**Text**   We will be using *A First Course in Linear Algebra*, (Version 1.20) by Robert A. Beezer as our textbook. We will be doing a mass-purchase as a class in the first couple of days. Electronic copies of the textbook can be found at the book's website (`linear.ups.edu`). These will be updated weekly, usually on Wednesday evenings, but Version 1.20 will be the canonical text for the entire semester.

The Bookstore also has a *highly* recommended optional text: *The Nuts and Bolts of Proofs* by Antonella Cupillari (Third Edition). The course WWW page has some recommendations for similar books about proof techniques.

**Home Page**   Start at `http://buzzard.ups.edu/courses.html` to locate the WWW page for this course.

**Office Hours**   My office is in Thompson 309A; the telephone number is 879–3564. Making appointments or simple, non-mathematical questions can be handled via electronic mail — my address is `beezer@ups.edu`. Office Hours are Monday, Tuesday, Thursday and Friday mornings. Normally I arrive on-campus at about 8:00 AM, and on Tuesdays I have a 9:30 AM construction meeting. If I am not in my office, and at-large in Thompson/Harned, I'll leave a note with my cell-phone number. You are also welcome to drop by my office in the afternoon. Office hours are your opportunity to receive extra help or clarification on material from class, or to discuss any other aspect of the course.

We will have "group office hours" roughly every two weeks, on Monday afternoons, midway between examinations. Exact time and location will be announced in class. In the past, students have found these extra sessions extremely valuable.

**Calculators**   This course requires the use of a calculator. It should be capable of doing matrix operations — specifically "reduced row echelon form," "determinants" and "eigenvalues and eigenvectors." I am most familar with the Texas Instruments series. If you no longer have a manual for your calculator, there is a good chance you can locate one on the Internet.

You may also opt to use the program *Mathematica* on a laptop computer during exams. Limited-time student copies of Mathematica are available at good prices — see the course web page for links.

Being unfamiliar with your calculator, using an insufficient model, forgetting to install fresh batteries, or forgetting your calculator all together are not excuses for poor performance on examinations. In particular, I have seen students have trouble making the TI-83 perform all the functions required for this course.

**Homework**   There is a fairly complete collection of exercises in the text. Any (or all) of the problems will be good practice as you learn this material. Many of these problems have complete solutions in the text to further aid your understanding. Of course, you are not limited to working *just* these problems.

None of these problems will be collected, but instead they will form the basis for the classes where we will have problem sessions and for discussions in office hours. It is your responsibility to be certain that you are learning from these exercises. The best ways to do this are to work the problems diligently as we work through the sections (see attached schedule) and to participate in the classroom discussions. If you are unsure about a problem, then a visit to my office is in order. Making a consistent effort outside of the classroom is the easiest way to do well in this course.

Mathematics not only demands straight thinking, it grants the student the satisfaction
of knowing when he [or she] is thinking straight.
> — D. Jackson

Mathematics is not a spectator sport.
> — Anonymous

I hear, I forget.
I see, I remember.
I do, I understand.
> — Chinese Proverb

An education is not received. It is achieved.
> — Anonymous

**Quizzes**   There will be seven 50-minute timed quizzes — they are all listed on the *tentative* schedule. The lowest of your seven quiz scores will be dropped. The comprehensive final exam will be given on Friday, December 21 at 2PM. The final exam cannot be given at any other time and also be aware that I may allow you to work longer on the final exam than just the two-hour scheduled block of time. In other words, plan your travel arrangements accordingly.

As a study aid, I have posted copies of old quizzes on the course web site. These are offered with no guarantees, since techniques, approaches, emphases and even notation will change slightly or radically from semester to semester. Some of the solutions contain mistakes, and some of the problem statments have typos. In other words, they are not officially part of this semester's course. In particular I do not advocate working old exams as a primary, or exclusive, technique for learning the material in this course. **Use at your own risk**: they have not been reviewed for minor mistakes or inconsistencies with this semester's course.

**Writing**   This course has been designated as part of the University's Writing in the Major requirement. Thus, there will be two days of discussion about the peculiarities of writing mathematics, and there will be two written assignments. These assignments will be discussed further in class, see the attached schedule for due dates. These assignments will not be accepted late.

**Reading Questions**   Each section of the textbook contains reading questions at the end. Once you have read the section *prior* to our in-class discussion, submit your responses to the reading questions via electronic mail as follows. Do **not** send your responses to my regular email address (`beezer@ups.edu`), but instead use the address `linearb@beezer.privacyport.com`. Your responses are due at 6 AM of the day prior to the day we discuss the section in class, and will not be accepted late, i.e. 6 PM is a firm deadline. Use a subject that is **only** the acronym for the section. So for example, your first response will be simply titled: WILA. Do not include anything else in the subject line. In the first line of your response, please put your real name, then answer the questions in order. If you are not getting replies from me within 24 hours of submission, something is amiss and we will need to figure out where your responses are going. In particular, notice that the email address **does not** include the word "report."

If a question asks for a computation, you can just give the numerical answer, no need to show your work in the email. If the question requests a yes/no answer, or asks "Why?" then give an explanation. Do your best with mathematical notation, but do not fret if it is a bit sloppy or weird, I can usually decipher any reasonable attempt. Please send *only straight text* — no attachments, no Word files, no graphics, no HTML if you can help it. Please pay careful attention to these procedures and deadlines.

**Grades**   Grades will be based on the following breakdown: Quizzes — 60%; Reading Questions — 10%; Writing — 10%; Final — 20%. Attendance and improvement will be considered for border-line grades. Scores will be posted on the Internet at `http://buzzard.ups.edu/courses.html`. A reminder about withdrawals — a Withdrawal Passing grade (W) can only be given during the third through sixth weeks of the semester, after that time (barring unusual circumstances), the appropriate grade is a Withdrawal Failing (WF), *even if your work has been of passing quality.* See the attached schedule for the last day to drop with an automatic 'W' and please read *Academic Handbook* at `http://www.ups.edu/x4727.xml#withdrawal` about these often misunderstood grades.

**Attendance**   Daily attendance is required, expected, and overall a pretty good idea.

**Purpose**   This course is much different from most any mathematics course you have had recently, in particular it is much different than calculus courses. We will begin with a simple idea — a linear function — and build up an impressive, beautiful, abstract theory. We will begin computationally, but soon shift to concentrating on theorems and their proofs. By the end of the course you will be at ease reading and understanding complicated proofs. You will also be very good at writing routine proofs and will have begun the process of learning how to create complicated proofs yourself.

You will see this material applied in subsequent courses in mathematics, computer science, chemistry, physics, economics and other disciplines (though we will not have much time for applications this semester). You will gain a "mathematical maturity" that will be helpful as you pursue upper-division coursework and in any logical, rational, or argumentative activity you might engage in throughout your lifetime. It is not easy material, but your attention and hard work will be amply repaid with an in-depth knowledge of some very interesting and fundamental ideas, in addition to beginning to learn to think like a mathematician.

# Tentative Daily Schedule

| Monday | Tuesday | Thursday | Friday |
|---|---|---|---|
| Sep 3<br>Labor Day | Sep 4<br>Section WILA | Sep 6<br>Section SSLE | Sep 7<br>Section RREF |
| Sep 10<br>Section TSS<br>Group Office Hours | Sep 11<br>Section HSE | Sep 13<br>Section NM | Sep 14<br>Problem Session |
| Sep 17<br>Quiz SLE | Sep 18<br>Section VO | Sep 20<br>Section LC | Sep 21<br>Section SS |
| Sep 24<br>Section LI<br>Group Office Hours | Sep 25<br>Section LDS | Sep 27<br>Section O | Sep 28<br>No class |
| Oct 1<br>Problem Session | Oct 2<br>Quiz V | Oct 4<br>Section MO | Oct 5<br>Section MM |
| Oct 8<br>Section MISLE<br>Group Office Hours | Oct 9<br>Section MINM | Oct 11<br>Section CRS | Oct 12<br>Section FS |
| Oct 15<br>Problem Session<br>Last day to drop | Oct 16<br>Quiz M | Oct 18<br>Section VS | Oct 19<br>Writing Discussion |

Midterm Break

| Monday | Tuesday | Thursday | Friday |
|---|---|---|---|
| Oct 22<br>Fall Break | Oct 23<br>Fall Break | Oct 25<br>Section S | Oct 26<br>Section LISS |
| Oct 29<br>Section B<br>Group Office Hours | Oct 30<br>Section D | Nov 1<br>Section PD | Nov 2<br>Problem Session |
| Nov 5<br>Quiz VS | Nov 6<br>Section DM | Nov 8<br>Section PDM<br>Writing #1 Due | Nov 9<br>Section EE |
| Nov 12<br>Section PEE<br>Group Office Hours | Nov 13<br>Section SD | Nov 15<br>Writing Discussion | Nov 16<br>Problem Session |
| Nov 19<br>Quiz D&E | Nov 20<br>Section LT | Nov 22<br>Thanksgiving | Nov 23<br>Thanksgiving |
| Nov 26<br>Section ILT<br>Group Office Hours | Nov 27<br>Section SLT | Nov 29<br>Section IVLT | Nov 30<br>Problem Session |
| Dec 3<br>Quiz LT | Dec 4<br>Section VR | Dec 6<br>Section MR<br>Writing #2 Due | Dec 7<br>Section CB |
| Dec 10<br>Problem Session | Dec 11<br>Quiz R | | |

## Final Examination
Friday, December 21 at 2 PM