Course Title  __Linear Algebra_______________________________

Course No.  __MAT 262__

Contact hrs/wk: Lecture _3_   Lecture/Discussion _X_   Lab ___

Course Prerequisites:  A grade of C or better in MAT 222.

Catalog description: Matrix algebra, linear systems of equations, vector spaces, subspaces, linear dependence, rank of matrices, determinants, linear transformations, eigenvalues and eigenvectors, diagonalization, inner products and orthogonal vectors, and symmetric matrices.

Course content (list of topics normally covered):

1. Systems of Linear Equations
2. Gauss-Jordan Elimination
3. Operations, properties of matrices, and the inverse of a Matrix
4. The Determinant of a Matrix

5. Vector Spaces
6. Linear independence and spanning sets
7. Subspaces of Vector Spaces including Basis and Dimension
8. Coordinates and Change of Basis

9. Inner Product Spaces
10. The Gram-Schmidt Process
11. Orthogonal Subspaces

12. Linear Transformations
13. Transition Matrices and Similarity

14. Eigenvalues and Eigenvectors
15. Diagonalization
16. Symmetric Matrices

17. throughout the course, an introduction to proofs will be given

Content-based department proficiencies:
The successful student will:

- Learn how to construct proofs of various sorts, e.g. proof by contradiction or contrapositive.

- Become familiar with properties and operations of matrices, as well as operations on matrices including the determinant, inverse, and Gauss-Jordan elimination.
• Make connections between solutions of systems of equations, the determinant of a matrix, the existence of the inverse of a matrix, the rank of a matrix, and other items.

• Explore various linear spaces including real and abstract vector spaces, subspaces, and normed vector spaces.

• Perform the vector operations addition, subtraction, inner and cross product as well as find the length, and coordinates of a vector.

• Understand properties of vector spaces, such as basis, dimension, changing bases, and finding orthogonal bases using Gram-Schmidt.

• Work with linear transformations, finding eigenvalues and eigenvectors of matrices and using them to diagonalize matrices.

**Colleges-wide proficiencies assigned to course:**

Students should be able to demonstrate the following:

**A. Analytical skills** Performance Indicators: Students should be able to:
1. Interpret and synthesize information and ideas.
4. Select and apply scientific and other appropriate methodologies.

**B. Quantitative skills** Performance Indicators: Students should be able to:
1. Solve quantitative and mathematical problems.
2. Interpret graphs, tables, and diagrams.

Representative textbooks used for the courses:
• Elementary Linear Algebra by Larson and Edwards

Approved April 22, 2006