

20F Syllabus - Linear Algebra, Fall 2004

Lecture Schedule based on Lay – *Linear Algebra and Its Applications* 3rd Edition

Section	Lectures	Topic
1.1	1	Systems of Linear Equations
1.2	1	Row Reduction and Echelon Forms
1.3	0.5	Vector Equations
1.4	1	The Matrix Equation $Ax = b$
1.5	1	Solution Sets of Linear Systems
1.6	0.5	Applications of Linear Systems
1.7	1	Linear Independence
1.8	0.5	Introduction to Linear Transformations
1.9	1	The Matrix of a Linear Transformation
2.1	1	Matrix Operations
2.2	1	The Inverse of a Matrix
2.3	0.5	Characterizations of Invertible Matrices
2.5	0.5	Matrix Factorizations
4.1	1	Vector Spaces and Subspaces
4.2	1	Null Spaces, Column Spaces and Linear Transformations
4.3	0.5	Linearly Independent Sets; Bases
4.5	0.5	The Dimension of a Vector Space
4.6	0.5	Rank
4.4	0.5	Coordinate Systems
4.7	1.5	Change of Basis
3.1	0.5	Introduction to Determinants
3.2	1	Properties of Determinants
3.3	0.5	Cramer's Rule; Volume and Linear Transformations
5.1	1	Eigenvectors and Eigenvalues
5.2	1	The Characteristic Equation
5.3	0.5	Diagonalization
6.1	1	Inner Product, Length and Orthogonality
6.2	0.5	Orthogonal Sets
6.3	1	Orthogonal Projections
6.4	0.5	The Gram-Schmidt Process
6.5	0.5	Least-Squares Problems
7.1	1	Diagonalization of Symmetric Matrices

List of Topics for MATLAB laboratories:

1. Introduction to MATLAB
2. Systems of Linear Equations and Floating-Point Errors
3. Matrix Algebra
4. Elementary Row Operations and LU-Factorization
5. Linear Dependence, Column Space, Null Space, and Bases
6. Change of Basis and Coordinate Transformations
7. Eigenvalues and Determinants
8. Orthogonality and Least Squares

<http://www.math.ucsd.edu/~math20f/Spring/>