

OFFICIAL SYLLABUS
MATH 321-LINEAR ALGEBRA
(Adopted Spring 2009; Committee: Drs. C. Lu, M.-S. Song, G.S. Staples)

Catalog Description: Systems of linear equations, matrices and determinants. Vector spaces and linear transformations. Eigenvalues, eigenvectors, diagonalization of a symmetric matrix.
Prerequisites: Math 135 and Math 152 with grade of C or higher.

Textbook: Elementary Linear Algebra, 6th edition, by Larson, Edwards, and Falvo.

Course Outline and Topics

Chapter 1: Systems Of Linear Equations

- 1.1: Introduction to Systems of Linear Equations
- 1.2: Gaussian Elimination and Gauss-Jordan Elimination
- 1.3: Applications of Systems of Linear Equations

Chapter 2: Matrices

- 2.1: Operations with Matrices
- 2.2: Properties of Matrix Operations
- 2.3: The Inverse of a Matrix
- 2.4: Elementary Matrices

Chapter 3: Determinants

- 3.1: The Determinant of a Matrix
- 3.2: Evaluation of a Determinant Using Elementary Operations
- 3.3: Properties of Determinants
- 3.4: Introduction to Eigenvalues

Chapter 4: Vector Spaces

- 4.1: Vectors in \mathbb{R}^n
- 4.2: Vector Spaces
- 4.3: Subspaces of Vector Spaces
- 4.4: Spanning Sets and Linear Independence
- 4.5: Basis and Dimension
- 4.6: Rank of a Matrix and Systems of Linear Equations
- 4.7: Coordinates and Change of Basis

Chapter 5: Inner Product Spaces

- 5.1: Length and Dot Product in \mathbb{R}^n
- 5.2: Inner Product Spaces
- 5.3: Orthonormal Bases: Gram-Schmidt Process

Chapter 6: Linear Transformations

- 6.1: Introduction to Linear Transformations
- 6.2: The Kernel and Range of a Linear Transformation
- 6.3: Matrices for Linear Transformations
- 6.4: Transition Matrices and Similarity

Chapter 7: Eigenvalues And Eigenvectors

- 7.1: Eigenvalues and Eigenvectors
- 7.2: Diagonalization
- 7.3: Symmetric Matrices and Orthogonal Diagonalization