

Model Theory and Set Theory (PMATH 733)

Online Fall 2020 Rahim Moosa

This is an introduction to mathematical logic.

It is a graduate course but it is open to advanced undergraduates.

A follow-up topics graduate course on model theory and algebraic dynamics will be held in Winter 2021.

The course is approximately one-third set theory and two-thirds model theory. The set theory will be naïve and the model theory will be semantic (i.e., no proof theory). There will be a small overlap with PMATH 432/632 (First Order Logic and Computability), but this latter course is neither a pre-requisite nor an anti-requisite.

Topics in set theory. Well ordered sets and ordinals, axiom of choice and equivalents, cardinals.

Topics in model theory. Semantics of first order logic, the compactness theorem (via ultra-products) and its consequences, quantifier elimination, algebraic examples, the Stone space of types (if time permits).

Pre-requisites. (Equivalent of) PMATH 347 and 348, or consent of instructor. Mathematical maturity.

Courseware. No textbook is required, the lectures will be self-contained and will follow Parts 1 and 2 of my notes “Set Theory and Model Theory” (Version 5) which will be made available.

Online structure. Based primarily on videotaped lectures at a blackboard. Assessments and other details to be determined.