Marshall University

College of Science

Mathematics Department

MTH 400/500: Structure of Algebra

Course catalog description

Informal development of modern elementary algebra. Recommended for pre-service middle school teachers and for elementary and secondary in-service teachers. May not be used for a 5-Adult (or 5-12) mathematics specialization. May not be used for any degree offered by the Department of Mathematics.

Credit hours

3 hours

Prerequisites

A grade of C or higher in MTH 130.

List of topics

Sets

- Set Notation
- One-to-one Correspondence
- Cardinality
- Set Operations
- Set Algebra
- Venn Diagrams
- Binary Operations on the Whole Numbers

- **Axiomatic Systems**

  - Undefined Terms
  - Definitions
  - Axioms or postulates
  - Theorems

- Inductive and Deductive Methods

- **Elementary Logic**
- **Patterns**

  - Relations and Functions
  - Sequences and Series
  - Mathematical Induction
  - Counting Principles
  - Binomial Theorem

- **Number theory on the Integers**
- **Development of the Real Number System**

  - Numeration Systems
  - Rational Numbers
  - Irrational Numbers
  - Real Numbers
  - Modular Arithmetic
  - Ratios and Proportions

- **Elementary Algebra**

  - Expressions
  - Equations
  - Inequalities
  - Functions

Course objectives

- Provide prospective middle school mathematics teachers with opportunities to explore fundamental concepts of algebra.
- Prepare students to mathematically model situations and creatively solve problems for which they may never have seen examples.
- Prepare students to decide when and what technology is appropriate to solve a problem.
- Provide opportunities for students to communicate mathematical ideas in written and oral forms.

- Provide a historical perspective for the algebra concepts addressed in class.
- Model a variety of strategies that can be used to introduce algebraic concepts.

Suggested textbooks

- O'Daffer et al., *Mathematics for Elementary School Teachers*, fourth edition

Last updated
December 2016