Math 222: Algebraic Structures
Spring, 1997
Instructor: M. Dyer

Textbook Abstract Algebra; A Geometric Approach by Theodore Shiffrin, Prentice Hall, Upper Saddle River, New Jersey, 1996.

Syllabus It is intended to cover the following, together with topics from the appendices and, if time permits, selected additional topics.

1 The Integers 1.1 The integers, mathematical induction and the binomial theorem 1.2 The Euclidean algorithm, prime numbers and factorization 1.3 Modular arithmetic and solving congruences 1.4 Z_m, rings, integral domains and fields

2 From the integers to the complex numbers 2.1 The rational numbers 2.2 From the rational numbers to the real numbers 2.3 The complex numbers

Polynomials 3.1 The Euclidean algorithm 3.2 Roots of polynomials 3.3 Polynomials with integer coefficients

4 Homomorphisms and quotient rings 4.1 Ring homomorphisms and ideals 4.2 Isomorphisms and the fundamental homomorphism theorem

6 Groups 6.1 The basic definitions 6.2 Group homomorphisms and isomorphisms 6.3 Cosets, normal subgroups and quotient groups 6.4 The symmetric group S_n and the 15-puzzle.

Honor Code The course will be conducted under the Honor Code. If you are aware of a violation of the Honor Code, contact the Mathematics Department Honor Code Committee.

Grading There will be three in-class exams worth 100 points each and a cumulative, two hour final exam worth 150 points. In addition, homework grades will be scaled to give an additional possible 50 points; and your performance on the course will be determined primarily by your total points score out of the possible total of 500 points. Grade cutoffs for major grades (A, B, C, D, F) will be assigned for each exam and for the homework total, and the grade cutoffs for the course will reflect these individual cutoffs.

The exam dates will be:
Exam 1: Wednesday, February 19
Exam 2: Friday, March 21
Exam 3: Wednesday, April 16
Final Exam: Thursday, May 8.

Homework Homework problems will be assigned daily and collected weekly (on Wednesdays). While not all problems will be graded, all the assigned problems must be turned in. Homework is expected to be turned in on time, and unexcused late homework will not be accepted.

The homework is an integral part of the course. One of the goals of the course is to develop skills in communicating in mathematical language; it is important that you do all the homework and make serious efforts to make your written homework solutions clear and comprehensible.

You may discuss the homework with other students, and are strongly encouraged to do so because it is a good way to learn and test your ideas, and to develop facility in communicating mathematical ideas. However, direct copying of another students homework is unacceptable; your final written homework solutions should reflect your own understanding of the problems.