

**MATH 270**  
**CLASS SYLLABUS Fall 2012**

**Course:** Linear Algebra  
Section Number 3251  
M: 6:50 -10:00 p.m., CMS 022

**Instructor:** Dr. R. L. Smazenka  
Office Hours: Monday and Wednesday 2:00 – 4:00  
Or by appointment  
Office: CMS 141  
Phone: (818) 364-7609  
Email: [smazenrl@lamission.edu](mailto:smazenrl@lamission.edu)  
Internet Homepage: <http://www.lamission.edu/~smazenrl>

**Text:** **Elementary Linear Algebra, 6<sup>th</sup> Ed.**  
Larson and Falvo, authors

**Important Dates:** Last day to drop without a “W”: Friday, September 10  
Last day to drop with a “W”: Friday, November 16  
Date of Final: Monday, December 10, 8:00 – 10:00 PM

### **Course Outline**

We will cover the first seven chapters of the textbook. After a review of systems of linear equations we will define and study the algebra of Matrices over the reals. We next develop the usual properties of determinants, complementing this with a brief introduction to Eigenvalues. This constitutes the first part of the course, much of which the student may perceive as a review. The heart of the course lies in the next four chapters of the text. Vector spaces are treated in depth including subspaces, linear independence, basis and dimension. This general discussion is then tied back to our earlier work with systems of equations through discussion of rank and null space of square matrices. Building on our work with general vector spaces, we focus on inner product spaces. The geometric aspects of these spaces are identified and we use the Gram-Schmidt Process to find orthonormal bases. Having developed our discussion of matrices from the algebraic point of view we now consider the topic from the point of view of linear transformations. The kernel and range of a linear transformation are developed as well as the matrices of these transformations. Similarity is also discussed. As our last topic we treat the Eigenvalue and introduce symmetric matrices and orthogonal diagonalization. Various applications are introduced during the course and are selected to best complement the interests of the students.

### **Homework and Exams**

Homework will be assigned and discussed in class. Since the exams and quizzes will closely resemble homework exercises, **success in this course strongly depends on doing all the homework in a timely fashion.** I cannot stress this last point enough! We will have four exams and a comprehensive final. No make-up exams will be given. I will replace your lowest score with your percentage correct on the final if higher. Successful students should plan to spend at least 5 hours of study outside of class for each hour of discussion. This translates into a minimum of 15 additional hours per week.

### **Quizzes**

We will have six quizzes during the semester. These will be closely aligned with the homework problems. No make ups will be given but I will drop your lowest quiz score.

**Special Note:** The textbook is extremely good. The author provides a high level of mathematical rigor and many exercises are quite intriguing and revealing. It is rare to find a text for an introductory course that I enjoy reading, but this book is one of those. I strongly encourage you to read the text carefully. The lectures are designed as a supplement to and not an alternative for the textbook.

### **Class comporment**

All students are expected to arrive on time. Late arrivals are disruptive to both the lecturer and students. We will have a short break about midway through the class period. Once you are seated, do not leave the room until the break. Such comings and goings are also disruptive. Students must turn off all pagers and cell phones while in class. Students are encouraged to ask questions and make comments on the lecture material. This should be done in a courteous manner by raising one's hand and being recognized. Side conversations between students that disrupt the flow of the lecture will not be tolerated. It is the student's responsibility to manage his or her academic workload. Should a student decide to stop attending class it is their responsibility to drop the class.

All students appearing on the grade roster will receive a grade regardless of whether they are attending classes or not.

### Grading

Your final grade is based on the homework and exams with percentage contribution to your that grade as follows.

Quizzes (Best 5 of 6)	10
Exams	65 %
Final	25 %

<b>Schedule Math 270 Fall 2012</b>			<b>Math 270 Learning Outcomes</b>
<b>Week</b>	<b>Date</b>	<b>Monday</b>	
1	August 27	Class Cancelled	<ol style="list-style-type: none"> <li>Solve linear systems problems using Gaussian &amp; Gauss-Jordan elimination methods</li> <li>Calculate the inverse of a matrix; solve modeling problems using matrix operations</li> <li>Calculate determinants; define Eigen values; solve application problems using determinants</li> <li>Calculate dot and cross products of vector spaces; transform a given basis into an orthonormal basis</li> <li>Determine whether a given set is a vector space; determine subspaces; test a set of vectors for linear dependence and/or independence; determine basis of a given set; determine rank of a matrix; solve application of vector space problems</li> <li>Calculate the kernel and the range of a linear transformation; calculate the standard matrix for a linear transformation; calculate a matrix relative to nonstandard bases; solve applications of linear transformation problems</li> <li>Calculate the characteristic equations and Eigen values of a matrix; determine whether a matrix is diagonalizable, symmetric or orthogonal; calculate the matrix of a quadratic form; solve application of Eigen vector and Eigen value problems</li> </ol>
2	September 3	Labor Day College Closed	
3	September 10	1.1, 1.2, , 2.1, 2.2	
4	September 17	2.3, 2.4, 3.1, 3.2 <b>Quiz 1</b>	
5	September 24	3.3, 3.4 <b>Quiz 2</b>	
6	October 1	<b>Exam I Ch 1-3</b> 4.1, 4.2	
7	October 8	4.3, 4.4 <b>Quiz 3</b>	
8	October 15	4.5, 4.6 <b>Quiz 4</b>	
9	October 22	4.6, 5.1, 5.2 <b>Quiz 5</b>	
10	October 29	<b>Exam II Ch 4</b> 5.2, 5.3	
11	November 5	<b>Exam III Ch 5</b> 6.1, 6.2, 6.3	
12	November 12	Veteran's Day College Closed	
13	November 19	6.3, 6.4 <b>Quiz 6</b>	
14	November 26	6.4, 7.1, 7.2	
15	December 3	<b>Exam IV Ch 6 &amp; 7</b> Final Review	
16	December 10	<b>Final Exam</b> <b>8:00 – 10:00</b>	

### Student Learning Outcomes

- Solve a system of linear equations using matrix methods.
- Apply results from solutions of systems to questions of basis, dimension, and linear independence in vector spaces.