WEBSTER UNIVERSITY

COURSE SYLLABUS

MTHC 5100.01 **Instructor: Andrea Rothbart**

FUNCTIONS & STRUCTURE **Term: SPRING 2003**

Site: 50

1. COURSE DESCRIPTION: (Student focus, rationale, scope, prerequisites)

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 functions, symmetries of geometrics figures, matrices, sets, and Boolean Algebra.

2. LEARNING OUTCOMES: (Goals, objectives, course outcomes, etc.)
Students will develop facility in extracting functions from empirical situations and in describing functions explicitly and recursively from patterns. Students will have a more sophisticated understanding of what mathematics is, by doing mathematics within the context of a variety of structures. In particular, they will deepen their understanding of algebra by solving equations over systems other than the real number system. And finally, students will accumulate material and learn teaching strategies that will be useful in their own classrooms.

3. 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

WEEK 3: Geoboards and Areas; Pic's Theorem

WEEK 4: Basic Concepts of Functions and Operations on Functions
Syllabus for MTHC 5110 continued

WEEK 5: The Algebraic Structure of Linear Functions wrt Function Composition. Solving Equations.

WEEK 6: Applications of Functions

WEEK 7: Applications (continued)

WEEK 8:QUIZ

WEEK 9: Symmetries of the Square; Solving Equations.

WEEK 10: Permutations; Path Problems, Matrices.

WEEK 11: The Algebraic Structure of 2X2 Matrices; Solving Equations.

WEEK 12: Sets; Applications

WEEK 13: Boolean Algebra; logic tables, circuits and Boolean Expressions

WEEK 14: Boolean Algebra; structure and properties

WEEK 15: Boolean Algebra; solving equations; designing circuits

WEEK 16: **QUIZ**

4. RESOURCES:

Text Used: **No textbook - Materials will be distributed by Instructor.**

5. EVALUATION:

a) Term Paper

b) Examinations X

c) Class participation X

d) Class presentation

e) Other--Problems and Exercises X

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