

COURSE ANNOUNCEMENT – SPRING 2010

**MATH 713 – MATHEMATICAL LOGIC II:
INCOMPLETENESS, UNDECIDABILITY, COMPUTABILITY**

MWF 11:00-11:50

INSTRUCTOR: David W. Kueker
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DESCRIPTION: Following an introduction to computable (i.e. recursive) functions, this course presents the classic incompleteness and undecidability results of K. Gödel, A. Church, A. Tarski and others. These include the incompleteness of elementary arithmetic, the undecidability of first-order logic, the undecidability of theories of various types of mathematical structures and the unsolvability of Hilbert's 10th Problem. The remainder of the course will cover some topics in recursion theory, including Turing degrees and the arithmetic hierarchy.

OUTLINE:

Math 713

C. Incompleteness and Undecidability

Chapter 7. An informal introduction to undecidability problems

Chapter 8. Recursive functions, representability and incompleteness

Chapter 9. Undecidability and further developments

D. Recursion Theory

Chapter 10. Partial recursive functions

Chapter 11. Turing reducibility

Chapter 12. The arithmetic hierarchy

PREREQUISITES: Familiarity with first-order logic through the completeness theorem, either from MATH 712 or a good upper level undergraduate course.

TEXT: Notes will be provided by the instructor.