Math 2300 **Elementary Linear Algebra** Spring 2011

Instructor:	Steve Mackey (*steve.mackey@wmich.edu*)
Office:	6602 Everett, 387-4539.
Office Hours:	M 3−4pm; TRF 12−1pm. You may also see me at other times by arrangement.
Class:	3308 Sangren, MTRF: 11−11:50 am.
Prerequisite:	Math 1220 or Math 1700 (Math 1230 or Math 1710 is recommended).

Text: Steven Leon, *Linear Algebra with Applications,* **8th edition (2010)**, Prentice–Hall.

Bring the Leon text to each class, since we will refer to it frequently. It is essential to read the text regularly, and read material before we cover it in class.

Course Rationale: Motivated by the geometry of two and three dimensions, linear algebra provides a setting in which a theory of great beauty and also of great utility can be developed. Indeed a clear understanding of the concepts of linear algebra is central to the understanding of mathematical and physical phenomena in higher dimensions. Consequently, the algorithms of linear algebra lie at the core of much of scientific computing. For many students, then, the tools of linear algebra will be as fundamental in their professional work as the tools of calculus. A first course in linear algebra serves also as an introduction to the development of logical structure, deductive reasoning, and to *mathematics as a language*.

Course Description: We begin with a study of systems of linear equations, and techniques for solving them. Formulating such systems in matrix form leads to the study of matrix algebra, and then to the more abstract concepts of vector spaces and linear transformations. The important concepts of orthogonality, eigenvalues, and eigenvectors will also be studied. *We will also learn how to do simple proofs.*

Attendance: Regular, on-time attendance is expected.

Homework will be assigned, but not collected. It is essential to do these assignments promptly, so that you do not fall behind. Solutions on homework, quizzes and exams are expected to **include reasoning expressed in complete sentences**, regardless of whether this is made explicit or not. At the end of each chapter in the textbook is a "Chapter Test", consisting of true-false statements concerning the basic concepts covered in the chapter. You are strongly advised to work out detailed solutions to all Chapter Tests − prove statements that are true, and construct a counter-example for those statements that are false.

Optional extra-credit problems may be assigned occasionally. Points earned on these problems will be added to your cumulative quiz total. Note that these problems will be more challenging than the average homework problem, and will sometimes be about topics not covered in class. Grading will be strict − illegible solutions or solutions without statements and reasoning will be returned ungraded. Spending time on extra-credit problems before you have successfully finished the assigned homework problems is counterproductive, and is likely to hurt rather than help your grade.

General Advice: In linear algebra, the *concepts* are as important as the *computations*. To master the concepts, you will have to read and reread the text carefully. You will quickly realize that linear algebra is a *language* — new terms and definitions will be introduced in

practically every class. You are expected to learn to use this language with precision, and that requires daily practice on your part. It will be difficult to keep up unless you put in extra effort outside of class. A general rule of thumb is to put in two to three extra hours for each hour of class, but you may require more than that, because of the nature of the abstract mathematical concepts you will need to understand.

A clear understanding of the definitions and theorems is essential to success in this course. For each section, make a list of the definitions and theorems in the section. Then study the list until you are thoroughly familiar with it. The study guide will help you do this; it also provides hints and *partial* solutions to selected exercises from the Leon text.

You are encouraged to form study groups. Talking about mathematics, and critiquing each other's solutions is a very effective way to learn the subject.

Exams, Quizzes and Grading: There will be eight or nine quizzes (held roughly weekly), three in-class midterm examinations, and numerous "micro"-quizzes. In addition, a comprehensive final exam will be held on Weds 27 Apr (10:15am−12:15 pm) during Finals Week. A *tentative* schedule for the in-class midterm exams is:

Exam 1: 4 Feb Exam 2: 15 Mar Exam 3: 8 Apr .

Makeup exams will be permitted only in those cases when a student documents a genuine medical or personal emergency. The lowest quiz score will be dropped, and so **no make-up quizzes** will be given for any reason.

Quizzes: 20% Exams (3@15 each): 45% Final Exam: 30% Micro-quizzes: 5%

Your grade will be determined by the scale:

A	$92-100$	B	$80-85$	C	$68-74$	D	$56-62$
BA	$86-91$	CB	$75-79$	DC	$63-67$	E	≤ 55

Some Important Dates:

Martin Luther King Day: Mon 17 Jan (no classes)
Spirit Day: Fri 25 Feb (no classes)
Spring Break: Mon 28 Feb − Sun 6 March
Last day to withdraw: Mon 21 Mar

Incompletes: Departmental rules will be followed regarding "I" (Incomplete) grades. An "I" grade may be assigned only when circumstances beyond the student's control prevent completion of a small segment of the course. Incompletes may not be granted under any circumstances when a student is doing unsatisfactory work; such students are advised to withdraw from the course.

Academic Integrity: You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate Catalog that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test. Violations of the academic honesty policies can result in failing grades for the assignment and the course. Additional penalties can be imposed by the University.