

McGill University, Department of Mathematics and Statistics
Mathematical Logic 2, MATH 592/Winter 2010

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Prerequisites: MATH 488 or equivalent or consent of instructor.

Textbook: Joseph R. Shoenfield: Mathematical Logic. 2002 reprint of book of Addison-Wesley, 1967..

The text is available in the bookstore.

Materials for the course: notes, assignments, answers to assignments, and a continuously updated NEWS posting, will be available at the site <http://www.math.mcgill.ca/makkai> ; click on MATH 592.

Catalog description of the course:

“Introduction to recursion theory; recursively enumerable sets, relative recursiveness. Incompleteness, undecidability and undefinability theorems of Godel, Church, Rosser and Tarski. Some of the following topics: Turing degrees, Friedberg-Muchnik theorem, decidable and undecidable theories.”

The course will cover the subjects mentioned in the first two sentences of the catalog description, although not in the order stated. In addition, the following will be discussed: 1) a review of Godel’s completeness theorem, and 2) axiomatic set theory. The course will be based entirely on the textbook.

Course outline (all references are to the text) :

Introduction (Chapter 1: The Nature of Mathematical Logic).
The syntax and semantics of first-order theories (Chapter 2: First-Order Theories; Chapter 3: Theorems in First-Order Theories).
The completeness theorem (Chapter 4: The Characterization Problem, with section 4.4 (Herbrand’s Theorem) omitted).
Incompleteness and undecidability (Chapter 6).
Recursion theory (Chapter 7, *part of* the first seven sections).
Axiomatic set theory (*part of* Chapter 9).

Work to be done and method of evaluation:

(1) About eight (8) homework assignments. Late assignments are accepted; however, they will be graded only at the end of the course, for the purposes of calculating the final grade. *There will be no formula* stated for how late assignments will be used for the calculation of the final grade.

(2) A take-home final examination.

Final grade: 30% of A + 70% of F , where A=assignment grade, F=final exam grade.

There will be no additional ways of upgrading the final grade.

There will be a supplemental examination, for 100% of the supplemental mark.

Exams and assignments may be written in French.

The Senate of the University has resolved that the following statement be included in this course outline: “McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offenses under the code of student conduct and disciplinary procedures (see www.mcgill.ca/integrity for more information).”