LINEAR ALGEBRA II - MTH 324/624 - Fall 2006

Course Goals: To learn about the properties of vector spaces and linear transformations and how to obtain nice representations of transformations, to improve your ability to reason abstractly, to construct counterexamples and rigorous proofs.

Text: *Further Linear Algebra* by T.S. Blyth and E.F. Robertson, Springer-Verlag, London (2002 (paperback). We cover material in Chapters 0-9. *Schaum Outlines: Beginning Linear Algebra*, by Seymour Lipschutz, McGraw-Hill, New York (1997) (paperback).

Topics: Building on a first course in linear algebra, this course develops the important theoretical tools of linear algebra (over an arbitrary field). After some review of the basic properties of vector spaces, linear transformations, change of basis, eigenvalues and diagonalizable operators, we will study inner products spaces and isometries, orthonormal bases (Gram-Schmidt orthogonalization process), direct sums and projections, orthogonal complement and orthogonal projections, Primary Decomposition and Jordan Normal Form, Cyclic Decomposition and Rational Canonical Form, the adjoint of a linear operator, self-adjoint (and symmetric) operators, unitary (and orthogonal) operators, ortho-diagonalisable operators, spectral resolutions, normal operators, the Singular Value Decomposition, bilinear forms, and the invariants (rank and signature) that characterize real quadratic forms.

Homework: Problems will be assigned each class period, and discussed during the following class session. Each **Friday** (beginning September 1) you will turn in all problems assigned during the previous week for comment by the instructor.

Tests: There will be three tests; half of each test will be completed in class, and half out of class (out of class tests for 324 and 624 will differ). Test dates will be announced at least one week before each test.

Final Exam: In-class final exam will be given on: **Saturday, December 9, 2 PM-5 PM**.

Final Grades: Final grades will be based on the total points accumulated on the following work:

Test 1	150
Test 2	150
Test 3	150
Final Exam	300
Total Points	**750**

Instructor: Dr. Ellen E. Kirkman
Office: 358 Manchester Hall **Phone**: 758-5351 (secretary 758-5354)
E-mail address: kirkman@wfu.edu
Office Hours: Monday, Wednesday, Friday: 2-4 PM (or by appointment)