

640:250-C1 Introduction to Linear Algebra with MATLAB

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 (Q = quiz)	Reading	Topics
1/20	1	1.1, 1.2	Matrices, Vectors, and Linear Combinations
1/25	2	1.3	Systems of Linear Equations
1/27	3Q	1.4	Gaussian Elimination
2/01	4	1.6	Span of a Set of Vectors
		MATLAB Lab #1 – Matrix and Vector Computations in MATLAB (due 2/01)	
2/03	5Q	1.7	Linear Dependence and Linear Independence
2/08	6	1.7, 2.1	Homogeneous Systems, Matrix Multiplication
2/10	7Q	2.1	Matrix Algebra
2/15	8	2.3	Invertibility and Elementary Matrices
		App. E	Uniqueness of Reduced Row Echelon Form
		MATLAB Lab #2 – Linear Equations and Matrix Algebra (due 2/15)	
2/17	9Q	2.4	Inverse of a Matrix
		2.5	Partitioned Matrices and Block Multiplication
2/22	10	2.6	<i>LU</i> Decomposition of a Matrix
2/24	11	Midterm Exam #1	
3/01	12	3.1	Determinants; Cofactor Expansions
3/03	13Q	3.2	Properties of Determinants
3/08	14	4.1	Subspaces
		MATLAB Lab #3 – <i>LU</i> Decomposition and Determinants (due 3/08)	
3/10	15Q	4.2	Basis and Dimension
		Spring Break	
3/22	16	4.3	Column Space and Null Space of a Matrix
3/24	17Q	5.1	Eigenvalues and Eigenvectors
3/29	18	5.2	Characteristic Polynomial
		MATLAB Lab #4 – Vector Spaces and General Solution to $Ax = b$ (due 3/29)	
3/31	19Q	5.3	Diagonalization of a Matrix
4/05	20	5.5	Examples of Diagonalization
4/07	21	Midterm Exam # 2	
4/12	22	6.1	Geometry of Vectors; Projection onto a Line
		MATLAB Lab #5 – Eigenvalues and Eigenvectors (due 4/12)	
4/14	23Q	6.2	Orthogonal Sets of Vectors; Gram-Schmidt Process; <i>QR</i> factorization
4/19	24	6.3	Orthogonal Projection; Orthogonal Complements
4/21	25Q	6.4	Least Squares; Normal Equations
4/26	26	6.5, 6.6	Orthogonal Matrices; Diagonalization of Symmetric Matrices
4/28	27Q	6.6	Spectral Decomposition for Symmetric Matrices Diagonalization of Quadratic Forms
5/03	28	Catch up and review	
		MATLAB Lab #6 – Orthonormal Bases and Least Squares Approximations (due 5/03)	