M088	**Mathematical Logic in Computer Science**	L	S	E	ECTS
		2	0	2	6

Course objectives. Main course objectives are to familiarize students with basic terms of Propositional Logic, First-Order Logic, Temporal Logic and Program Verification. Students will master techniques for practical use of logic programming language PROLOG.

Course prerequisites. None

Syllabus.

1. Propositional Logic: Syntax and Semantics. Proof Theory of Propositional Logic: The Gentzen System G'. Resolution.
2. First-Order Logic: Syntax and Semantics of First-Order Languages. Proof Theory of First-Order Languages.
3. Gentzen's Cur Elimination Theorem and Applications. Herbrand's theorem.
4. Resolution in First-Order Logic. SLD resolution and logic programming.
5. Temporal Logic: Syntax and semantics. Deductive System.
6. Program verification**:** Deductive System for verification of sequential programs. .

EXPECTED LEARNING OUTCOMES

No.	**LEARNING OUTCOMES**
1.	To demonstrate and apply the knowledge and understanding of propositional logic and logic of the first order.
2.	The ability to use programming language PROLOG to solve problems.
3.	To apply knowledge, understanding and skills to verify computer programs.
4.	To be able to present the conclusions and findings to the experts and laymen based on knowledge and experience.
5.	To apply the acquired skills onto further education in this field.

COUPLING OF THE EXPECTED LEARNING OUTCOMES, TEACHING PROCESS ORGANIZATION AND THE EVALUATION OF THE TEACHING OUTCOMES

TEACHING PROCESS ORGANIZATION	ECTS	EXPECTED LEARNING OUTCOMES **	STUDENT ACTIVITY*	EVALUATION METHOD	SCORE	
					min	max
Lecture attendance	1	1-5	Class attendance, discussion, solving the problems individually and in a team	Lists with signatures, observing the activity during the lectures	0	4
Homework	1	1-4	Solving the problems individually	Grading	12	20
Repeated exams	2	1-4	Preparation for the written exam	Grading	19	38
Final exam	2	1-4	Revising	Oral exam	19	38
TOTAL	6				50	100

Teaching methods and student assessment. Classes are organized through lectures and exercises. During lectures students will be familiarized with basic terms and results in mathematical logic through illustrative examples and/or proofs. Exercises are auditory. During exercises students apply the acquired abstract knowledge to concrete problems. Lectures and exercises are obligatory. Final examination consists of a written and an oral part which is taken after completion of lectures. Acceptable mid-term exam scores replace the written examination. Homework and seminar papers made during the semester could influence the final result of the exam.

Can the course be taught in English: Yes

Basic literature:

1. Jean H. Gallier. Logic for Computer Science: Foundation of Automatic Theorem Proving. Second Editon. Courier Corporation, 2015.

Recommended literature:

1. M. Ben-Ari, Mathematical Logic for Computer Science, Springer Verlag, 2001.
2. M. Huth, M. Ryan, Logic in Computer Science, Cambridge University Press, 2004.
3. M. Vuković. Matematička logika 1, skripta PMF-Matematičkog odjela, 2004.