Advanced Linear Algebra. Syllabus

L #	Topics	Notes & Remarks
1	What is Linear Algebra?	Notes
2	Complex Numbers	Notes
3	Complex Numbers	
4	Fundamental Theorem of Algebra (proof optional)	Notes
5	Vector Spaces, Subspaces	Axler pp 4–14
6	Direct Sum, Span	Axler pp 14–23
7	Linear Independence, Bases	Axler pp 23–31
8	Dimension	Axler pp 31–34
9	Linear Maps	Axler p 37–41
10	Null Space, Range	Axler pp 41–47
11	Matrix of a Linear Map	Axler pp 48–53
12	More on Matrices	Notes
13	Invertibility	Axler pp 53–58
14	Eigenvalues and eigenvectors	Axler pp 75–80
15	Existence of Eigenvalues	Axler pp 81–84
16	Upper Triangular Matrix Representation	Axler pp 84–90
17	Diagonalization (2x2) and Applications	Notes
18	Midterm	
19	Inner Product Spaces	Axler pp 97–101
20	Cauchy-Schwarz, Triangle Inequality, Pythagoras	Axler pp 101–106
21	Orthonormal Bases, Gram-Schmidt procedure	Axler pp 106–110
22	Orthogonal Projections, Minimization Problems	Axler pp 111–116
23	Vectors and Coordinates – Maps and Matrices	Notes
24	Spectral Theorem for Normal Maps (complex)	Axler pp 127–133
25	Diagonalization	Notes
26	Positive Operators, Polar and Singular Value Decomposition	Axler pp 144–155
27	Permutations and the Determinant	Notes
28	Properties of the Determinant	Notes
29	LU-Factorization and Solving Linear Systems	Notes

Notes of all lectures are available on the class website at
`http://www.math.ucdavis.edu/~anne/WQ2007/mat67.html`

Additional handouts with useful material are:

Common Math Symbols, Notes on Sets and Functions, Matrices,
Solving Linear Equations, Homework Sets and Solutions