Syllabus for: Linear Algebra, Math 45	
Semester & Year:	Fall 2015
Course ID and Section Number:	MATH-45-E8029-2015F Linear Algebra
Number of Credits/Units:	4
Day/Time: **Location:**	MTThF, 2:50PM – 03:55PM SC204
Instructor's Name:	Jackson
Contact Information:	Office location and hours: SC214L, TBA 476-4219 (Steve Jackson) Email: steve-jackson@redwoods.edu

Course Description (catalog description as described in course outline):
A course which develops the techniques and theory needed to solve and classify systems of linear equations. Solution techniques include row operations, Gaussian elimination, and matrix algebra. Properties of vectors are investigated in two and three dimensions, leading to the notion of an abstract vector space. Vector space and matrix theory are presented including topics such as inner products, norms, orthogonality, eigenvalues, eigenspaces, and linear transformations. Selected applications of linear algebra are included.

Course Learning Outcomes (as described in course outline) :
1. Solve systems of linear equations using Gaussian elimination and matrix algebra, and apply these techniques to real world applications. Interpret the value of a determinant geometrically and use the value to determine the singularity of a matrix.
2. Determine the dimension of a vector space (e.g. the null space, the column space, and the row space of a matrix) and find a basis for the vector space.
3. Determine the matrix of a linear transformation and analyze the geometric action of the transformation and its inverse (if it exists).
4. Determine the eigenvalues and eigenvectors of a matrix and find bases for the eigenspaces. Interpret the definition of eigenvalues and eigenvectors geometrically. Use orthonormal bases to solve problems in linear algebra.

Special accommodations: College of the Redwoods complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request at least one week before the first test so that necessary arrangements can be made. No last-minute arrangements or post-test adjustments will be made. If you have a disability or believe you might benefit from disability related services and may need accommodations, please see me or contact Disabled Students Programs and Services. Students may make requests for alternative media by contacting DSPS.

Academic Misconduct: Cheating, plagiarism, collusion, abuse of resource materials, computer misuse, fabrication or falsification, multiple submissions, complicity in academic misconduct, and/ or bearing false witness will not be tolerated. Violations will be dealt with according to the procedures and sanctions proscribed by the College of the Redwoods. Students caught plagiarizing or cheating on exams will receive an "F" in the course.
The student code of conduct is available on the College of the Redwoods website at:
http://www.redwoods.edu/District/Board/New/Chapter5/Ap5500.pdf

College of the Redwoods is committed to equal opportunity in employment, admission to the college, and in the conduct of all of its programs and activities.

Our Course Description:
Linear algebra consists of an interesting mixture of computational techniques and abstract theory. The theory arises out of the use and applications of matrices in the solution of systems of linear equations, and leads through the topics of determinants, vector spaces, linear transformations, eigenvalues, and eigenvectors. Linear algebra also has many applications in other areas of mathematics, in the physical and social sciences, and in business. Consequently, linear algebra is a core course in many engineering, physics,

mathematics, and computer science programs. We will study both the abstract theory and the computations, and will also look at some applications.

Prerequisite: Math 50A (or equivalent) with a grade of "C" or better.

Attendance Policy:
We reserve the right to drop from the course any student that has more than three unexcused absences. Reference: Title 5, Sections 55024 and 58004. Approved: 05/01/2012

Textbook:
Linear Algebra and its Applications, by David C. Lay (4th edition). The textbook comes bundled with the Student Study Guide. The Student Study Guide includes detailed solutions to many of the odd exercises, supplementary material in the form of study notes and tips, key ideas, warnings, etc., and also has help resources for calculators and computers.

HOMEWORK: There will be daily reading and homework assignments that will be mostly computational and routine, and assigned primarily for practice. You are expected to complete these assignments each day, and come to class prepared to discuss them. You are also required to keep a neatly organized binder with your completed homework assignments, and we will collect and check these periodically. Most of your homework grade will be based on weekly homework assignments that will be collected and graded carefully. These assignments will generally be more challenging and will involve more intermediate steps, synthesis of concepts, experimentation, and writing. A portion of these homework assignments will involve proofs, but they will also include some of the more important computations. Some of the assignments will involve the use of MATLAB to help you learn and explore the concepts of the course. You will also gradually learn how to use TeX (the mathematics typesetting language) to write your solutions. TeX (and probably MATLAB) will also be needed for your final project. In general, the homework will be indicative of the type and difficulty of material that you need to know for the exams. You are expected to turn in homework assignments on time.

FINAL PROJECT: All students are required to complete a final project. The subject of the final project must be a real world application of linear algebra, or possibly an application of linear algebra to another area of mathematics. You will be expected to complete a written report and also give a brief presentation. Presentations will be given during the last week of classes and during finals week. More information about the project will be available later in the course.

GRADING:

Homework and class activities:	15%
Quizzes and Exams:	70%
Final project:	15%

Class participation will also be an important consideration in your course grade.

USE OF CALCULATORS AND COMPUTERS: A good graphing calculator is required. The calculator must have the capability to use matrices and to solve linear systems of equations. Recommended calculators for students in linear algebra are the TI-83+, TI-84+, TI-92, TI-89, TI-86, or TI-85. However, if you already have another good calculator that meets the above requirements, that may be used instead. The TI-89 and TI-92 can do symbolic calculations. While these calculators are powerful and useful tools, the ability to do linear algebra calculations by hand is important for understanding the concepts. Therefore, unless otherwise indicated, you will be expected to show all steps on your homework and exams in order to receive full credit for your work.

USE OF COMPUTERS: Our class will also make use of MATLAB as a computational and visual aid to understanding the course material. We will use MATLAB in the classroom, and you may also use it in the computer lab in SC212 Physical Science to help with homework and the project. However, no prior computer knowledge is required for the course – you will receive instructions on how to use MATLAB. You will also learn the basics of TeX, the mathematical typesetting language, for writing up proofs and your project report. You will receive an account to use the computers in SC 212. Both MATLAB and TeX

are installed on these computers.

A student version of MATLAB (for Windows or Mac OS X) is available for your home computer if you are interested. There are free versions of TeX is available for Windows, Mac OS X, and Linux.

COURSE INFORMATION ON THE WEB: Information on computer use and the use of MATLAB and TeX will be available on our MyCR site You should also consult this site regularly for information on homework assignments, exams, etc.

DISABILITIES: Any student who feels that s/he may need an accommodation based on the impact of a disability should contact the instructors as soon as possible. The student will also need to visit the Disabled Student Programs and Services office (476-4280) and obtain a DSPS Support Services Agreement. Every effort will be made to meet accommodation requests. However, no retroactive accommodations will be provided.
