Major Assignments/Exams

Final Exam: 30%
Test 1 and 2: 20% each
Homework: 30%

Required Reading

Linear Algebra and Its Applications (5th Edition), David C. Lay

List of discussion/lecture topics

(1) Linear Equations in Linear Algebra

1.1 Systems of Linear Equations
1.2 Row Reduction and Solution Sets of Linear Systems
1.3 Vector Equations
1.4 The Matrix Equation Ax =b
1.5 Solutions Sets of Linear Systems
1.7 Linear Independence
1.8 Introduction to Linear Transformations
1.9 The Matrix of a Linear Transformation
COURSE SYLLABUS

(2) Matrix Algebra

2.1 Matrix Operations
2.2-3 The Inverse of a Matrix and Characterizations of Invertibility
2.4 Partitioned Matrices
2.8 Subspaces of $\mathbb{R}^n$
2.9 Dimension and Rank

(3) Determinants

3.2 Properties of Determinants, the Determinant and Invertibility
3.3 Cramer's Rule, Volume, and Linear Transformations
*Permutation Matrices (not in text)

(4) Vector Spaces

4.1 Vector Spaces and Subspaces
4.2 Null Spaces, Column Spaces, and Linear Transformations
4.3 Linearly Independent Sets; Bases
*4.4 Coordinate Systems
4.5 The Dimension of Vector Space
4.6 Rank
*4.7 Change of Basis
*4.9 Applications to Markov Chains

(5) Eigenvalues and Eigenvectors

5.1 Eigenvectors and Eigenvalues
5.2 The Characteristic Equation
5.3 Diagonalization
*5.4 Eigenvectors and Linear Transformations
*5.5 Complex Eigenvalues
*5.6-8 Applications

(6) Orthogonality and Symmetric Matrices

6.1 Inner Product, Length, and Orthogonality
6.3 Orthogonality and Projections
6.4 The Gram-Schmidt Process
6.5 Least-Squares Problems

(7) Symmetric Matrices and Quadratic Forms

*7.1 Diagonalization of Symmetric Matrices
*7.2 Quadratic Forms
*7.3 The Singular Value Decomposition
* Sections are optional, as time permits