Finite Model Theory
Math 290B/Phil 350B – Winter Quarter 2006-2007
(Enroll in Math 290B)
Working Syllabus (12/14/06)

Meeting times: Tu Th 11:00-12:15, Room 380-381U
Instructor: Solomon Feferman
Feferman office hours: Tu Th 3:45-4:30, Room 380-383Z

Course description: The model theory of finite structures grew out of computer science applications to database theory, computational complexity, and formal languages. The course will concentrate on concepts and techniques developed for the first two of these areas. Many different kinds of logics other than first order logic, including fragments of second order and infinitary logics, have proved to be more appropriate for these purposes, and, in addition, various game-theoretic techniques are employed.

Prerequisites: Phil 151, 152 or equivalent.

Course work: Regular assigned homework. No final examination, but in its place students will be required to prepare a paper of 6-8 pages summarizing the results of an article or part of a book in the literature of this subject on material not covered in the course.

Grading: Letter or CR/NC. 3 units

Text for the course (required): Leonid Libkin, *Elements of Finite Model Theory*
  Chapters to be covered in full or in part:
1. Introduction
2. Preliminaries
3. Ehrenfeucht-Fraissé games
4. Locality and winning games
5. Ordered structures
6. Complexity of first-order logic
7. Monadic second-order logic
9. Turing machines and finite models
10. Fixed point logics and complexity classes
11. Finite variable logics.

Other resources:
Heinz-Dieter Ebbinghaus and Jörg Flum, *Finite Model Theory*
Jouko Väänänen, *A Short Course in Finite Model Theory*

The Libkin and Ebbinghaus-Flum books will be on reserve in the Math/CS Library.
The Väänänen notes are at
http://www.math.helsinki.fi/logic/people/jouko.vaananen/shortcourse.pdf