Webster UNIVERSITY SCHOOL OF EDUCATION

POINTS OF INFLUENCE

COURSE NUMBER MTHC 5320.01	COURSE TITLE Topics in Mathematics: The Real Number System	SEMESTER & YEAR Fall 2007
Instructor: Andrea Rothbart		

Course Description:

This course will examine the algebraic and topological properties of the real number system and some of its subsystems. We will also investigate the complex numbers, negative number bases, and other related topics.

Learning Outcomes:

The student will better understand the real number system, the complex number system, recursion, arithmetic algorithms, and the expansions of rational numbers in different bases. The student will increase his ability to think through mathematical problems, particularly in the areas of mathematics examined in this course.

Schedule of Classes:

Classes 1-2

Finite differences; applications to empirical problems and to Geoboards

Class 3:

Field Properties; Mental Arithmetic; Whole Number Bases

Classes 4 and 5:

Negative Number Bases; applications

Class 6:

Quiz

Class 7:

Decimal expansions of rational and irrational numbers in base 10.

Class 8:

Proofs of the irrationality of assorted reals.

Classes 9 and 10:

"Decimal" expansions of real nos. in bases other than base 10. Length of cycles including applications of relevant concepts from group theory.

Class 11:

Quiz

Class 12:

Density properties of rationals and irrationals; closure properties.

Class 13:

Complex numbers, De'Moivres Theorem

Class 14:

Recursion; Fibonacci Sequence, Mathematical Induction

Class 15:

Subrings and Subfields of the Real Numbers

Class 16:

Quiz

Resources: All materials will be distributed by the instructor.

Course Evaluation is based on quizzes, homework assignments, and class participation.

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