



**Catalog Description:**

Matrix algebra, vector spaces and linear maps, bases and dimension, eigenvalues and eigenvectors, applications.

**Prerequisite:**

C- or above in 1172, 1544, 2153, 2162.xx, 2182H, or 4182H; or C- or above in both 1152 and CSE 2321; or credit for 154, 254.xx, 263.xx, 263.01H, or 264H.

**Exclusions:**

Not open to students with credit for 4568 (568), 5520H (520H), or 572.

**Text:**

*Introduction to Linear Algebra*, 5<sup>th</sup> edition, by L.W. Johnson, R.D. Riess, and J.T. Arnold, published by Pearson, ISBN Softcover: 0321628217, Hardcover: 0201658593

**Topics List:**

***Part I***

- 1.1 Introduction to Matrices and Systems of linear equations
- 1.2 Echelon Form and Gaussian-Jordan Elimination
- 1.3 Consistent Systems of linear Equations
- 1.5 Matrix Operations
- 1.6 Algebraic Properties of Matrix operations
- 1.7 Linear Independence and Nonsingular Matrices
- 1.9 Matrix Inverses and Their Properties
- Midterm 1

***Part II***

- 2.1 Vectors in The Plane (Review only because it was done in 1152)
- 2.2 Vectors in Space (Review only because it was done in 1152)
- 2.3 The Dot Product and The Cross
- 3.1 Introduction
- 3.2 Vector Space Properties of  $\mathbb{R}^n$
- 3.3 Examples of Subspaces
- 3.4 Bases for Subspaces
- 3.5 Dimension
- 5.2 Vector Spaces
- 5.3 Subspaces
- 5.4 Linear Independence, Bases, and Coordinates
- 3.6 Orthogonal Bases for Subspaces
- 3.7 Linear Transformation from  $\mathbb{R}^n$  to  $\mathbb{R}^m$



Midterm 2

***Part III***

- 4.1 The Eigenvalue Problem for  $2 \times 2$  Matrices
  - 4.2 Determinants and the Eigenvalue Problem
  - 4.4 Eigenvalues and Characteristic Polynomial
  - 4.5 Eigenvectors and Eigenspaces
  - 4.6 Complex Eigenvalues and Eigenvectors
  - 4.7 Similarity Transformations and Diagonalization
- Final