

Study programme(s): Computer Science - master				
Level: Master				
Course title: Data Structures and Algorithms 3				
Lecturer: Miloš Radovanović				
Status: Elective				
ECTS: 8				
Requirements: Data Structures and Algorithms 2				
Learning objectives Students learn to understand and use data structures graph and tree.				
Learning outcomes <i>Minimum:</i> At the end, students are expected to implement different types of trees and graphs <i>Desirable:</i> At the end, students are expected to implement different types of trees and graphs and to recognize desirable structure for problem solving. Also, it is expected that student is able to modify those structures and adjust them for practical applications.				
Syllabus <i>Theoretical instruction</i> Abstract data type tree and its implementations. Tree traversals. Binary search tree. Balanced tree and its analysis. Different types of balanced tree (AVL-tree, B-tree, red-black tree, etc.) Other kinds of trees. Modifications of standard tree implementations. Abstract data type graph and its implementations. Basic graph implementations. Graph traversals (depth-first search, breath-first search). Applications. Modifications of standard graph implementations. <i>Practical instruction</i> Implementations of data structures tree and graph and their different applications and modifications.				
Literature <i>Recomended</i> 1. Đura Paunić. Data Structures and Algorithms, University of Novi Sad, Faculty of Sciences, Novi Sad, 1997, University book 2. Robert Sedgewick and Kevin Wayne. Algorithms, Fourth edition. Addison-Wesley. 2011. 3. Michael T. Goodrich, Roberto Tamassia and Michael H. Goldwasser. Data structures & algorithms in Java, Sixth edition. Wiley. 2014.				
Weekly teaching load				Other:
Lectures: 2	Exercises: 2	Practical Exercises: 1	Student research:	
Teaching methodology Theoretical classes are based on the classical teaching model involving a projector. Implementations of data structures tree and graph are explained and illustrated with appropriate examples. During the lessons, student knowledge is checked through one seminar paper. At the exercises, Java programming language is used to implement tree and graph and their applications. During the exercises, student knowledge is tested with two colloquia that use different data types. At the oral exam, student shows understanding of data structures and algorithms with those structures.				
Grading method (maximal number of points 100)				
Pre-exam obligations		points	Final exam	
Colloquia		30	oral examination	
Seminars		20	50	