

M140	Introduction to Mathematical Logic	L	P	S	ECTS
		2	2	0	6

Course objectives. Make students familiar with the basic terms, ideas, and methods of mathematical logic, especially propositional logic and first-order logic as the basis for a deeper understanding of the foundations of mathematics.

Prerequisites. Elementary Mathematics.

Course content.

1. Propositional logic. Syntax and semantics of propositional logic. Normal forms. Validity tests: resolution, tableaux. Propositional calculus. Consistency and completeness. Metatheorems about propositional calculus: the Soundness Theorem, the Deduction Theorem, the Completeness Theorem, and the Compactness Theorem. Natural deduction. Non-classical propositional logics: intuitionistic logic and modal logic.
2. First-order logic. Syntax and semantics of first-order logic. Prenex normal form. Tableaux. Predicate calculus. Metatheorems about predicate calculus: the Soundness Theorem, the Deduction Theorem, and the Completeness Theorem. Natural deduction in first-order logic.

LEARNING OUTCOMES

No.	LEARNING OUTCOMES
1.	Know and understand the syntax and semantics of propositional logic and first-order logic.
2.	Apply resolution or tableaux to test satisfiability, validity, and logical consequence.
3.	Define axiomatically propositional logic and first-order logic.
4.	Reproduce correct proofs of theorems within propositional calculus and predicate calculus.
5.	Apply the acquired knowledge and skills in other fields of mathematics.

RELATING THE LEARNING OUTCOMES, ORGANIZATION OF THE EDUCATIONAL PROCESS AND ASSESSMENT OF THE LEARNING OUTCOMES

TEACHING ACTIVITY	ECTS	LEARNING OUTCOME **	STUDENT ACTIVITY*	EVALUATION METHOD	POINTS	
					min	Max
Attending lectures and exercises	1	1-5	Lecture attendance, discussion, team work and independent work on given tasks	Attendance lists, tracking activities	0	4
Written exam (Mid-terms)	2	1-5	Preparing for written exam	Evaluation	25	48
Final exam	3	1-5	Revision	Oral exam	25	48
TOTAL	6				50	100

Teaching methods and student assessment. Lectures and exercises are obligatory. The exam consists of a written and an oral part. Upon completion of the course, students can take the exam. Successful midterm exam scores replace the written exam.

Can the course be taught in English: Yes

Basic literature:

1. E. Mendelson, Introduction to Mathematical Logic, CRC Press, Taylor & Francis Group, New York, 2015.
2. M. Vuković, Matematička logika, Element, Zagreb, 2009.

Recommended literature:

1. A. G. Hamilton, Logic for Mathematicians, Cambridge University Press, 1995.
2. J. Nolt, D. Rohatyn, A. Varzi, Logic, Schaum's Outline series, McGraw Hill, New York, 1998.