

Study program : Informatics				
Type and level of studies: Undergraduate academic studies				
Course unit: Theoretical Foundations of Informatics 3				
Teacher in charge : dr Tatjana Aleksić Lampert. Assistant Professor				
Language of instruction: <i>English</i>				
ECTS: 6				
Prerequisites:				
Semester : <i>Winter Semester</i>				
Course unit objective				
This course offers an introduction to Discrete Mathematics oriented toward Computer Science. The subject coverage divides roughly into thirds: Fundamental Concepts of Combinatorics, Discrete Probability Theory and Graph Theory which includes Combinatorial Optimization.				
Learning outcomes of Course unit				
On completion of this course, students will be able to explain and apply the basic methods of discrete (noncontinuous) mathematics in Computer Science. They will be able to use these methods in subsequent courses in the design and analysis of algorithms, software engineering, and computer systems.				
Course unit contents				
<i>Theoretical and Practical classes</i>				
<i>Part 1: Combinatorial theory-concepts and definitions:</i> permutations, combinations, variations, binomial and polynomial theorem, inclusion-exclusion theorem. Combinatorial algorithms and their implementation.				
<i>Part 2: Discrete Probability Theory-concepts and definitions:</i> random variables, distributions, expected value, conditional and total expectation.				
<i>Part 3: Graph Theory-concepts and definitions:</i> graphs and matrices, spanning trees in graphs, Euler circuits and paths, coloring problems. Optimizing graph algorithms and their implementation.				
Literature				
<ul style="list-style-type: none"> • Jean Gallier, <i>Discrete Mathematics for Computer Science</i>, Springer 2011 • James A. Anderson, <i>Discrete Mathematics with Combinatorics</i>, Prentice Hall; 2 edition (August 29, 2003) • Jørgen Bang-Jensen, Gregory Gutin, <i>Digraphs Theory, Algorithms and Applications</i>, Springer-Verlag, 2007 				
Number of active teaching hours				Other classes
Lectures: 30	Practice: 30	Other forms of classes: <i>mentoring system for small groups of students</i>	Independent work:	
Teaching methods				
Examination methods (maximum 100 points)				
Exam prerequisites	No. of points:	Final exam	No. of points:	
Student's activity during lectures	4	oral examination	30	
practical classes/tests	56	written examination		
Seminars/homework	10		
Project				
Other				

Grading system		
Grade	No. of points	Description
10	91-100	Excellent
9	81-90	Exceptionally good
8	71-80	Very good
7	61-70	Good
6	51-60	Passing
5	0-50	Failing

(Table 5.2) Course unit description