Course Outline

Department of Mathematics and Statistics

Minnesota State University, Mankato

Math 446 Abstract Algebra II (4 semester hours)

Course Description:

A continuation of Math 345. The course will include topics from groups, rings, and fields.

Prerequisites: MATH 345 with “C” (2.0) or better or consent

Learning Outcomes:

The students are expected to

1. Learn structural differences in groups, rings, and fields;
2. Learn homomorphisms and isomorphisms of different algebraic structures;
3. Learn applications of abstract algebra in the areas of number theory and coding theory;
4. Communicate mathematics clearly and accurately in oral and written form; and
5. Exhibit a positive attitude toward mathematics.

Content Outline:

1. Integral Domains
2. Ideals and Factor Rings
3. Ring Homomorphisms
4. Factorization of Polynomials
5. Divisibility in Integral Domains.
6. Extension Fields and Algebraic Extensions
7. Finite Fields
8. Sylow Theorems
9. Finite Simple Groups
10. Generators and Relations
11. An Introduction to Algebraic Coding Theory
12. An Introduction to Galois Theory

Textbook/Related Readings/Materials:

Gallian, Contemporary Abstract Algebra
Fraleigh, A First Course in Abstract Algebra
Hungerford, Algebra
Artin, Algebra
Lang, Algebra