Math 2660 Course Syllabus

Textbook: *Linear Algebra with Applications*, S. Leon, 8th ed.

Credit hours: 3

Prerequisites: Math 1620

Bulletin description:


Objectives:

To present to the student an understanding of elements of linear algebra. To present to the student an understanding of the concepts of higher dimensional spaces, matrices and matrix algebra, eigenvalues, and the application of these concepts to physical world problems.

Course content: (instructors have the freedom to alter the ordering of this material).

- Systems of linear equations, Gaussian elimination, matrix algebra, matrix inverses [7 days]
- Determinants [3 days]
- Vector spaces, Euclidean $n$-space, subspaces of vector spaces, kernels, linear independence, dimension, row and column spaces of a matrix [9 days]
- Linear transformations and their matrix representations, change of basis [4 days]
- Inner product spaces, orthogonality, Gramm-Schmidt orthogonalization process [8 days]
- Eigenvalue problems for matrices, eigenvalues and eigenvectors, diagonalization of symmetric matrices [5 days]

[total days: 36]

- Application to physical world problems such as: Markov chains, circuits, network flow, ordinary differential equations, least squares approximation. Use of matrix specific software (text uses MATLAB®) [3-4 days]

The syllabus leaves 5-6 days open for tests and for review or for coverage of additional topics (e.g., quadratic forms). Note: it would be good to cover Cramer’s rule (§2.3) and least squares approximations because engineering students need these.

The following sections of the text *Linear Algebra with Applications* (S. Leon, 8th ed.) would cover all of the required material above.

- Chapter 1 Matrices and systems of equations §§1-5 [7 days]
- Chapter 2 Determinants §§1-2 [3 days]
- Chapter 3 Vector Spaces §§1-6 [9 days]
- Chapter 4 Linear Transformations §§1-3 [4 days]
- Chapter 5 Orthogonality §§1-6 [8 days]
- Chapter 2 Eigenvalues §§1-3 [5 days]

[36 days]

August, 2012