

revised 9/1/08

## 640:250 sec. 03 Introduction to Linear Algebra

**Text:** Spence, Insel & Friedberg *Elementary Linear Algebra: A Matrix Approach, 2nd Edition*  
ISBN # 978-0-13-187141-0, Prentice-Hall, Upper Saddle River, NJ 07458

### Syllabus

|  | Lecture | Reading | Topics                  |   |
|--|---------|---------|-------------------------|---|
|  | 9/02    | 1       | 1.1, 1.2                | Matrices, Vectors, and Linear Combinations  |
|  | 9/05    | 2       | 1.3                     | Systems of Linear Equations   |
|  | 9/09    | 3       | 1.4                     | Gaussian Elimination  |
|  | 9/12    | 4       | 1.6                     | Span of a Set of Vectors  |
|  | 9/16    | 5       | 1.7                     | Linear Dependence and Linear Independence   |
|  | 9/19    | 6       | 1.7, 2.1                | Homogeneous Systems, Matrix Multiplication  |
|  | 9/23    | 7       | 2.1                     | Matrix Algebra  |
|  | 9/26    | 8       | 2.3                     | Invertibility and Elementary Matrices   |
|  |         | App. E  |                         | Uniqueness of Reduced Row Echelon Form  |
|  | 9/30    | 9       | 2.4                     | Inverse of a Matrix   |
|  |         |         | 2.5                     | Partitioned Matrices and Block Multiplication                                       |
|  | 10/03   | 10      | 2.6                     | $LU$ Decomposition of a Matrix  |
|  | 10/07   | 11      | <b>Midterm Exam #1</b>  |   |
|  | 10/10   | 12      | 3.1                     | Determinants; Cofactor Expansions   |
|  | 10/14   | 13      | 3.2                     | Properties of Determinants  |
|  | 10/17   | 14      | 4.1                     | Subspaces   |
|  | 10/21   | 15      | 4.2                     | Basis and Dimension   |
|  | 10/24   | 16      | 4.3                     | Column Space and Null Space of a Matrix   |
|  | 10/28   | 17      | 5.1                     | Eigenvalues and Eigenvectors  |
|  | 10/31   | 18      | 5.2                     | Characteristic Polynomial   |
|  | 11/04   | 19      | 5.3                     | Diagonalization of a Matrix   |
|  | 11/07   | 20      | 5.5                     | Examples of Diagonalization   |
|  | 11/11   | 21      | <b>Midterm Exam # 2</b> |   |
|  | 11/14   | 22      | 6.1                     | Geometry of Vectors; Projection onto a Line   |
|  | 11/18   | 23      | 6.2                     | Orthogonal Sets of Vectors;<br>Gram-Schmidt Process; $QR$ factorization             |
|  | 11/21   | 24      | 6.3                     | Orthogonal Projection; Orthogonal Complements                                       |
|  | 11/26   | 25      | 6.4                     | Least Squares; Normal Equations   |
|  | 12/02   | 26      | 6.5, 6.6                | Orthogonal Matrices; Diagonalization of Symmetric Matrices                          |
|  | 12/05   | 27      | 6.6                     | Diagonalization of Quadratic Forms<br>Spectral Decomposition for Symmetric Matrices |
|  | 12/09   | 28      |                         | Catch up and review   |
|  |         |         | <b>Final Exam</b>       | (Class Hour Schedule)   |