

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
1/21	1	1.1, 1.2	Matrices, Vectors, and Linear Combinations
1/26	2	1.3	Systems of Linear Equations
1/28	3Q	1.4	Gaussian Elimination
2/02	4	1.6	Span of a Set of Vectors
MATLAB Lab #1 – Matrix and Vector Computations in MATLAB (due 2/02)			
2/04	5Q	1.7	Linear Dependence and Linear Independence
2/09	6	1.7, 2.1	Homogeneous Systems, Matrix Multiplication
2/11	7Q	2.1	Matrix Algebra
2/16	8	2.3	Invertibility and Elementary Matrices
		App. E	Uniqueness of Reduced Row Echelon Form
MATLAB Lab #2 – Linear Equations and Matrix Algebra (due 2/16)			
2/18	9Q	2.4	Inverse of a Matrix
		2.5	Partitioned Matrices and Block Multiplication
2/23	10	2.6	<i>LU</i> Decomposition of a Matrix
2/25	11	Midterm Exam #1	
3/02	12	3.1	Determinants; Cofactor Expansions
3/04	13Q	3.2	Properties of Determinants
3/09	14	4.1	Subspaces
MATLAB Lab #3 – LU Decomposition and Determinants (due 3/09)			
3/11	15Q	4.2	Basis and Dimension
Spring Break			
3/23	16	4.3	Column Space and Null Space of a Matrix
3/25	17Q	5.1	Eigenvalues and Eigenvectors
3/30	18	5.2	Characteristic Polynomial
MATLAB Lab #4 – Vector Spaces and General Solution to $Ax = b$ (due 3/30)			
4/01	19Q	5.3	Diagonalization of a Matrix
4/06	20	5.5	Examples of Diagonalization
4/08	21	Midterm Exam # 2	
4/13	22	6.1	Geometry of Vectors; Projection onto a Line
MATLAB Lab #5 – Eigenvalues and Eigenvectors (due 4/13)			
4/15	23Q	6.2	Orthogonal Sets of Vectors; Gram-Schmidt Process; <i>QR</i> factorization
4/20	24	6.3	Orthogonal Projection; Orthogonal Complements
4/22	25Q	6.4	Least Squares; Normal Equations
4/27	26	6.5, 6.6	Orthogonal Matrices; Diagonalization of Symmetric Matrices
4/29	27Q	6.6	Spectral Decomposition for Symmetric Matrices Diagonalization of Quadratic Forms
5/04	28	Catch up and review	
MATLAB Lab #6 – Orthonormal Bases and Least Squares Approximations (due 5/04)			