

640:250:C1 Introduction to Linear Algebra (with MATLAB)

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
9/3	1	1.1, 1.2	Matrices and Vectors
9/8	2	1.3	Systems of Linear Equations
9/10	3	1.4	Gaussian Elimination
9/15	4	1.6	Span of a Set of Vectors
MATLAB Lab #1 – Matrix and Vector Computations in MATLAB			
9/17	5	1.7	Linear Dependence and Linear Independence
9/22	6	1.7, 2.1	Homogeneous Systems, Matrix Multiplication
9/24	7	2.1	Matrix Algebra
9/29	8	2.3	Invertibility and Elementary Matrices
MATLAB Lab #2 – Linear Equations and Matrix Algebra			
10/1	9	2.4	Inverse of a Matrix
10/6	10	2.5	LU Decomposition of a Matrix
10/8	11	Midterm Exam #1	
10/13	12	3.1	Determinants; Cofactor Expansions
10/15	13	3.2	Properties of Determinants
MATLAB Lab #3 – LU Decomposition and Determinants			
10/20	14	4.1	Subspaces
10/22	15	4.2	Basis and Dimension
10/27	16	4.3	Column Space and Null Space of a Matrix
10/29	17	5.1	Eigenvalues and Eigenvectors
MATLAB Lab #4 – Vector Spaces and General Solution to $Ax = b$			
11/3	18	5.2	Characteristic Polynomial
11/5	19	5.3	Diagonalization of a Matrix
11/10	20	5.5	Applications of Eigenvalues (Markov Chains)
11/12	21	Midterm Exam # 2	
11/17	22	6.1	Geometry of Vectors; Projection onto a Line
MATLAB Lab #5 – Eigenvalues and Eigenvectors			
11/19	23	6.2	Orthogonal Sets of Vectors; Gram-Schmidt Process
11/24	24	6.2	Orthogonal Projection; Orthogonal Complements
12/1	25	6.3	Least Squares; Normal Equations
12/3	26	6.4, 6.5	Orthogonal Matrices; Diagonalization of Symmetric Matrices
MATLAB Lab #6 – Orthonormal Bases and Least Squares Approximations			
12/8	27	6.5	Spectral Decomposition for Symmetric Matrices Diagonalization of Quadratic Forms
12/10	28	Catch up and review	
Final Exam (Class Hour Schedule)			