

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

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
9/05	1	1.1, 1.2	Matrices, Vectors, and Linear Combinations
9/10	2	1.3	Systems of Linear Equations
9/12	3Q	1.4	Gaussian Elimination
9/17	4	1.6	Span of a Set of Vectors
		MATLAB Lab #1 – Matrix and Vector Computations in MATLAB (due 9/17)	
9/19	5Q	1.7	Linear Dependence and Linear Independence
9/24	6	1.7, 2.1	Homogeneous Systems, Matrix Multiplication
9/26	7Q	2.1	Matrix Algebra
10/01	8	2.3	Invertibility and Elementary Matrices
		App. E	Uniqueness of Reduced Row Echelon Form
		MATLAB Lab #2 – Linear Equations and Matrix Algebra (due 10/01)	
10/03	9Q	2.4	Inverse of a Matrix
		2.5	Partitioned Matrices and Block Multiplication
10/08	10	2.6	<i>LU</i> Decomposition of a Matrix
10/10	11	Midterm Exam #1	
10/15	12	3.1	Determinants; Cofactor Expansions
10/17	13Q	3.2	Properties of Determinants
10/22	14	4.1	Subspaces
		MATLAB Lab #3 – <i>LU</i> Decomposition and Determinants (due 10/22)	
10/24	15Q	4.2	Basis and Dimension
10/29	16	4.3	Column Space and Null Space of a Matrix
10/31	17Q	5.1	Eigenvalues and Eigenvectors
11/05	18	5.2	Characteristic Polynomial
		MATLAB Lab #4 – Vector Spaces and General Solution to $Ax = b$ (due 11/05)	
11/07	19Q	5.3	Diagonalization of a Matrix
11/12	20	5.5	Examples of Diagonalization
11/14	21	Midterm Exam # 2	
11/19	22	6.1	Geometry of Vectors; Projection onto a Line
		MATLAB Lab #5 – Eigenvalues and Eigenvectors (due 11/19)	
11/26	23Q	6.2	Orthogonal Sets of Vectors; Gram-Schmidt Process; <i>QR</i> factorization
11/28	24	6.3	Orthogonal Projection; Orthogonal Complements
12/03	25Q	6.4	Least Squares; Normal Equations
12/05	26	6.5, 6.6	Orthogonal Matrices; Diagonalization of Symmetric Matrices
12/10	27Q	6.6	Diagonalization of Quadratic Forms Spectral Decomposition for Symmetric Matrices
		MATLAB Lab #6 – Orthonormal Bases and Least Squares Approximations (due 12/10)	
12/12	28	Catch up and review	
12/21		Final Exam (8:00-11:00 AM)	