

## **MATH 306 Linear Algebra II**

### 1. Catalog Description

#### **MATH 306 Linear Algebra II**

**4 units**

Prerequisite: MATH 206 or MATH 244; MATH 241; and a C- or better in MATH 248, or consent of instructor.

Rigorous development of real and complex vector spaces, including infinite dimensional spaces. Subspaces, bases, products and direct sums. Examples and properties of linear transformations. Similarity, eigenvalues, eigenvectors and diagonalization. Characteristic and minimal polynomials, Cayley-Hamilton Theorem. 4 lectures.

### 2. Required Background or Experience

Math 206 or Math 244, or Math 241 and a C- or better in Math 248.

### 3. Learning Objectives

The student should learn the language and methods of linear algebra and some of the most important applications.

### 4. Text and References

To be chosen by instructor. Suggested texts include:

- Axler, Sheldon, Linear Algebra Done Right
- Friedberg, Stephen et al., Linear Algebra
- Lewis, David, Matrix Theory
- Meyer, Carl, Matrix Analysis and Applied Linear Algebra

### 5. Minimum Student Materials

Paper, pencils, and notebook.

### 6. Minimum University Facilities

Classroom with ample chalkboard space for class use, and (optionally) computer lab.

7. Content and Method

- a. Vector spaces: include abstract definition, spaces of functions, spaces of linear transformations, and  $\mathbf{R}^n$
- b. Subspaces, linear independence, bases, and sums of subspaces
- c. Linear transformations and matrices.
- d. Determinants
- e. Eigenvalues and eigenvectors of linear transformations
- f. Diagonalization

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.