revised 1/9/07 Spring, 2007

640:250 Introduction to Linear Algebra (MATLAB Sections)

Text: Spence, Insel & Friedberg *Elementary Linear Algebra: A Matrix Approach*
ISBN # 0-13-716722-9, Prentice-Hall, Upper Saddle River, NJ 07458

Syllabus

Lecture	Reading	Topics
1	1.1, 1.2	Matrices and Vectors
2	1.3	Systems of Linear Equations
3	1.4	Gaussian Elimination
4	1.6	Span of a Set of Vectors
MATLAB Lab #1 – Matrix and Vector Computations in MATLAB		
5	1.7	Linear Dependence and Linear Independence
6	1.7, 2.1	Homogeneous Systems, Matrix Multiplication
7	2.1	Matrix Algebra
8	2.3	Invertibility and Elementary Matrices
MATLAB Lab #2 – Linear Equations and Matrix Algebra		
9	2.4	Inverse of a Matrix
10	2.5	LU Decomposition of a Matrix
11	**Midterm Exam #1**	
12	3.1	Determinants; Cofactor Expansions
13	3.2	Properties of Determinants
MATLAB Lab #3 – *LU* Decomposition and Determinants		
14	4.1	Subspaces
15	4.2	Basis and Dimension
16	4.3	Column Space and Null Space of a Matrix
17	5.1	Eigenvalues and Eigenvectors
MATLAB Lab #4 – Vector Spaces and General Solution to $A\mathbf{x} = \mathbf{b}$		
18	5.2	Characteristic Polynomial
19	5.3	Diagonalization of a Matrix
20	5.5	Examples of Diagonalization
21	**Midterm Exam # 2**	
22	6.1	Geometry of Vectors; Projection onto a Line
MATLAB Lab #5 – Eigenvalues and Eigenvectors		
23	6.2	Orthogonal Sets of Vectors; Gram-Schmidt Process
24	6.2	Orthogonal Projection; Othogonal Complements
25	6.3	Least Squares; Normal Equations
26	6.4, 6.5	Orthogonal Matrices; Diagonalization of Symmetric Matrices
MATLAB Lab #6 – Orthonormal Bases and Least Squares Approximations		
27	6.5	Spectral Decomposition for Symmetric Matrices Diagonalization of Quadratic Forms
28		Catch up and review
	Final Exam	(Class Hour Schedule)