

Math 221 – Linear Algebra
Spring 2004

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Text: Linear Algebra And Its Applications 3rd ed. David C. Lay

Equipment: Sorry, no calculators.

Other Resources: As detailed in the preface of the text, the author maintains a website at www.laylinalgebra.com which serves as a companion for the text and offers supplementary material.

Course Content: Systems of Linear equations and techniques for finding their solutions, Matrix Operations, Vector Spaces, Determinants and their relationship to volume, Cramer's rule, Eigenvalues and Eigenvectors, Inner Product and its geometric interpretation, Gram-Schmidt process.

Goals: By the end of the course the successful student will be able to find the reduced form of a matrix, to solve systems of equations by more than one method and to identify when a system is independent or consistent. Such a student will be able to explain clearly the geometric interpretation of determinant, inner product, orthogonal projections, vector spaces, and change of coordinates. He or she ought to be able to prove some of the simpler propositions presented in the course.

Grades: There will be two closed book exams, a final, and weekly take home quizzes. The quizzes will feature problems which emphasize calculation over concepts. The exams and final will be the other way around. The exams will be taken outside of class at a time and day yet to be determined, but expect them in the last week of February and the second week of April.

Grades in the course will be determined by the points earned with the total possible being the following:

Closed book exams: 2@100 pts each

Quizzes: 10@20 points each

Final exam: 200 points

The following scale will be used when determining your final grade:

A: 540-600 points

B: 480-539 points

C: 420-479 points

D: 360-419 points

F: Below 360 points

Honor Code: The Oxford Honor Code applies to all work submitted for credit. All such work will be pledged to be yours and yours alone. You pledge that with your signature.

HW: Homework will not be graded. This does not mean, however, that conscientiously doing or not doing the homework has no impact on your grade. One can only learn mathematics by actually trying to do mathematics. Thus, doing the homework is extremely important. As such, I will be very happy to talk to you about any of the problems either in (time permitting) or outside of class. You may also work with one another on the homework.

Section	Topic	Homework Problems:
1.1:	Systems of Linear Equations	5,7,8,15,23,24,29
1.2:	Row Reduction and Echelon Forms	1,3,9,10,11,14,15,16,21,22,26,29
1.3:	Vector Equations	6,7,14,16,19,20,24
1.4:	Matrix Equations	1,2,3,4,11,13,15,21,22,29,30,31
1.5:	Solution Sets	5,13,14,15,17,28,35
1.7:	Linear Independence	1-4,9,15-22,33-38
1.8:	Linear Transformations	8,9,11,13-16,19,29,31
1.9:	Matrix of Linear Transform	1-8,23 a-c,24 a-c
2.1:	Matrix Operations	1,2,7-9,11,17,19-22
2.2:	Inverse of Matrices	1-4,9-10,17,18,21,24,31-32,38
2.8:	Subspaces of R^n	1-5,15-21,27,28,31,33
2.9:	Dimension and Rank	1-6,9-10, 13-14,17-18,20,24
3.1:	Introduction to Determinants	1-4, 9-11, 15-18, 19-21,37-38
3.2:	Properties of Determinants	1-4,8-10,21-22,27-29
3.3:	Cramer's Rule and Geometry	1,5,7,8,11,14,17,18,20,23,32a
4.1:	Vector Spaces and Subspaces	1,3,5,7,10,12,15,23,24
4.2:	Linear Transforms and Subspaces	1,4,5,15,18,23,25,26,27,29
4.3:	Linear Independence	1,4,10,19,21,22,23
4.4:	Coordinate Systems	1,5,11,15,16,18,21,31
4.5:	Dimension	1,2,5,13,16, 19,20, 21,23,27
4.6:	Rank	1,2,5,6,9,10,15,17,18,21,22,27,28
4.7:	Change of Base	1,2,3,7,12,16
5.1:	Eigenvectors and Eigenvalues	1-8,13-15,21,22(not c) 23,31-32
5.2:	The Characteristic Equation	1-4,9-10,20-24
5.3:	Diagonalization	1-2,5-6,9-14,21-24,27
5.4:	Linear Transforms and Eigenvectors	1,2,5,7,,13,19-24,31
6.1:	Inner Product and Geometry	1-14,19-20,27-31
6.2:	Orthogonality	1-6,7,9,11-12,15-16,23-24,27-30
6.3:	Orthogonal Projection	1,2,3,4,7,8,11,16,21-24
6.4:	Gram-Schmidt	1-4,12,13,17-23
6.7:	Inner Product Spaces	1,2,3,4,7,11