

**Math 202 (Graduate Algebra III) Syllabus**  
Spring 2011

**Instructor:** Professor Samit Dasgupta, sdasgup2@ucsc.edu, math.ucsc.edu/~sdasgup2

**Class:** Tuesday and Thursday, 12–1:45, in JBE 360

**Textbook:** *Abstract Algebra* by Dummit and Foote, Third Edition

**Requirements:** Weekly homework assignments are due every Tuesday. There will be an in-class midterm exam on Tuesday, May 3th. There will be a final exam.

**Summary:** In this course we will cover chapters 10–14 of the textbook. We will begin by defining modules, and studying basic constructions: quotients, free modules, direct sums, tensor products. We will discuss module homomorphisms, as well as exact sequences, projective, injective, and flat modules.

Next we will classify finitely generated modules over principal ideal domains. After briefly recalling some basics of linear algebra, we will apply the theory of modules over PIDs to obtain the rational canonical form and Jordan canonical form.

We conclude the course with a discussion of field theory. We discuss splitting fields, algebraic extensions, and separability. We conclude by discussing Galois theory, with several concrete examples.