MATH 544 Linear Algebra
Syllabus for Spring, 2009

Instructor. Matt Miller, offices LeConte 300I and 411, hours: MW 2:00-4:00, TTh 1:00-3:00 in LC 300i or 411, and by appointment, phone: 777-3690, e-mail: `miller@math.sc.edu`, web: `http://www.math.sc.edu/ ~miller/544`

Text. Required: *Linear Algebra*, third edition, by David C. Lay, published by Addison-Wesley, ISBN 0-20170970-8. The "updated" version is presumably very much the same. We don't need any of the supplemental stuff; if I can get my hands on the Student Solution Manual or the Instructor's Solution Manual, I will keep these for your inspection in LC 300i.

Overview and Course content. This course is an extension of the vector material of MATH 241, and begins with much the same problem solving character, but builds up the theory and abstraction to a level that will prepare you for MATH 546, for example. Proofs will be given in class, and you will be expected to do some (mostly computationally driven) proofs on your own You will be expected to know and understand definitions and statements of theorems, and be able to apply theorems to solve problems or prove corollaries. We will also emphasize the geometric character of the subject much more than is done in the regular sections, which is one reason that a different text is used (also ours is cheaper). The course covers all but isolated sections of chapters chapters 1-5, and then selected sections of chapters 6 and 7. In more detail, I expect we will at least touch on sections 1.1-1.10 (except for 1.6), 2.1, 2.3, 2.7, 3.1-3.3, 4.1-4.9, 5.1-5.5, 6.1-6.3, 6.4 or 6.5, 7.1-7.2. This means that we do need to keep moving along, and you will have to read the text as i can't possibly put out all the information in class and answer questions, discuss homework problems, etc. in the time allotted. Development of your mathematical precision in writing and your geometric intuition will be important goals throughout. I will make connections to other courses wherever and whenever possible, recognizing that in many cases these will be merely sneak previews.

Learning objectives. Students will master the concepts and solve problems drawn from matrix algebra, solution of linear systems; notions of vector space, independence, basis, dimension; linear transformations, change of basis; eigenvalues, eigenvectors, diagonalization; and topics to be chosen from inner product spaces and the structure of their operators.

Use of technology. Computer graphics play an increasingly important role in understanding geometry in 3-D. If you feel comfortable enough with MATLAB or Maple, you will be welcome to use these computer algebra systems for ordinary homework assignments. Some graphing calculators do much the same thing, and you may use these for homework and exams as well, once you have demonstrated that you can do the hand calculations sufficiently well.

Grades. Three major tests will be given, each worth 100 points. Scheduled dates are Fridays: February 6, March 6, April 10. At least seven ten-point quizzes will be given; the six highest scores will be counted. **No make-ups will be given on quizzes or exams**. Selected homework problems will be collected and graded; the total will be scaled to 40 points. There will be a final exam, worth 160 points; it is scheduled for Thursday at 9:00 am on April 30. **No exemptions will be granted**. It will be in two parts: part A, worth 120 points, will be somewhat comprehensive–it will recap the material of the first three exams, and if your score is X, then X/120 will replace the lowest of the three previous exam scores, if this helps you; part B, worth 40 points, will cover the material of the course that was not covered by the first three exams. A total of 560 points may be earned:

Exams (3)	300	
Final, part A	120	
Final, part B	40	
Quizzes	60	(best six)
Homework	40	(scaled score)

Letter grades will be announced separately for each exam, for the final, and for the other items. They will generally fall close to the (percent) scale 85–100 A, 75–84 B, 65–74 C, 55–64 D, below 55 F, but will vary up or down. Note that the deadline to drop this course without a grade of WF is Monday 23 February; you should have a pretty good idea before then how you are doing.

Collaboration. One of the goals of this course is to learn how to communicate mathematical ideas. By all means form study groups to discuss the homework problems (but give them a fair shot first before you ask others for their ideas). I hope many of you will also take advantage of presenting problems, or longer mini-lectures, in class; there is no better way to learn something than to explain it to others.

Attendance. Ten bonus points will be awarded for perfect attendance, 5 for only one absence. No excuses will be considered in this regard. This class has 42 meetings; university policy states that if more than 10% of the meetings are missed, whether excused or unexcused, then the instructor may impose a penalty. This is a relatively small class and each and every one of you has something to contribute, and not all topics will be presented exactly as in the text. Therefore, if you miss 5 or more class sessions, I will lower your grade by half a grade point (from an A to a B+, or a C+ to a C, for example), and if you miss 7 or more classes, your grade will drop by a full grade point.