

Study programme(s): Computer Science				
Level: bachelor				
Course title: Discrete Structures 1				
Lecturer: Dragan Mašulović, Maja Pech				
Status: obligatory				
ECTS: 6				
Requirements: ---				
Learning objectives In this course students shall acquire fundamental mathematical literacy and will understand the notions such as sets (informally), relations and functions; propositional logic and logical inference; mathematical proofs; and will be able to demonstrate and apply those skills in case of finite graphs.				
Learning outcomes At the end of the course a successful student will be able to perform simple computations with finite sets, identify equivalence relations and partial orders, identify surjective/injective/bijjective functions, compute function composition and inverses of bijective functions, perform basic calculations in the propositional logic, be able to prove mathematical facts directly, using contraposition or mathematical induction, understand basic facts about finite graphs and apply the knowledge acquired above to reason about finite graphs.				
Syllabus <ul style="list-style-type: none">• Sets (Venn diagrams; Union, intersection, complement; Cartesian product; Power sets; Cardinality of finite sets)• Relations (Reflexivity, symmetry, transitivity; Equivalence relations, partial orders)• Functions (Surjections, injections, bijections; Inverses; Composition)• Propositional logic (Logical connectives; Truth tables; Normal forms (conjunctive and disjunctive); Validity of well-formed formula; Propositional inference rules (concepts of modus ponens and modus tollens))• Limitations of propositional logic (e.g., expressiveness issues)• The structure of mathematical proofs (Direct proofs; Disproving by counterexample; Proof by contradiction)• Induction over natural numbers• Undirected graphs, Directed graphs, Weighted graphs• Trees, Spanning trees/forests• Graph isomorphism				
Literature R. Garnier, J. Taylor: "Discrete Mathematics: Proofs, Structures and Applications", 3rd Ed, CRC Press, Chapman and Hal 2009 S. G. Krantz: "Discrete Mathematics Demystified", McGraw-Hill, 2009				
Weekly teaching load				Other: 0
Lectures: 3	Exercises: 2	Practical Exercises: 0	Student research: 0	
Teaching methodology Blackboard lectures, Blackboard exercises				
Grading method (maximal number of points 100)				
Pre-exam obligations		points	Final exam	points
Colloquium 1		30	Oral exam	40
Colloquium 2		30		