

**MATH 4377/6308 – Advanced Linear Algebra I – Fall 2012**  
**Syllabus**

**Instructor:** Dr. Gordon Heier

**Contact Information:**

Office: 666 PGH

Office Hours: M 3pm-4pm, W 2pm-3pm, or by appointment

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**Lecture:** MW 4pm-5:30pm in Lamar Fleming Jr., Room 154

**Exams:** Midterm Exam: October 22, 2012 (in-class)

Final Exam: December 14, 2012, 5pm-8pm

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

**Lecture notes** will be posted on my web site (see above). They are provided “as is” and as a courtesy only. They do not replace use of the textbook or attending class.

**Homework** will be assigned every Wednesday on my web site 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 20 percent, and the final exam will account for 30 percent. Your two lowest homework scores and your two lowest pop-quiz scores will be dropped.

**4377 vs. 6308:** 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 4377” 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.

- 1.1 Introduction (with excerpts from Appendices A (Sets), B (Functions), C (Fields), D (Complex Numbers))
- 1.2 Vector Spaces
- 1.3 Subspaces
- 1.4 Linear Combinations and Systems of Linear Equations
- 1.5 Linear Dependence and Linear Independence
- 1.6 Bases and Dimension
- 1.7\* Maximal Linearly Independent Subsets
  
- 2.1 Linear Transformations, Null Spaces, and Ranges
- 2.2 The Matrix Representation of a Linear Transformation
- 2.3 Composition of Linear Transformations and Matrix Multiplication
- 2.4 Invertibility and Isomorphisms
- 2.5 The Change of Coordinate Matrix
- 2.6 Dual Spaces
- 2.7\* Homogeneous Linear Differential Equations with Constant Coefficients
  
- 3.1 Elementary Matrix Operations and Elementary Matrices
- 3.2 The Rank of a Matrix and Matrix Inverses
- 3.3 Systems of Linear Equations—Theoretical Aspects
- 3.4 Systems of Linear Equations—Computational Aspects
  
- 4.1 Determinants of Order 2
- 4.2 Determinants of Order  $n$
- 4.3 Properties of Determinants
- 4.4 Summary—Important Facts about Determinants
- 4.5\* A Characterization of the Determinant
  
- 5.1 Eigenvalues and Eigenvectors (and Appendix E (Polynomials))
- 5.2 Diagonalizability

Sections marked with a \* will be included if time permits.