enriched in class. Your grade in the course may be reduced by isolation, because the enriched material is tested on exams.

Grading:

Final grades will be based on:

> Textbook problems, the major part of the **dailies**, about 132 scores.
>
> Four computer projects form the minor part of the **dailies**. Each project is counted like several textbook problems, for a total of 11 scores, making 132+11=143 dailies. About 8 of these are dropped to make a total of 135.
>
> Three written midterm examinations.
>
> Final exam. This in-class 2-hour examination counts as two additional midterm scores.

Written In-Class Exams:

There are three (3) midterm exams. There is a 2-hour in-class final exam as scheduled by the university. The midterm and final exams are graded by G.B. Gustafson. These exams are scheduled for Wednesday 4:30pm. An additional exam time is scheduled for the next day at 3pm in 113jwb (my office, 581-6879), to cover people who work, or have baby-sitting limits, or are simply ill and miss the Wednesday exam. Please notify me in advance of the exam date, that you will miss the Wednesday exam and take it the next day. Email `ggustaf@math.utah.edu` is best, phone `581-6879` works too. Please know that once you miss the exam, the crisis has ended, and recovery is the next plan. Please respond ASAP.

Hand-written Dailies:

There will be 143 dailies due during the semester, including textbook problems and four maple labs. They will be graded in part by a staff of readers employed by Angie Gardiner.

Records:

Accounting of exams and the dailies is initially on paper and ultimately by `excel` computer records. The electronic records are web-based, with keys replacing names. During the course, the currently available electronic record is printed and distributed in class like returned homework. This usually happens about the last day of class or shortly thereafter. Electronic records are available later, on the web.

If you ask for record information before it is electronic, then the request involves 10-20 minutes of my time, to retrieve it from paper records. Please keep your own records. Correction of records, when required, can be made by email communication.

Homework, computer labs, midterms and final

Textbook problems

Those problems to be submitted for grading are listed on the `gradesheet` for the course and also at the end of the syllabus. Visit the web site for extra copies. The due dates for problems appear only on the web site. They are dynamically updated to reflect the reality of what was discussed in class. Generally, problems are submitted shortly after class discussion.

Students are requested to complete each textbook problem and submit their work in their own handwriting.

Homework problems are submitted one problem per package with your name, class time and a problem label. **Please write the class time** **4:20pm** **and the problem label near your name**, e.g., write problem label **1.2-5** for problem 5 in section 1.2 of Bretcher's textbook.

There are certain **rules** for writing up the textbook problems. A full accounting of the *format suggestions* contributed by students of 2250 appears on the internet course page as *format for submitted work*. Kindly apply the ideas therein to your written work. It is not a requirement that you follow any advice, but rather, a suggestion that you may rob successful ideas from the document aforementioned.

Computer projects

There will be four computer projects assigned during the semester, related to the classroom material. Each project counts the same as 2 or 3 daily problems from the textbook, for a total of 11 scores on the dailies. They will be written by hand and use the software package `maple`.

Packaging rules for homework problems apply to maple labs as well.

There is a Math Department Computer Lab in building LCB at which registered students automatically own accounts, and there are other unix labs around campus where `maple` is also available, for example at the College of Engineering CADE lab. Most unix labs can launch remote X-windows sessions on math hosts using `ssh`. Remote files on math hosts can be transferred to your local unix computer with `sftp`. For information on how to do the same for personal computers, visit the campus computer help sites.

Drop-in tutoring in the computer lab in the basement of building LCB starts the second week of the semester. The staff there is best at elementary topics from algebra and calculus. A few of them can handle 2270 questions.

Midterm exam details

Past midterm in-class exams appear on the web. Your exam is modeled after the old exams. A sample exam will be supplied. Available on the web page are solution keys to old exams. You may print these for reference. The final exam has a separate study guide, also available at the site.

Books, tables, notes and calculators are not allowed on exam day.

An in-class Midterm exam has different presentation rules, and none of the textbook problem rules