

Study programme(s): Mathematics (M3) (M4)			
Level: bachelor			
Course title: Boolean algebras and optimisation (M-01)			
Lecturer: Branimir M. Šešelja			
Status: elective			
ECTS: 6			
Requirements: none			
Learning objectives Systematization of the basics of mathematics, logical rules of reasoning; developing the ability to properly and creatively solve mathematical problems.			
Learning outcomes <i>Minimal:</i> After completing the course, students should know and understand the finite ordered structures, in particular Boolean algebras, they should be familiar with the appropriate language. They should understand the role of terms or Boolean functions in digital technology, as well as the reasons and the meaning of minimization. They should know the appropriate algebraic techniques. <i>Desirable:</i> Detailed knowledge of ordered structures: ordered sets, distributive and Boolean lattices, representation theorems. Good understanding of Boolean terms and identities, and ability to solve complex minimization problems .			
Syllabi <i>Theoretical lessons</i> Ordered set and lattices; diagrams. Modular, distributive and Boolean lattices and Boolean algebras. Representation of finite Boolean algebras. Boolean ring. Boolean terms and functions. Switching and logical circuits. Half-adder and adder. Minimization - concept and analysis. Different techniques of minimization. Examples. <i>Tutorial</i> Examples and problems in ordered structures. Presentation of diagrams. Analyzing and solving problems and tasks that illustrate the minimization techniques of Boolean terms and functions. Analyzing practical examples.			
Literature <ol style="list-style-type: none"> 1. B. Šešelja, A. Tepavčević, <i>Bulove algebre i funkcije, teorija i zadaci</i>, Univerzitet u Novom Sadu, PMF, 2005. 2. R. Lidl, G. Pilz, <i>Applied Abstract Algebra</i>, 2-nd ed., Springer, 1998. 			
Weekly teaching load			Other: 0
Lectures: 2	Exercises: 3	Other forms of teaching: 0	Student research: 0
Teaching methodology Lectures are presented using classical teaching methods on a board and supported by beamer presentations. Exercises are aimed at practising and analysing typical problems and techniques of their solutions. The ability of application of the theoretical knowledge is checked in two colloquia. The final exam is written and students are supposed to demonstrate general understanding of the presented theoretical material and to solve particular problems.			
Grading method (maximum number of points 100)			
Pre-exam obligations	points	Final exam	points
Colloquia	50	Written exam	50