

**MATH 4378/6309 – Advanced Linear Algebra II – Spring 2011
Syllabus**

Instructor: Dr. Gordon Heier

Contact Information:

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TA: Anando Sen

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Lecture: MWF 10am-11am in SW 102.

Exams: Midterm Exam: March 28, 2011 (in-class)

Final Exam: May 9, 2011, 11am-2pm, in SW 102

Text: Linear Algebra, 4th edition, by Friedberg, Insel, and Spence, ISBN 0-13-008451-4

Homework will be assigned every Wednesday on my web site (see above) and will be due the following Wednesday. Late homework will not be accepted.

Quizzes: Several unannounced in-class pop-quizzes will be given throughout the semester.

Attendance: Attending classes and exams is mandatory for all students. Missing class makes a student liable to missing important information, pop-quizzes etc. Substantial documentation is necessary to receive any kind of excuse or make-up privilege.

Grades: The homework and the midterm exam will each account for 25 percent of your grade. The pop-quizzes will account for 15 percent, and the final exam will account for 35 percent. Your two lowest homework scores and your two lowest pop-quiz scores will be dropped.

4378 vs. 6309: All students will be treated the same, regardless of their seniority. When very challenging problems are to be solved by students, then it will usually be for extra credit only. For simplicity, I will refer to this course usually as “Math 4378” only.

Disability: If you think or know that you have a disability that needs special accommodation, please see me at the beginning of the semester so that the proper steps can be taken.

Academic Dishonesty will not be tolerated and dealt with appropriately.

Course Content: On the next page you will find a tentative list of the sections from the textbook that I intend to cover.

- 5.1 Eigenvalues and Eigenvectors
- 5.2 Diagonalizability
- 5.4 Invariant Subspaces and the Cayley–Hamilton Theorem

- 6.1 Inner Products and Norms
- 6.2 The Gram–Schmidt Orthogonalization Process and Orthogonal Complements
- 6.3 The Adjoint of a Linear Operator
- 6.4 Normal and Self-Adjoint Operators
- 6.5 Unitary and Orthogonal Operators and Their Matrices
- 6.6 Orthogonal Projections and the Spectral Theorem
- 6.7* The Singular Value Decomposition and the Pseudoinverse
- 6.8* Bilinear and Quadratic Forms
- 6.9* Einstein’s Special Theory of Relativity
- 6.10* Conditioning and the Rayleigh Quotient
- 6.11* The Geometry of Orthogonal Operators

- 7.1 The Jordan Canonical Form I
- 7.2 The Jordan Canonical Form II
- 7.3 The Minimal Polynomial
- 7.4* The Rational Canonical Form

The topics marked with a * may or may not be discussed based on available time.