

Syllabus for SM361 - Intermediate Linear Algebra, FALL 2012

Text *Matrix Analysis & Applied Linear Algebra by C. D. Meyer*

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Week	Topic	Section	Problems
1 (8/20-8/24)	1 Review of Linear Systems	1.2, 2.1-2.5	1.2.1, 2.1.1(b), 2.1.3, 2.1.6, 2.2.1(a), 2.3.1(c), 2.3.3, 2.4.7, 2.5.1(a), 2.5.4
	2 Matrix Inversion	3.7	3.7.1(d)&(e), 3.7.3, 3.7.4, 3.7.6, 3.7.8, 3.7.9, 3.7.11(a)
	3 Elementary Matrices	3.9	3.9.1, 3.9.3, 3.9.4, 3.9.5, 3.9.7, 3.9.8, 3.9.9
	4 LU Decomposition	3.1	3.10.1, 3.10.2, 3.10.3, 3.10.6, 3.10.9
2 (8/27-8/31)	5 Vector Spaces; Subspaces 1	4.1	4.1.1, 4.1.2, 4.1.5, 4.1.6
	6 Vector Spaces; Subspaces 2	4.1	4.1.7, 4.1.8, 4.1.9, 4.1.11
	7 Four Fundamental Subspaces	4.2	4.2.1, 4.2.2, 4.2.3, 4.2.5, 4.2.8, 4.2.10, 4.2.12
	8 Linear Independence	4.3	4.3.1(a)&(c), 4.3.5, 4.3.7, 4.3.8, 4.3.10, 4.3.12, 4.3.13(b)&(c)
3 (9/3-9/7)	9 Basis and Dimension	4.4	4.4.2, 4.4.3, 4.4.4, 4.4.6, 4.4.7, 4.4.8, 4.4.17, 4.4.18
	10 Rank and Nullity	4.5	4.5.1, 4.5.2, 4.5.4, 4.5.8, 4.5.9, 4.5.10, 4.5.11(a)
	11 Linear Transformations 1	4.7	4.7.1, 4.7.2, 4.7.4, 4.7.5, 4.7.6, 4.7.7, 4.7.8
	12 Linear Transformations 2	4.7	4.7.11, 4.7.12, 4.7.14, 4.7.17
4 (9/10-9/14)	13 Change of Basis & Similarity	4.8	4.8.1, 4.8.2, 4.8.3, 4.8.6, 4.8.8
	14 Catch-up/Review		
	15 Catch-up/Review		
	16 TEST 1		
5 (9/17-9/21)	17 Vector Norms	5.1	5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5, 5.1.6, 5.1.8
	18 Matrix Norms	5.2	5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.2.5
	19 Inner Product Spaces	5.3	5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.5(b)
	20 Orthogonality	5.4	5.4.1(b)&(c), 5.4.3, 5.4.4, 5.4.6, 5.4.7, 5.4.8, 5.4.9, 5.4.16
6 (9/24-9/28)	21 Gram-Schmidt	5.5	5.5.1, 5.5.2, 5.5.3, 5.5.5
	22 QR Decomposition	5.5	5.5.6, 5.5.8, 5.5.11
	23 Orthogonal Matrices	5.6	5.6.1(b)&(c), 5.6.2, 5.6.3, 5.6.5(a)&(b), 5.6.8(a), 5.6.10, 5.6.13
	24 Orthogonal Reduction	5.7	5.7.1, 5.7.2, 5.7.3
7 (10/1-10/5)	25 Discrete Fourier Transform	5.8	5.8.1, 5.8.2, 5.8.3, 5.8.5, 5.8.10
	26 Complementary Subspaces	5.9	5.9.1, 5.9.3, 5.9.4, 5.9.5, 5.9.6, 5.9.8
	27 Range-Nullspace Decomposition	5.10	5.10.1, 5.10.3, 5.10.5, 5.10.6(a)
	28 Orthogonal Decomposition	5.11	5.11.1, 5.11.3, 5.11.4, 5.11.5, 5.11.6, 5.11.8
8 (10/8-10/12)	29 Singular Value Decomposition	5.12	5.12.1, 5.12.2, 5.12.3, 5.12.13(a), 5.12.14
	30 Image Compression with SVD	Notes	
	31 Orthogonal Projections	5.13	5.13.1, 5.13.2, 5.13.3, 5.13.9, 5.13.11, 5.13.12
9 (10/15-10/19)	32 Catch-up/Review		
	33 Catch-up/Review		
	34 TEST 2		

	35	Modular Arithmetic	Notes	
10	36	Hamming Code	Notes	
(10/22-10/26)	37	Hill Cipher 1	Notes	
	38	Hill Cipher 2	Notes	
	39	Eigenvalues	7.1	7.1.1(B), 7.1.2(a)&(b), 7.1.3, 7.1.5, 7.1.6, 7.1.8, 7.1.9, 7.1.10, 7.1.12
11	40	Diagonalization	7.2	7.2.2, 7.2.3, 7.2.4, 7.2.5, 7.2.6, 7.2.8, 7.2.9, 7.2.17
(10/29-11/2)	41	Matrix Exponentials	7.3	7.3.1, 7.3.2, 7.3.3, 7.3.6, 7.3.10
	42	Power Method	7.3	7.3.13, 7.3.14
	43	Normal & Symmetric Matrices	7.5	7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.5.8
12	44	Positive Matrices 1	7.6	7.6.1(A,B), 7.6.2, 7.6.3, 7.6.4
(11/5-11/9)	45	Positive Matrices 2	7.6	7.6.5, 7.6.6, 7.6.7
	46	Catch-up/Review		
	47	Catch-up/Review		
13	48	TEST 3		
(11/12-11/16)	49	Principal Component Analysis 1	Notes	
	50	Principal Component Analysis 2	Notes	
14	51	Multiresolution Analysis	Notes	
(11/19-11/23)	52	Wavelets 1	Notes	
15	53	Wavelets 2	Notes	
(11/26-11/30)	54	Ill-Conditioned Linear Systems	1.6	1.6.1, 1.6.5
	55	Gauss-Seidel Approximation	Notes	
	56	Jacobi Approximation	Notes	
16	57	Catch-up/Review		
(12/3-12/7)	58	Catch-up/Review		
	59	TEST 4		
	60	Review		