

**MATH 4377/6308 – Advanced Linear Algebra I – Spring 2010
Syllabus**

Instructor: Dr. Gordon Heier

Contact Information:

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Lecture: TuTh 11:30am-1pm in SR 128

Exams: Midterm Exam: March 11, 2010 (in-class)

Final Exam: May 11, 2010, 11am-2pm

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

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

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 will account for 25% of your grade. The midterm exam will also account for 25%, and the final exam for the remaining 50%. In-class pop-quizzes are counted as a homework set. Your three lowest homework 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.