

**Math 361 Syllabus**  
**Fall, 1999**  
Instructor; Warren Wong

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

## Syllabus

### 1. Things familiar and less familiar

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

I left the following two sections as review reading for the students: 1.6 Mathematical induction 1.7 Complex numbers.

### 2. Groups

2.1 Definitions and examples of groups (including notation for symmetric groups in 3.1) 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 2.9 Direct products

I added two classes on actions of groups on sets (orbits, stabilizers, counting principles, the first Sylow theorem).

### 3. The symmetric group

3.2 Cycle decomposition 3.3 Even and odd permutations

### 4. Rings

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

I finished with the construction of simple algebraic extensions (adjoining a root of an irreducible polynomial to a field).