

COURSE ANNOUNCEMENT – FALL 2009
MATH 712 – MATHEMATICAL LOGIC I:
FORMAL LANGUAGES AND THEIR MODELS

MWF 11:00-11:50

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DESCRIPTION: Math 712-713 is a self-contained introduction at the graduate level to the main areas of modern mathematical logic, exclusive of set theory. No previous study of logic is assumed. Math 712 begins with an introduction to first order languages and a proof of Gödel's Completeness Theorem. It continues with an introduction to the research area of model theory. Examples and applications in algebra and graph theory will be included. Math 713 treats the topics of incompleteness, undecidability and computability. It begins with the Incompleteness Theorems of Gödel and continues with other undecidability results, including Hilbert's 10th Problem.

OUTLINE:

Math 712

A. Elementary Logic

1. First order languages
2. Formal deductions
3. Theories and their models
4. Completeness, compactness, Löwenheim-Skolem theorems

B. Model Theory

1. Realizing and omitting types
2. Elementary extensions and chains
3. Prime and saturated models
4. Model construction techniques

PREREQUISITES: Good undergraduate mathematics background. If in doubt, check with the instructor. Note that no previous study of logic is assumed. This course is also suitable for the well prepared undergraduate.

TEXT: Notes will be provided by the instructor.

REFERENCES: Enderton, A Mathematical Introduction to Logic.
Chang and Keisler, Model Theory.
Marker, Model Theory.