

Study Programme: Computer Science – Master			
Course Unit Title: Data Structures and Algorithms 3			
Course Unit Code: CS701			
Name of Lecturer(s): Miloš Radovanović			
Type and Level of Studies: Master Academic Degree			
Course Status (compulsory/elective): Elective			
Semester (winter/summer): Winter			
Language of instruction: Serbian (primary), English (secondary)			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face			
Number of ECTS Allocated: 8			
Prerequisites: Data Structures and Algorithms 2			
Course Aims: 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>Theory</i>			
Abstract data type tree and its implementations. Tree traversals. Binary search tree. Balanced tree and its analysis. Different types of balanced tree (2-3-tree, red-black tree, B-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>Practice</i>			
Implementations of data structures tree and graph and their different applications and modifications.			
Required Reading:			
1. Robert Sedgewick and Kevin Wayne. Algorithms, Fourth edition. Addison-Wesley. 2011.			
Weekly Contact Hours: 5	Lectures: 2	Practical work: 3	
Teaching Methods:			
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. 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.			
Knowledge Assessment (maximum of 100 points):			
Pre-exam obligations	points	Final exam	points
Practical exercises – individual problems	50	Oral examination	50
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam,			

project presentation, seminars, etc.