

Mathematics 104

LINEAR ALGEBRA & APPLICATIONS

Syllabus, Spring Semester 2004

All section numbers and homework problems are from the text,
Linear Algebra: A Geometric Approach,
 by Theodore Shifrin and Malcolm R. Adams.

<i>Lesson number</i>	<i>Section number</i>	<i>Topic / Homework</i>
1	1.1	Vectors HW, pp. 18-21: 3(a,c,e), 4, 5, 7, 15, 17, 18, 20, 21
2	1.2	Dot Products HW, pp. 28-33: 1(a,e,g), 2(a,e,g), 3, 7, 10, 15, 17, 19
3	1.3	Hyperplanes in \mathbb{R}^n HW, pp. 41-43: 1(a,b,d), 3(a,b,c), 5, 7, 10a, 11
4	1.4	Systems of Linear Equations and Gaussian Elimination, Part 1
5	1.4	Systems of Linear Equations and Gaussian Elimination, Part 2 HW, pp. 59-62: 1, 3(a-f), 4(b,c), 6, 7, 8
6	1.5	Theory of Linear Systems, Part 1
7	1.5	Theory of Linear Systems, Part 2 HW, pp. 73-76: 1, 2(a,b), 3(a,b), 4a, 5b, 6, 8, 10, 12, 14
8	1.6	Some Applications HW, pp. 89-92: 3, 5, 7, 8, 10, 11a, 12b
9	2.1	Matrix Operations, Part 1
10	2.1	Matrix Operations, Part 2 HW, pp. 113-117: 1, 2(a,c,f), 6, 7(a,b,c), 8, 9, 10(a,b,d), 11, 12, 13, 15, 19
11	2.2	Inverse Matrices HW, pp. 127-131: 1(a,b,d), 2(a,b,d), 4(a,c,d), 8, 10, 12, 13, 14, 19
12	2.3	The Transpose HW, pp. 133-136: 1(a,j,k), 2, 3, 4, 5, 6, 7, 9, 13(a,b,c), 16, 17a
13	3.1	Subspaces of \mathbb{R}^n , Part 1
14	3.1	Subspaces of \mathbb{R}^n , Part 2 HW, pp. 152-155: 1(a,b,c,e,g), 2(a,c,d), 4, 6, 8(b,d), 9, 10, 12, 13(a,b), 16, 20
15	3.2	Linear Independence HW, pp. 165-167: 1, 2, 3(a,b), 4, 5, 6, 7, 11, 12, 13, 14

16	3.3	Basis and Dimension HW, pp. 175-177: 1, 2(a,b,c), 3, 4(a,c), 6, 7, 10, 13, 14
17		Quiz
18	3.4	The Four Fundamental Subspaces, Part 1
19	3.4	The Four Fundamental Subspaces, Part 2 HW, pp. 188-191: 1(a,b,d), 4, 5, 7, 11, 12, 15, 16
20	3.6	Abstract Vector Spaces, Part 1
21	3.6	Abstract Vector Spaces, Part 2 HW, pp. 211-214: 1, 2(a,c,d), 3(a,c,f), 4, 6(a,b), 8, 11a, 12, 13(b,c), 14(a,b)
22		Complex Vector Spaces, \mathbb{C}^n and related topics
23	4.1	Inconsistent Systems and Projection HW, pp. 226-229: 1(a,b), 3, 4, 6, 8, 9, 11, 13
24	4.2	Orthogonal Bases, Part 1
25	4.2	Orthogonal Bases, Part 2 HW, pp. 238-240: 2c, 3, 6, 7(a,b), 8a, 9a, 11, 12(a,b)
Spring Break		
26	4.3	Linear Transformations, Part 1
27	4.3-4.4	Linear Transformations Part 2; Change of Basis, Part 1 HW, pp. 252-256: 1, 3(a,c), 6, 7, 9, 10, 11, 13, 15, 17, 20
28	4.4	Change of Basis, Part 2 HW, pp. 267-271: 1b, 3, 4, 8, 12, 14, 15, 16, 17, 22
29	5.1-5.2	Signed Area in \mathbb{R}^n ; Determinants, Part 1 HW, pp. 278-279: 2, 3
30	5.2	Determinants, Part 2 HW, pp. 287-290: 1(a,b,c), 2, 4, 5, 7, 9a, 11, 12
31	5.3	Cofactors and Cramer's Rule HW, pp. 298-301: 1, 2, 3, 5, 7, 8(a,c,f), 12a
32		Quiz
33	6.1	The Characteristic Polynomial HW, pp. 312-315: 1(a,b,d,g,h,i,p), 2, 3, 4, 6, 7(a,d), 9, 10, 13(a,b)
34	6.2	Diagonalizability HW, pp. 320-323: 1(a,b,d,g,h,i,p), 2(c,e,f), 4, 7, 8, 10(a,b) 11a, 12, 15, 16, 18(a,b)
35	6.3	Applications HW, pp. 333-334: 1, 2, 3, 8, 11, 12a, 13

36	6.4	The Spectral Theorem, Part 1
37	6.4	The Spectral Theorem, Part 2 HW, pp. 345-349: 1(a,d,e,g), 3, 5, 7, 12(a,b,c,d), 14, 16a, 17b
38	7.1	Complex Eigenvalues and Jordan Canonical Form, Part 1
39	7.1	Complex Eigenvalues and Jordan Canonical Form, Part 2 HW, pp. 366-370: 1, 2(a,b,c,e), 4, 5, 7(a,b,c), 8(a,c,e), 13, 15
40	7.3	Matrix Exponentials and Differential Equations, Part 1
41	7.3	Matrix Exponentials and Differential Equations, Part 2 HW, pp. 410-444: 1(a,c,d,e), 2(a,b,d), 4, 5(a,b), 6, 7, 8(only for $n = 3$), 9(a,b), 10, 13, 14
42		Quiz
