Math 4200 Abstract Algebra Lec. 3 Lab. 0 Cr. 3

Effective Date Fall 2006-2007

Course Description

Prerequisite: A grade of "C" or better in both MATH 2040 and MATH 3085. Elementary properties of sets, relations, mappings, integers; groups, subgroups, normal subgroups, quotient groups, homomorphisms, automorphisms, and permutation groups; elementary properties of rings.

Course Objectives

Students will:

1. Understand the fundamentals of abstract algebra as presented in the topical outline.
2. Develop critical thinking and problem solving skills.

Procedures to Evaluate these Objectives

1. In-class problems after concept presentations
2. Homework assignments
3. In-class and/or take-home exams
4. Comprehensive in-class or take-home final exam

Use of Results of Evaluation to Improve the Course

1. Students responses to in-class problems will be used to help clarify misunderstandings and to adjust the course material.
2. Exams will be graded and used to determine areas of teaching and learning which could use improvement.
3. All evaluation methods will be used to determine the efficacy of the material presentation.

Detailed Topical Outline

1. Sets: concepts, operations, subsets, relations, and mappings.
2. Mathematical induction.
3. Integers: integers, ordering, and congruence.
4. Basic concepts: groups, homomorphisms, and isomorphisms.
5. Groups and Homomorphisms: groups, subgroups, abelian and nonabelian groups, cyclic groups, permutation groups, Lagrange's Theorem, normality, cosets, factor and quotient groups, conjugacy, homomorphisms, the three Homomorphisms Theorem, Cauchy's Theorem, Cayley's Theorem, and Sylow's Theorem.
6. Rings: rings, commutative and noncommutative rings, identity, ideals, homomorphisms, integral domain, polynomial rings, unique factorization domains, division rings, and fields.