

**640:250 Introduction to Linear Algebra****General Syllabus**

**Note:** This is a *suggested* syllabus. The exact timing of mid-term exams and coverage of topics is determined by the individual course instructors.

<b>Lecture</b>	<b>Reading</b>	<b>Topics</b>
1	1.1, 1.2	Linear Systems, Method of Elimination, Matrices
2	1.3, 1.4	Dot Product, Matrix Multiplication
3	1.5	Solving Linear Systems, Row Echelon Form
4	1.6	Inverse of a Matrix
5	1.7	$LU$ Factorization
6	3.1	Definition and Properties of the Determinant of a Matrix
7	3.2	Cofactor Expansion, Matrix Inverse by Determinants
8	4.1, 4.2	Vectors in $\mathbf{R}^2$ and $\mathbf{R}^n$ ; dot product and norm
9	4.3, 5.1	Introduction to Linear Transformations
10	<b>Midterm Exam #1</b>	
11	6.1, 6.2	Vector spaces, Subspaces
12	6.3	Linear Independence
13	6.4	Basis and Dimension
14	6.5	Homogeneous Systems, General Solution to $\mathbf{Ax} = \mathbf{b}$
15	6.6	Row Space, Column Space, and Rank of a Matrix
16	6.8	Orthogonal Bases, Gram-Schmidt Process
17	6.9	Orthogonal Complements, Four Fundamental Subspaces
18	6.9, 7.1	Orthogonal Projections, $QR$ Factorization
19	7.2	Application: Least Squares Fitting of Data
20	<b>Midterm Exam # 2</b>	
21	8.1	Eigenvalues and Eigenvectors
22	8.1	Characteristic Polynomial
23	8.2	Diagonalization of a Matrix
24	8.3	Eigenvalues/Eigenvectors for Symmetric Matrices
25	8.3	Diagonalization of a Symmetric Matrix
26	9.2	Homogeneous Linear Differential Equations
27	9.4	Quadratic Forms
28		Catch up and review

**Final Exam**