

640:250 Linear Algebra

General Information

Lecturer: Chris Woodward, Asst Prof in Mathematics

Office and telephone number: Hill 336, 5-2466

Office Hours: MW 3:00- 4:00 Hill 336 or by appt. Feel free to e-mail questions to me. If I think that other people might have the same question, I will forward the message and my response to everyone, unless you ask me not to in the message.

Text: Gilbert Strang, *Introduction to Linear Algebra*, 2nd ed.,

ISBN # 0-9614088-5-5, Wellesley-Cambridge Press, Box 812060, Wellesley MA 02482

Exams, Homework, and Grades: There will be two midterm exams and a final exam. Short quizzes based on the assigned homework problems will be given in class. The weightings to determine course grade will be as follows:

each midterm exam = 20%

graded homework and quizzes = 20%

final exam = 40%

Roster: Bring a photocopy (with recognizable photo) of your Rutgers I.D., to turn in for a quiz on 9/11. It will count for credit. List on the sheet your e-mail address/possible major.

Attendance is required. After the first two absences, prior written excuses will be required. More than two inexcused absences may count against your grade.

Academic Honesty: The work you submit should be your own; do not copy other students assignments and exams, or allow your assignments/exams to be copied by others. Students taking make-up exams are responsible for not looking at exams other students have taken, even if they are different versions. Evidence that students have obtained previous versions of the exam will lead to a grade of zero. Formula sheets are not allowed in exams.

Working together on assignments is fine (even encouraged!), as long as (1) the answers are not copied; this means there should be (at least small) differences in the assignment (2) the names of the collaborators are listed.

Course Website: This document, other course materials, information about the course, and links to relevant web sites are posted on the Mathematics Department web site (<http://www.math.rutgers.edu>) Click on **course materials** and then **Math 250 Linear Algebra**. Follow the indicated links from there.

Course Syllabus

Lecture	Reading	Topics
9/6	1.1-1.2 2.1	Vectors, Lengths and Dot Products Vectors and Linear equations
9/11	2.2, 2.3	The Idea of Elimination, Elimination using Matrices
9/13	2.4, 2.5	Rules for Matrix Operations; Inverse Matrices
9/18	2.6	Elimination by $A = LU$ Factorization
9/25	2.7	Transposes and Permutations, $PA = LU$ Factorization
	Extra-Credit Project #1	
9/27	3.1	Spaces of Vectors

10/2	3.2	Nullspace of A
10/4	3.3	Rank; Echelon Matrices and Row Reduced Form
10/9	3.4	Complete Solution to $Ax = b$
10/11	3.5	Independence, Basis, and Dimension
10/16	3.6	Dimensions of the Four Subspaces
10/18	Midterm Exam #1	
10/23	4.1	Orthogonality of the Four Subspaces
10/25	4.2, 4.3	Projections; Least Squares Approximate Solution to $A\mathbf{x} = \mathbf{b}$
10/30	4.4	Orthogonal Bases, Gram-Schmidt Algorithm, $A = QR$ Factorization
11/1	5.1	Determinant Function and its Properties
11/6	5.2	Permutations and Cofactors
11/8	5.3	Cramer's Rule, Inverses
11/13	6.1	Introduction to Eigenvalues and Eigenvectors
	10.1	Review of complex numbers
11/15	6.2	Diagonalizing a Matrix
	Extra-Credit Project #2	
11/20	6.3	Applications to Differential Equations
11/22		Friday schedule - No class!
11/27	6.4	Eigenvalues and Eigenvectors of Symmetric Matrices
11/29	6.5	Positive Definite Matrices
12/4	Midterm Exam # 2	
12/6	6.7	Singular Value Decomposition (SVD)
12/11	7.1, 7.2	Linear Transformations and their Matrices
12/13	7.3, 7.4	Change of Basis; Dual Basis Geometric meaning of SVD, Solving $Ax = b$ by pseudo inverse
12/20 8am	Final Exam (closed book)	