Prerequisites
Math 227

Bulletin Description
Vector spaces, linear transformations, elements of matrix algebra including determinants and eigenvalues.

Course Objectives
Students will:
1. Use matrix methods to solve systems of linear equations and analyze overdetermined and underdetermined systems
2. Calculate matrix sums, products and inverses
3. Use dot product, cross product and orthogonality to find equations for planes, distance between two lines, and perform other geometric calculations
4. Find bases for subspaces (e.g. kernels) of real Euclidean space and prove simple theorems about subspaces
5. Evaluate determinants of matrices and recognize special cases when the determinant of a matrix is zero.
6. Find eigenvalues and eigenvectors including defective cases, recognize special eigenvalue properties of symmetric matrices, and prove simple theorems about eigenvalues and eigenvectors.
7. Perform at least one of the operations above with software

Evaluation of Students
Student will demonstrate their mastery of the first six objectives on frequent graded homework assignments or quizzes, midterm and final examinations. Students will also complete at least one graded assignment requiring the use of software to perform matrix and vector calculations.

Course Outline
The order in which the following topics are undertaken may vary depending on the text used. Some variation is timing is permitted, but all topics must be covered.
1. Linear equations—3 weeks
2. Matrices and inverses—2 weeks
3. Vector geometry of lines and planes—2 weeks
4. Subspaces of real Euclidean space, bases and dimension—3 weeks
5. Determinants—2 weeks
6. Eigenvalues and eigenvectors—3 weeks

**Textbooks and Software**


Submitted by: David Meredith   Date: December 2, 2002