

Course Announcement
Mathematical Logic and Set Theory
Math 220B, Winter Quarter 2013
MWF 1:00pm–1:50pm, MS 5148

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Office hours. W 11:00am–11:50am.

Description. *Mathematical logic* is a group of interrelated mathematical subjects which came about as an outgrowth of the advances in the foundations of mathematics that were made in the late 19th and early 20th century. Since its birth during the study of the philosophical underpinnings of mathematics, the subject has grown both in breadth and depth, and has forged connections to many other parts of mathematics and computer science. Nowadays, mathematical logic is often divided into the four fields of *set theory*, *model theory*, *recursion theory* (or *computability theory*) and *proof theory*. The topics in this course are part of the common background of mathematicians active in any one of these areas.

In Math 220A we introduced the syntax and semantics of first order logic, proved Gödel's Completeness Theorem, and took a first few steps in model theory (including the Omitting Types Theorem). In Math 220B we will concentrate on proof theory, Gödel's Incompleteness Theorems, and computability theory.

Syllabus. (From the official course description of the Department.) Fundamental methods and results in mathematical logic, using mathematical methods to reason about existence or nonexistence of proofs and computations in many different settings. Topics include compactness theorem, saturation of models, completeness and incompleteness theorems of Gödel, Turing computability and degrees of unsolvability, recursion in Baire space, Zermelo/Fraenkel axioms, universe of constructible sets, and related equiconsistency results in set theory.

Prerequisites. Math 220A or familiarity with its content.

Course text. Lecture notes will be distributed in class. The following book is a good companion:

J. Shoenfield, *Mathematical Logic*, A K Peters/CRC Press, 2001.

Grading. The final grade will be based on homework (50%), and a final exam (50%). Homework will be due on Friday by the end of the day, preferably submitted as PDF by email.