

Study program: Communication Technologies			
Course title: Algorithms and Data Structures			
Professor/assistant: Slavimir N. Stošović			
Type of course: compulsory			
ECTS credits: 6			
Pre-requisites: none			
Aims of the course: To prepare students to: - understand basic concepts related to creating and presenting algorithms, - solve engineering problems algorithmically, - independently construct, perform and test algorithms using basic and advanced data structures, - perform and apply internal data structures, control structures of algorithm flow, as well as principles of modular programming, - analyze the complexity of algorithms and optimize them accordingly.			
Learning outcomes: By mastering the subject, a student will be able to: - understand, formulate and present basic linear, branched and cyclic algorithmic structures, - analyze, define and construct a solution of a problem in the form of an algorithm, - select and apply the appropriate data structure for problem solving, - evaluate and perform an analysis of the complexity of the algorithm and notice the difference in the complexity of multiple algorithms, - optimize the algorithm, that is, the solution to the problem, if necessary.			
Syllabus <u>Theoretical part</u> History of computer origin. History of creation of algorithms. Computer model. Concept of algorithm. Algorithm development algorithm. Algorithm design. Elements for graphical representation of algorithm. Complexity of algorithm. Asymptotic notation. The concept of a variable, the concept of a constant, the term operator. Line structure of the algorithm. A branched algorithmic structure. Structure of multiple branching. Analysis and solving of mathematical and geometric problems. Cyclic algorithmic structures. Cyclic algorithmic structures with a condition. Data structures. One-dimensional fields (arrays). Operations with one-dimensional fields. Multidimensional fields (matrices). Operations with multi-dimensional fields. Sorting the field <u>Practical part:</u> Practice, other forms of study and research work. Practical classes follow theoretical units by solving concrete examples and tasks.			
Literature 1. Tomašević, Algoritmi i strukture podataka, Akademska misao, Beograd 2010. 2. Autorizovana predavanja, S. Stošović, M. Kosanović, Visoka tehnička škola Niš. 3. Cormen, Leiserson, Rivest, Intoduction to Algorithms, MIT Press, 1994., Cormen, Leiserson, Rivest, Intoduction to Algorithms, MIT Press, 1994.			
Number of active classes 60			Other forms of teaching:
Lectures: 30	Practical classes: 30	Research work:	
Teaching methods Theoretical and practical teaching in combination with interactive teaching with practical problem solving.			
Grading system (maximum 100 points), grading scale from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.			
Pre-exam obligations	points	Final exam	points
activity during theoretical lectures	10	written exam	20
practical training	20	oral exam	10
colloquium(s)/seminar papers	40		
Sum	70	Sum	30