Course Unit Descriptor

Study Programme: Computer Science

Course Unit Title: Discrete Structures 2

Course Unit Code: CS154

Name of Lecturer(s): Dragan Mašulović, Maja Pech

Type and Level of Studies: Bachelor Academic Degree

Course Status (compulsory/elective): Compulsory

Semester (winter/summer): Summer

Language of instruction: Serbian (primary), English (secondary)

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 7

Prerequisites: None

Course Aims:

In this course students shall acquire deeper knowledge of discrete processes that are vital to computer science and will understand the notions such as universal and existential quantification; recursive mathematical definitions; fundamental counting techniques; classical algebraic structures and applications in coding theory.

Learning Outcomes:

At the end of the course a successful student will be able to perform basic calculations in the predicate logic, be able to produce and understand recursive mathematical definitions, solve elementary counting problems, understand basic facts about classical algebraic structures and apply this knowledge to basic coding techniques.

Syllabus:

- Predicate logic (Universal and existential quantification)
- Structural induction
- Recursive mathematical definitions
- Limitations of predicate logic (e.g., expressiveness issues)
- Basic Counting
- The pigeonhole principle
- Permutations and combinations
- Inclusion-Exclusion
- Solving recurrence relations
- Basic modular arithmetic
- Concrete algebraic structures (permutations as groups; integers and matrices as rings; rational, real and complex numbers as fields; finite fields)

Introduction to coding theory

Required Reading:

D. J. Hunter: "Essentials of Discrete Mathematics", Jones and Bartlett Learning, 2017

J. Matoušek, J. Nešetril: "Invitation to Discrete Mathematics", Oxford University Press, 2008

S. G. Krantz: "Discrete Mathematics Demystified", McGraw-Hill, 2009

Weekly Contact Hours: 5	**Lectures:** 3	**Practical work:** 2

Teaching Methods:

Blackboard lectures, Blackboard exercises

Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	
Practical work		oral exam	40
Preliminary exam(s)	30+30		
Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			