MAT 272, Linear algebra, 3 credits
Fall 2010
Prof. Larisa Alikhanova

Pre-requisite: MAT K256

Text: **Linear Algebra and Its Applications, 3rd edition, updated by David C. Lay, Pearson/Addison-Wesley, 2006**

Course Description: A first course in linear algebra for students in mathematics, science and engineering. Topics include: systems of linear equations, matrices, determinants, vectors and vector spaces, linear transformations, eigenvalues and eigenvectors. The course is an introduction to the techniques **Of Linear Algebra with applications.**

Measurements: Projects/quizzes - 15%, each test - 20%, final exam – 25%.

Attendance: Attendance is extremely important. Regular class attendance is expected.

Support Services: Tutorial services. Meeting with me for an extra help.

Office Hours: M and W, 3:30 pm – 5:30 pm, **Room C 104**
Email lalikhanova@trcc.commnet.edu

Plagiarism and Academic Honesty: At TRCC, we expect the highest standards of academic honesty. The Board of Trustees' Proscribed Conduct Policy prohibits cheating on examinations, unauthorized collaboration on assignments, unauthorized access to examinations or course materials, plagiarism.

Disabilities Statement: Students with disabilities, who may require special accommodations and support services, are encouraged to notify:

1. Chris Scarborough, who is coordinating services to students with disabilities.
2. The instructor during the first two weeks of class.

Course Content and Homework Assignments. (Odd numbers only).

This is a guide only, the assignments may vary

Sec. 1.1 Systems of linear equations	p. 11/5, 7, 11, 13, 15, 29, 31
Sec. 1.2 Row reductions, echelon forms	p. 25/1, 3, 11, 13, 15
Sec. 1.3 Vector equations	p.37/5, 9, 11, 13, 15
Sec. 1.4 The matrix equation	p. 47/1 -11, 21
Sec. 1.5 Solution sets	p. 55/1, 5, 11
Sec. 1.7 Linear independence	p.71/1, 5, 9, 11, 19
Sec. 1.8 Introduction to linear transformation	p. 79/1, 3, 5, 9
Sec. 1.9 The matrix of a linear transformation	p. 90/1 – 11, 15

TEST

Sec. 2.1 Matrix Algebra	p. 116/1 – 11
Sec.2.2 The inverse of matrix	p. 126/1, 3, 5, 7
Sec.2.3 Invertible matrices	p. 133/1 – 7, 9
Sec. 2.4 Partitioned matrices	p.139/1,3
Sec 2.5 Matrix factorization	p.149/1, 3, 5

Sec. 3.1Introduction to determinants	p. 190/1, 5, 9
Sec.3.2 Properties of determinants	p.199/5, 11
Sec. 3.3 Cramer's rule	p. 209/1 – 5, 11, 13

TEST

Sec. 4.1 Vector spaces and subspaces	p. 223/1 – 7, 13
Sec.4.2 Null, column spaces, and linear transformations	p. 234/1 – 11, 15, 17
Sec. 4.3 Linearly independent sets; Bases	p.243/1 -9, 13 – 15
Sec. 4.4 Coordinate systems	p. 253/1 – 11
Sec. 4.5 The dimension of a vector space	p. 260/1, 3, 11, 13
Sec. 4.6 Rank	p.269/1 – 13
Sec. 4.7 Change of basis	p. 276/1 – 7

TEST

Sec. 5.1 Eigenvectors and eigenvalues	p. 308/1 – 7, 13, 17
Sec. 5.2 The characteristic equation	p. 317/1 – 11, 17
Sec. 5.3 Diagonalization	p. 325/1 – 11
Sec. 5.4 Eigenvectors and linear transformations	p. 333/1, 3, 13
Sec. 5.5 Complex eigenvalues	p. 341/1, 5, 13
Sec. 6.1 Inner product, length, and orthogonality	p. 382/1, 9, 15, 17
Sec. 6.2 Orthogonal sets	p.392/3 – 13, 17
Sec. 6.3 Orthogonal projections	p. 400/1 – 11
Sec. 7.1Diagonalization of symmetric matrices	p.454/5, 717

FINAL EXAM

Linear Algebra course objectives:

Student should be able to:

1. Solve the systems of linear equations.
2. Find a vector equation and a matrix equation equivalent to a system of linear equations.
3. Write the solution sets in parametric form.
4. Determine the linearly independent, dependent systems.
5. Find the matrix of linear transformations.
6. Perform algebraic operations on matrices.
7. Find the inverses of matrices.
8. Consider the applications of linear algebra that involve two or more matrices.
9. Use partitioned matrices and operations on them.
10. Use matrix factorization and its application in electrical engineering.
11. Compute the determinants. Use their properties.
12. Use the Cramer's Rule.
13. Use the rules of a vector space and subspace.
14. Find the Null space, column space, perform the linear transformation.
15. Determine the linearly independent sets; find a basis for the set vectors.
16. Find the coordinate vector.
17. Find the dimension of the vector space.
18. Find the rank of matrix.
19. Find the change-of-coordinate matrix.
20. Find the eigenvalues , eigenvectors of the matrices
21. Find the characteristic equation of a matrix.
22. Use the diagonalization theorem, diagonalize matrices.
23. Find complex eigenvalues.
24. Find inner products of vectors, determine the orthogonality.
25. Find orthogonal projections.
26. Diagonalize symmetric matrices.