

MAT 631 — INTRODUCTION TO ALGEBRA I

FALL 2006

instructor: Graham Leuschke
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text: M. Artin, *Algebra*, Prentice Hall 1991
see also Dummitt & Foote, *Abstract Algebra*,
or J. Rotman, *Advanced Modern Algebra*

place: Carn 220
time: MW 2:15–3:35

office hours: MW 10–11, TR 11–12:30, by appointment, and any time my door is open

Course Description: This is the first course in a two-semester introductory graduate sequence. The topics covered will come from linear algebra, group theory, and some ring theory as time allows.

Grades:

Homework assignments		30%
First midterm	Mon, Oct 16	20%
Second midterm	Mon, Nov 20	20%
Take-home final	due Dec 15	30%

Midterm exams will likely be take-home tests, and dates are subject to change.

Approximate syllabus:

Group Theory I	definitions and examples; subgroups; isomorphisms; homomorphisms; cosets; quotient groups	Chapter 2
Matrices and Vector Spaces	fields; vector spaces; bases and dimension; linear transformations; dimension formula; linear operators; eigenvectors and eigenvalues; characteristic polynomial; diagonalization	Chapters 1, 3, 4
Group Theory II	symmetries; Sylow theorems; simple groups; free groups; generators and relations	Chapters 5, 6
Bilinear Forms and Linear Groups	definitions; symmetric forms; Gram–Schmidt; hermitian forms; the Spectral Theorem; the classical groups	Chapters 7,8