

**Pure Mathematics 415                      Set Theory**

Axioms for set theory, the axiom of choice and equivalents, cardinal and ordinal arithmetics, induction and recursion on wellfounded sets, infinitary combinatorics, applications.

Course Hours: H(3-0)

Prerequisite(s): [Mathematics 271](#) or [273](#) or [311](#) or [353](#) or [381](#) or [Pure Mathematics 315](#), or consent of the Division.

**Suggested Text:**

- W. Just and M. Weese, "Discovering Modern Set Theory I", AMS
- Thomas Jech, "Set Theory", Academic Press
- Enderton, "Elements of Set Theory", Academic Press, 1977 edition.
- K. Kunen, "Set Theory: An Introduction to Independence Proofs", North-Holland

*Syllabus*

<u>Topics</u>	<u>Number of Hours</u>
Introduction: Review of informal set theory, Russell's Paradox, the need for axioms, formal language, history.	2
Ordered pairs, relations and functions, equivalence relations, ordering relations, partial order and well orderings, trees.	3
Axiomatic foundation of Set Theory. Power and limitations of the axiomatic method.	5
Axiom of choice and equivalents, paradoxes.	5
Cardinal and ordinal numbers, arithmetic, induction and recursion on $\omega$ and wellfounded sets.	9
Infinitary combinatorics, stationary sets and clubs, filters and ideals. Further axioms and applications.	9
<b>TOTAL AMOUNT</b>	<b>33</b>

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