MATH 544 (Section 001) – Linear Algebra

Instructor Professor Doug Meade

Office Hours:	M 4:00– 5:00, Th 11:00-12:00 and by *prior* appointment
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Meeting Times TTh 9:30AM–10:45PM, LC 112

Text Johnson, Riess, and Arnold, *Introduction to Linear Algebra.*

Prerequisite Completion of Math 241.

Course Content Linear algebra is one of the fundamental topics in mathematics. Even if you do not know what linear algebra is, we have all been using many of the ideas for several years. While matrices will be common in this course, linear algebra is much more than "matrix algebra".

A second, and equally important, objective of this course is the exposure to mathematical proofs. The early parts of the course emphasize manipulative aspects more than the theoretical issues. As the course progresses, however, the same topics will be revisited — with more of an emphasis on the abstract theory of linear algebra. Many proofs will be presented and discussed in class; you will be expected to produce similar proofs for homework and on exams.

A solid knowledge of linear algebra — both manipulations and theory — will be helpful in almost any upper-division course in mathematics or any course that uses mathematics: differential equations, numerical analysis, optimization, ...

We will be looking at the topics in Chapters 1 – 4, with a few selected topics from Chapters 5 and 6 visited at appropriate times. Specific topics that will be covered include:

Chapter 1 Matrices and Systems of Linear Equations

- basic terminology for linear systems and matrices
- solutions to linear systems and Gaussian elimination

Chapter 2 The Vector Space R^n

- definitions and examples
- basis, dimension, orthogonality
- linear transformations
- application: data fitting

Chapter 3 The Eigenvalue Problem

- determinants
- characteristic polynomial
- eigenvalues and eigenvectors: real and complex
- diagonalization

Chapter 4 Vector Spaces and Linear Transformations

- vector spaces, subspaces, inner-product spaces
- independence, bases, dimension
- linear transformations and matrices
- change of basis

Study Hints Reading the material **in advance** of the lecture is strongly encouraged. Benefits of this preparation include obtaining a familiarity with the terminology and concepts that will be encountered (so you can distinguish major points from side issues), being able to formulate questions about the parts of the presentation that you do not understand, and having a chance to review the skills and techniques that will be needed to apply the new theory and concepts.

While MATH 241 is the prerequisite for this course, the content is quite different. The main connection with 241 is vectors, scalar products, lengths, ...

Grading Your grade in this course will be based on your performance on homework, three (3) mid-term exams, and a final exam. The weights assigned to each of these components will be:

Homework	10%
Mid-term exams (3)	60%
Final exam	30%

Course grades will be determined according to the following scale:

A	90 –100
B	80 – 89
C	70 – 79
D	60 – 69
F	0 – 59

Note that the deadline to drop this course with a grade of W is Thursday, October 3, 1996.

Exams There will be three (3) exams during the semester. *Tentative* dates and topics for these exams are:

Thursday, September 26	Chapters 1 and 2
Tuesday, October 29	Chapter 3 and 4.1–3
Tuesday, November 26	Chapter 4.4–10

Make-up exams will be given only for documented reasons of illness, family emergency or participation in a University sponsored event. Excuses such as oversleeping, forgetting the time or location of the exam, and lack of studying are explicitly noted as unacceptable grounds for the administration of a make-up exam.

A comprehensive final will be given at 9:00A.M. on Tuesday, December 10, 1996.
(Do not trust exam schedules published by unofficial sources, e.g. the Mortar Board.)

Homework Problems will be assigned on a regular basis. You are expected to work all of these problems. We will go over some, but not all, of these problems in class. All problems marked with an asterisk (*) will be collected at the end of (almost) every class. Graded homework will be returned promptly.

Your five (5) lowest homework scores will be dropped when computing the homework grade.

No late homework will be accepted.

Attendance Regular class attendance is important. Consistent with the USC Undergraduate Bulletin, a grade penalty may be applied to any student missing more than four classes (10%) during the semester.

Academic Honesty Cheating and plagiarism will not be tolerated in this course. You may discuss homework problems with others, but do not copy solutions from another student or from a book. Violations of this policy will be dealt with in a matter consistent with University guidelines.