Mathematics 67- 413 (4 credits)
Modern Algebra for Elementary and Middle School Programs
Fall 2007

Pre-requisites: Mathematics 110 (Number Systems); 211 (Geometry and Measurement) and Mathematics 217 (Data Exploration), each with a grade of C or better.

Objectives: In this course we will study three important categories of algebraic thinking:

1) Algebra as the study of the structure of arithmetic.
2) Algebra as the study of generalizing patterns and processes; and
3) Algebra as the study of symbolizing and making sense of information.

We will examine problems and ideas from the National Council of Teachers of Mathematics and from upper elementary and middle school curriculum materials that help foster algebraic thinking in children. Finally, we will study the historical development of algebraic thinking.

Instructor: Dr. Jennifer Szydlik

Office: 218 Swart

Phone: 424-7350, **Email:** szydlik@uwosh.edu

Office: Monday and Friday 10:20 – 11:20; Tuesday 12:40-1:40; Wednesday 4:10-5:10 and other times by appointment. Please don't let yourself fall behind. I am happy to meet with you; just let me know if you would like an appointment.

Textbook: *Big Ideas in Mathematics for Future Middle Grades Teachers: Big Ideas in Algebra* by Jennifer Szydlik and John Koker.

Format: The ideas of this course will be introduced through interesting hands-on activities and problems. Class time typically will be spent working on those problems together and discussing and presenting strategies and solutions. You will be responsible for completing readings and working on problems sets outside of class.

Outline: **Chapter 1: A Few Fundamentals (2 weeks):** Symbols, Mathematical language and reasoning, and a reminder about sets and operations on sets.

Chapter 2: Understanding Structure (4 weeks): Algebraic properties, Clock and power operations, group structure, symmetries, and the idea of isomorphism.

Chapter 3: Patterns and Modeling (4 weeks): Generalization and functional thinking, linear, quadratic, sine, and exponential models, two-dimensional models, problem solving and mathematical arguments.

Chapter 4: Building and Solving Equations (4 weeks): Solving equations, the Fundamental Theorem of Algebra, systems of equations, modeling algebraic rules with algebra tiles.

Assessment:

We will have three exams: Each exam is worth 20% of your course grade.

Written work (problem sets, quizzes, and problem write-ups) will comprise 20% of your grade in the course.

You will each complete two projects (written report and presentation). One will focus on the history of algebraic thinking and the other will focus on an educational aspect of algebraic thinking. Each is worth 10% of your grade.

The grading scale will be approximately as follows:

A	90 - 100% of the course points
B	80 - 89%
C	70 - 79%
D	60 - 69%
F	0 - 59%

Intermediate grades (e.g., AB, BC, and CD) will be assigned as final grades if you are close to the cutoff for the next highest grade.