



Phg01phg

<b>COURSE NUMBER</b> MTHC 5100	<b>COURSE TITLE</b> Functions and Structure 3 credit hours	<b>SEMESTER &amp; YEAR</b> Fall, 2007 W 5-7:30
<b>Instructor:</b> Andrea Rothbart	<b>Office Hours: T,W and R: 3:30 - 5</b> WH room 248 rothbart@webster.edu (314) 9686976	

**COURSE DESCRIPTION:**

This course is for math teachers, grades 5-8. The first half of the course will examine one of the most fundamental concepts in mathematics, that of a function. The second half of the course will focus on another fundamental mathematical concept, that of structure. Teaching strategies used in class will be applicable to helping children learn mathematics.

Mathematical content includes a study of functions, symmetries of geometrics figures, matrices, sets, and Taxicab Geometry.

**DESIRED LEARNING OUTCOMES:**

Students will develop facility in extracting functions from empirical situations and in describing functions explicitly and recursively from patterns. By experiencing mathematics within the context of a variety of structures, students will develop a more sophisticated understanding of what mathematics is. For example, their understanding of algebra will deepen as a result of solving equations over systems other than the real number system, and, similarly, their understanding of geometry will expand as a result of doing geometry in a “taxicab” environment. And finally, students will accumulate material and learn teaching strategies that will be useful in their own classrooms.

**SCHEDULE (Subject to Change)**

**Note: Each week there will be a homework assignment on the ideas discussed in class.**

**WEEK 1:** Guess My Rule; Linear Functions

**WEEK 2:** Polynomial and Exponential Functions; Peg Game; Tower of Hanoi

Syllabus for MTHC 5100 continued

**WEEK 3:** Geoboards and Areas; Pic's Theorem

**WEEK 4:** Basic Concepts of Functions and Operations on Functions

**WEEK 5:** The Algebraic Structure of Linear Functions with respect to Function Composition.  
Solving Equations for functions.

**WEEKS 6 - 7:** Applications of Functions

**WEEK 8:** QUIZ

**WEEK 9 - 11:** Taxicab Geometry

**WEEK 12:** Sets; Applications of set.

**WEEK 13:** Symmetries of the Square; Solving Equations for symmetries.

**WEEK 14:** Permutations; Path Problems, Matrices

**WEEK 15:** The Algebraic Structure of  $2 \times 2$  Matrices; Solving Equations for  
Matrices

**WEEK 16:** QUIZ

**RESOURCES:**

Text Used: Taxicab Geometry (available in the bookstore); Other materials will be distributed by the instructor.

**EVALUATION:** The course grade will be based upon examinations and class participation.

**This syllabus is subject to change at the discretion of the instructor.  
Therefore, regular attendance is required.**

