Math 361 Syllabus
Fall, 1998
Instructor: Joachim Rosenthal

Textbook: Abstract algebra by I. N. Herstein, 3rd edn, (1996) Prentice Hall, Upper Saddle River, New Jersey 07458. ISBN 0-13-374562-7

General: I essentiall followed the book quite closely and I think Herstein is a very suitable book for this course. The student seem to like the book as well.

1.1 Preliminary Remarks
1.2 Set Theory
1.3 Mappings
1.4 The set of 1-1 mappings of S onto itself
1.5 The integers
1.6 Mathematical induction
1.7 Complex numbers.

2.1 Definitions and examples of groups
2.2 Some simple remarks
2.3 Subgroups
2.4 Lagrange's theorem
2.5 Homomorphisms and normal subgroups
2.6 Factor groups
2.7 Homomorphism theorems (1st, 2nd homomorphism theorem and correspondence theorem on subgroups of a quotient were proved)
2.9 Direct products (definition of direct product)
2.10 Fundamental Theorem for finite abelian groups was proved.

I added two hours on the RSA public key crypto system.

3.1 Preliminaries
3.2 Cycle decomposition
3.3 Even and odd permutations

4.1 Definition and examples
4.2 Some simple results
4.3 Ideals, homomorphisms, quotient rings
4.4 Maximal ideals
4.5 Polynomial rings
4.6 Polynomials over the rational numbers
4.7 Field of quotients of an integral domain.

5.1 Characteristic of a field.
6.2., 6.3, 6.4 Finite Fields

I used finite fields to discuss the structure of the quotient ring $F[x]/(p)$. I proved the existence of finite fields of order p^n and I showed the subfield structure for finite fields. In the last two hours of the course I did cover the Reed-Solomon construction of Block codes.