

# Mathematics 498\* - Winter 2006

## Introduction to Set Theory

This course will be an introduction to modern set theory.

**Topics that will be discussed:** Cardinality and the continuum hypothesis; the axiom of choice; ordinal numbers and their arithmetic; cardinal numbers and their arithmetic; transfinite induction and recursion; first-order logic, the Zermelo-Fraenkel axioms, the Gödel incompleteness theorems, and relative consistency.

**Additional topics to be selected from:** Skolem's paradox and absoluteness; Martin's axiom; trees; the Souslin problem; closed sets, unbounded sets, and stationary sets; Silver's theorem; partition calculus; constructible sets and  $V = L$ .

**Text:** The lectures will not follow any particular one book but most of the material to be discussed will be taken from the following books:

*Set Theory for the Working Mathematician* by Krzysztof Ciesielski

*The Joy of Sets* by Keith Devlin

*Set Theory: An Introduction to Independence Proofs* by Kenneth Kunen

*Introduction to Modern Set Theory* by Judith Roitman.

**Prerequisite:** Math-281\* or permission of the instructor.

**Format:** Three lectures each week.

**Evaluation:** The course grade will be based on homework, an essay or project, a written examination, and possibly a class presentation.

**Instructor:** Professor O. A. Nielsen (nielseno@post.queensu.ca).