

640:250 Introduction to Linear Algebra (MATLAB Sections)

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

Date	Lecture	Reading	Topics
9/01	1	1.1, 1.2	Matrices, Vectors, and Linear Combinations
9/08	2	1.3	Systems of Linear Equations
9/13	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 (due 9/15)			
9/20	5	1.7	Linear Dependence and Linear Independence
9/22	6	1.7, 2.1	Homogeneous Systems, Matrix Multiplication
9/27	7	2.1	Matrix Algebra
9/29	8	2.3	Invertibility and Elementary Matrices
		App. E	Uniqueness of Reduced Row Echelon Form
MATLAB Lab #2 – Linear Equations and Matrix Algebra (due 9/29)			
10/04	9	2.4	Inverse of a Matrix
		2.5	Partitioned Matrices and Block Multiplication
10/06	10	2.6	<i>LU</i> Decomposition of a Matrix
10/11	11	Midterm Exam #1	
10/13	12	3.1	Determinants; Cofactor Expansions
10/18	13	3.2	Properties of Determinants
10/20	14	4.1	Subspaces
MATLAB Lab #3 – <i>LU</i> Decomposition and Determinants (due 10/20)			
10/25	15	4.2	Basis and Dimension
10/27	16	4.3	Column Space and Null Space of a Matrix
11/01	17	5.1	Eigenvalues and Eigenvectors
11/03	18	5.2	Characteristic Polynomial
MATLAB Lab #4 – Vector Spaces and General Solution to $Ax = b$ (due 11/03)			
11/08	19	5.3	Diagonalization of a Matrix
11/10	20	5.5	Examples of Diagonalization
11/15	21	Midterm Exam # 2	
11/17	22	6.1	Geometry of Vectors; Projection onto a Line
MATLAB Lab #5 – Eigenvalues and Eigenvectors (due 11/22)			
11/22	23	6.2	Orthogonal Sets of Vectors; Gram-Schmidt Process; <i>QR</i> factorization
11/29	24	6.3	Orthogonal Projection; Orthogonal Complements
12/01	25	6.4	Least Squares; Normal Equations
12/06	26	6.5, 6.6	Orthogonal Matrices; Diagonalization of Symmetric Matrices
12/08	27	6.6	Diagonalization of Quadratic Forms Spectral Decomposition for Symmetric Matrices
MATLAB Lab #6 – Orthonormal Bases and Least Squares Approximations (due 12/13)			
12/13	28	Catch up and review	