Class information for

Metamathematics II

Math 503, Spring 2006
Monday, Wednesday, and Friday, 2–2:50pm,
312 Lincoln Hall

Instructor: Matthias Aschenbrenner

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Course web page: http://www.math.uic.edu/∼maschenb
(follow the link to Math 503)

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Office hours: Monday, Wednesday and Friday, 1–2pm, or by appointment

Description: The focus of this course will be incompleteness and undecidability in mathematics. In particular, it will provide an introduction to two landmarks of 20th-century mathematical logic: Gödel's Incompleteness Theorems, and the undecidability of Hilbert's Tenth Problem. (Hilbert had asked for an algorithm to decide whether a given polynomial equation with integer coefficients has a solution in the integers. Matiyasevich, based on work of Putnam, Davis, and Robinson, proved that no such algorithm exists.) Time permitting, we will contrast this with positive results such as the decidability of Presburger arithmetic.

Course text: For Hilbert's 10th Problem: *Hilbert's 10th Problem* by Yuri Matiyasevich, MIT Press, 1993.

Other texts that you might want to consult:

- *Mathematical Developments Arising from Hilbert Problems* edited by Felix Browder, AMS, 1976.
- *Hilbert's Tenth Problem: Relations with Arithmetic and Algebraic Geometry* edited by Jan Denef et al., AMS, 2000.
- *The Collected Works of Julia Robinson* edited by Solomon Feferman, AMS, 1996.

A good general reference for mathematical logic is *Mathematical Logic* by Joseph R. Shoenfield, A K Peters, Ltd., 2000.

Some light reading about the Hilbert problems: *The Honors Class: Hilbert's Problems and Their Solvers* by Ben Yandell, A K Peters, Ltd., 2003.

More suggested readings can be found on the web page.

Homework: There will be a problem set due every two weeks or so, to be handed in at the beginning of class.