

CALIFORNIA STATE UNIVERSITY, SACRAMENTO  
Department of Mathematics and Statistics

SYLLABUS

Math 117: Linear Algebra

Prerequisite: Math 110A

Abstract linear spaces and linear transformations; invariant subspaces; canonical forms.

OUTLINE:

- I. Vector Spaces
  - a. Bases
  - b. Dimension
  - c. Direct Sums
- II. Matrices and Linear Mappings
  - a. Linear equations
  - b. Linear map associated with a matrix
  - c. Changes of basis and similarity
- III. Scalar Products
  - a. Orthogonal bases
  - b. Dual space
- IV. Operators
  - a. Bilinear forms and quadratic forms
  - b. Symmetric operators
  - c. Hermetian operators
  - d. Unitary operators
- V. Eigenvalues and Eigenvectors
  - a. Characteristic Polynomial
  - b. Triangulation
  - c. Cayley-Hamilton Theorem
- VI. Spectral Theorem
  - a. For symmetric linear mappings
  - b. For unitary mappings
  - c. Jordan normal form