

## 640:250 Introduction to Linear Algebra, Spring 2002

**Lecturer:** Chris Woodward, Asst Prof in Mathematics

Office and telephone number: Hill 336, 5-2466

Office Hours: W 1:00 - 2:00 Hill 336 or by appt. at Douglas.

E-mail: [ctw@math.rutgers.edu](mailto:ctw@math.rutgers.edu)      webpage: [math.rutgers.edu/~ctw/250-02](http://math.rutgers.edu/~ctw/250-02)

**Text:** Kolman & Hill, *Introductory Linear Algebra with Applications*, 7<sup>th</sup> ed.,  
ISBN # 0-13-018265-6, Prentice-Hall, Upper Saddle River, NJ 07458

**Exams, Homework, and Grades:** There will be two midterm exams and a final exam. The homework problems are not optional, but usually will not be collected; keep them in a notebook. Short quizzes from the assigned homework problems will be given in class on Wednesdays. The weightings to determine course grade will be as follows:

each midterm exam = 20%

quizzes/homework = 20%

final exam = 40%

**Roster:** Bring a photocopy (with recognizable photo) of your Rutgers I.D. by the third class; this WILL COUNT as the first quiz. Late submissions will get partial credit. List on the sheet your e-mail address/possible major/reason for taking the course.

**Regular Attendance** is expected.

**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. Breaking these rules will lead, at the very least, to a grade of zero. Formula sheets and calculators are not allowed in exams.

**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. There is also a web-page for this section, at <http://www.math.rutgers.edu/~>

### Course Syllabus

Lecture (250:05,250:13)	Reading	Topics
1/22,1/23	1.1, 1.2	Linear Systems, Method of Elimination, Matrices
1/25,1/28	1.3, 1.4	Dot Product, Matrix Multiplication
1/29,1/30	1.5	Solving Linear Systems, Row Echelon Form
2/1,2/4	1.6	Inverse of a Matrix
2/5,2/6	1.7	<i>LU</i> Factorization
2/7,2/11	3.1	Definition and Properties of the Determinant of a Matrix
2/12,2/13	3.2	Cofactor Expansion, Matrix Inverse by Determinants
2/15,2/18	4.1, 4.2	Vectors in $\mathbf{R}^2$ and $\mathbf{R}^n$ ; dot product and norm
2/19,2/20	4.3, 5.1	Introduction to Linear Transformations
2/22,2/25	<b>Midterm Exam #1</b>	
2/26,2/27	6.1, 6.2	Vector spaces, Subspaces
3/1,3/4	6.3	Linear Independence
3/5,3/6	6.4	Basis and Dimension
3/8,3/13	6.5	Homogeneous Systems, General Solution to $\mathbf{Ax} = \mathbf{b}$
3/12,3/13	6.6	Row Space, Column Space, and Rank of a Matrix

3/15,3/25	6.8	Orthogonal Bases, Gram-Schmidt Process
3/16-3/24	<b>Spring Break</b>	
3/26,3/27	6.9	Orthogonal Complements, Four Fundamental Subspaces
3/29,4/1	6.9, 7.1	Orthogonal Projections, $QR$ Factorization
4/2,4/3	7.2	Application: Least Squares Fitting of Data
4/5,4/8	<b>Midterm Exam # 2</b>	
4/9,4/10	8.1	Eigenvalues and Eigenvectors
4/12,4/15	8.1	Characteristic Polynomial
4/16,4/17	8.2	Diagonalization of a Matrix
4/19,4/22	8.3	Eigenvalues/Eigenvectors for Symmetric Matrices
4/23,4/24	8.3	Diagonalization of a Symmetric Matrix
4/26,4/29	9.2	Homogeneous Linear Differential Equations
4/30,5/1	9.4	Quadratic Forms
5/3,5/6		Catch up and review
<b>Final Exam</b>	250:05 (TF2)	Thursday May 9, 12-3pm
	250:13 (MW5)	Thursday, May 9, 8-11am.

### Section Homework Exercises

1.1	1, 3, 7, 9, 11, 15, 23, 25, 27
1.2	5, 7, 9, T3, T5
1.3	1, 3, 9, 11, 13, 15, 21, 27, 29, T6, T7, T8
1.4	1, 2, 3, 4, 5, 9, 11, 13, 19, T7, T8, T10, T19, T20, T21, T22, T23, T26, T32
1.5	1, 3, 5, 7, 9, 13, 15, 17, 19, 21, 23, 27, 29, 33, 39, 41, 43, 45, T11, T12, T13
1.6	1, 3, 5, 7, 11, 13, 15, 18, 20, 22, 23, 24, 25, 26, T4, T5, T6, T8, T9, T10
1.7	1, 3, 5, 7, 9
3.1	1, 2, 3, 4, 5, 9, 10, 11, 13, 15, 17, 19, 21, 22, 23, T1, T3, T5, T6, T7, T8, T9, T10, T12, T15, T16
3.2	1, 3, 7, 9, 11, 15, 19, 21, 23, T1, T3, T5, T6, T8, T11
4.1	5, 7, 9, 15, 17, 19
4.2	1, 3, 11, 15, 17, 18, 19, 21, 23, 25, 26, 27, T5, T7, T8, T10, T11, T13, T15
4.3	1, 5, 7, 13, 15, 17, 18, 21, 25, 27, 29, 31, T4, T9
5.1	1, 2, 3, 4, 5, 6, 7
6.1	1, 3, 13, T1, T2, T3, T4, T5, T6
6.2	1, 3, 5, 11, 13, 15, 21, T2, T3, T5, T10, T11
6.3	1, 3, 5, 7, 9, 11, 13, 15, T4, T5, T8, T10
6.4	1, 3, 7, 11, 15, 17, 19, 25, 29, 31, T3, T7, T10, T12
6.5	1, 3, 5, 7, 11, 13, 21, T4
6.6	1, 3, 5, 7, 9, 11, 13, 16, 17, 18, 19, 20, 21, 25, 27, 29, 31, 33, T4, T5, T6, T7, T8
6.8	1, 3, 5, 7, 9, 11, 13, 17, 19, T3, T6
6.9	1, 3, 5, 7, 9, 11, T4, T6
7.1	1, 3, 5, T1, T2
7.2	1, 3, 5, 6, 7, 11
8.1	1, 3, 5, 7, 9, 11, 15, 17, T1, T3, T4, T5, T8, T10, T14
8.2	1, 3, 5, 9, 11, 13, 15, 19, 25, 29, 33, 41, 42, T6, T7, T8, T9, T10, T12
8.3	1, 2, 5, 9, 11, 13, 17, T1, T2, T4, T5, T6, T7, T8, T10
9.2	1, 3, 5, 9
9.4	1, 3, 5, 7, 9, 11, 13, 17, 21, 23, T1, T2, T4, T5