MATH 206 Linear Algebra I

1. Catalog Description

MATH 206 Linear Algebra I **4 units**

Prerequisite: MATH 143.

Systems of linear equations. Matrix algebra, including inverses and determinants. Vectors, vector spaces, bases and linear transformations in real coordinate space of n dimensions. Eigenvalues, eigenvectors and diagonalization. Applications of linear algebra. Introduction to inner products and orthogonality. 4 lectures.

2. Required Background or Experience

Math 143 or consent of instructor.

3. Learning Objectives

The student should be able to:

a. Understand the concept of matrices and their role in linear algebra and applied mathematics.
b. Have a complete understanding of linear systems $Ax = b$, and the role of rank, subspace, linear independence, etc. in the analysis of these systems.
c. Understand eigenvalues and eigenvectors of matrices and their computation.
d. Know the concept of determinant and its properties.
e. Understand the concepts of vector space and linear maps when the vector space is $\mathbf{R}^n$.
f. Understand important definitions in linear algebra and the ability to do very elementary proofs.

4. Text and References

To be chosen by instructor. Suggested texts include:

- Lay, David C., Linear Algebra and its Applications
- Bretscher, Otto, Linear Algebra with Applications

5. Minimum Student Materials

Paper, pencils, and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use. Use of a computer lab is optional.

7. Content and Method

a. Systems of linear equations
b. Matrix and vector operations
c. Properties of $\mathbf{R}^n$ (linear combinations, bases, spanning set, dimensions, dimension equation)
d. Coordinate systems and change of basis
e. Determinants
f. Eigenvalues and eigenvectors
g. Orthogonality
h. Diagonalization of symmetric matrices
i. Further topics selected by instructor

8. Methods of Assessment

The primary methods of assessment are: essay examinations, quizzes and homework. Typically, there will be one or more hour-long examinations during the quarter, and a required comprehensive final examination. Students are required to show their work, and are graded not only on the correctness of their answers, but also on their understanding of the concepts and techniques.