

Study program: Information Technology			
Course title: DATA STRUCTURES AND ALGORITHMS			
Teachers: Olga M. Ristić, Željko Lj. Jovanović			
Course status: mandatory			
Number of ECTS credits: 6			
Prerequisite courses: Introduction to programming , Programming languages			
Course objectives Enable students to apply basic data structures, abstract data types, and corresponding algorithms in software development. The application of algorithms in solving specific problems is essential for software development. Studying basic data structures is an important prerequisite for efficient software operation.			
Learning outcomes Students are enabled to follow the study of modern programming techniques and independently keep up with the development of software products. The readiness of students to implement various data structures in the Java programming language.			
Content of the course <i>Theoretical teaching</i> Definitions and concepts of data structures and algorithms. Design and analysis of algorithms. Execution time of algorithms. Big O notation. Recursion. Linear and non-linear structures. One-dimensional and multidimensional arrays. Stacks. Queues. Lists. Sorting algorithms (Selection, Bubble, Insertion sort,...). Data searching algorithms (sequential, binary, interpolation,...). Recursive algorithms. Trees. Binary trees. Binary search trees. Graphs. Algorithms for traversing graphs. Minimum spanning trees. Topological sorting. Dynamic programming. <i>Practical teaching</i> The practical exercises accompany the lectures and individual work in solving problems and tasks. Application and development of educational software for simulation and animation of data structures and algorithms.			
Literature [1] Laslo Kraus: Programski jezik Java sa rešenim zadacima 3. izdanje - JSE 13, Akademska misao, 2022, 508s, ISBN broj: 9788674668078. [2] Dragan Urošević: Zbirka zadataka iz algoritama i struktura podataka, Računarski fakultet, 492 s, ISBN: 978-86-7991-435-4 [3] Dejan Živković: Uvod u algoritme i strukture podataka, Univerzitet Singidunum, Beograd, 2021, ISBN 978-86-7912-311-4. https://singipedia.singidunum.ac.rs/izdanje/40839-uvod-u-algoritme-i-strukture-podataka [4] Clifford A. Shaffer: Practical Introduction to Data Structures and Algorithm Analysis (Java Edition), dover publications, 2010, (доступна бесплатно на интернету: https://people.cs.vt.edu/shaffer/Book/). [5] James Cutajar, Beginning Java Data Structures and Algorithms, Packt Publishing, 2018, ISBN: 9781789537178 [6] Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser: Data Structures and Algorithms in Java, Wiley, 2014, 720 p. http://bedford-computing.co.uk/learning/wp-content/uploads/2016/08/Data-Structures-and-Algorithms-in-Java-6th-Edition.pdf			
Number of active teaching classes: 4		Theoretical teaching: 2	Practical teaching: 2
Teaching methods Implementation of lectures and exercises based on the model of interactive teaching (teaching methods: popular lecture, discussion); activated forms of learning: verbal meaningful receptive learning, cooperative learning, practical learning.			
Evaluation of knowledge (maximum number of points 100)			
Pre-exam obligations		Points	Final exam
Activities during teaching process		10	Final exam (written):
Practical teaching		/	Final exam (oral):
Colloquium		60	
Practical teaching		/	