

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	(Q = quiz) Lecture	Reading	Topics
9/02	1	1.1, 1.2	Matrices, Vectors, and Linear Combinations
9/08	2	1.3	Systems of Linear Equations
9/09	3Q	1.4	Gaussian Elimination
9/14	4	1.6	Span of a Set of Vectors
MATLAB Lab #1 – Matrix and Vector Computations in MATLAB (due 9/14)			
9/16	5Q	1.7	Linear Dependence and Linear Independence
9/21	6	1.7, 2.1	Homogeneous Systems, Matrix Multiplication
9/23	7Q	2.1	Matrix Algebra
9/28	8	2.3	Invertibility and Elementary Matrices
		App. E	Uniqueness of Reduced Row Echelon Form
MATLAB Lab #2 – Linear Equations and Matrix Algebra (due 9/28)			
9/30	9Q	2.4	Inverse of a Matrix
		2.5	Partitioned Matrices and Block Multiplication
10/05	10	2.6	LU Decomposition of a Matrix
10/07	11	Midterm Exam #1	
10/12	12	3.1	Determinants; Cofactor Expansions
10/14	13Q	3.2	Properties of Determinants
10/19	14	4.1	Subspaces
MATLAB Lab #3 – LU Decomposition and Determinants (due 10/19)			
10/21	15Q	4.2	Basis and Dimension
10/26	16	4.3	Column Space and Null Space of a Matrix
10/28	17Q	5.1	Eigenvalues and Eigenvectors
11/02	18	5.2	Characteristic Polynomial
MATLAB Lab #4 – Vector Spaces and General Solution to $Ax = b$ (due 11/02)			
11/04	19Q	5.3	Diagonalization of a Matrix
11/09	20	5.5	Examples of Diagonalization
11/11	21	Midterm Exam # 2	
11/16	22	6.1	Geometry of Vectors; Projection onto a Line
MATLAB Lab #5 – Eigenvalues and Eigenvectors (due 11/16)			
11/18	23Q	6.2	Orthogonal Sets of Vectors; Gram-Schmidt Process; QR factorization
11/23	24	6.3	Orthogonal Projection; Orthogonal Complements
11/30	25Q	6.4	Least Squares; Normal Equations
12/02	26	6.5, 6.6	Orthogonal Matrices; Diagonalization of Symmetric Matrices
12/07	27Q	6.6	Diagonalization of Quadratic Forms Spectral Decomposition for Symmetric Matrices
MATLAB Lab #6 – Orthonormal Bases and Least Squares Approximations (due 12/09)			
12/09	28	Catch up and review	