Course Unit Descriptor

Study Programme: Computer Science – Master			
Course Unit Title: Combinatorial Algorithms			
Course Unit Code: CS752			
Name of Lecturer(s): Miloš Stojaković			
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: 6			
Prerequisites: Introduction to Algorithms, Discrete Structures 1, Discrete Probability and Statistics			
Course Aims: Students should learn and understand how to use various types of algorithms that deal with discrete data structures and networks.			
Learning Outcomes: Minimal: At the end of the course, it is expected that a student is familiar with the concept of computer processing of discrete data structures, and particularly graphs and networks. Desirable: At the end of the course, it is expected that a successful student is able to find a suitable algorithm for a given problem, to modify and adjust a standard algorithm if needed.			
Syllabus: Data structures for storing sets, arrays and networks. Generating and enumerating the elements of the partitive set, subsets of fixed size, permutations. Dynamic programming, examples. Algorithms on networks. Network representation. Hardness, some complexity classes and polynomial reductions. Algorithms for finding a Hamiltonian cycle, a vertex cover, an edge cover, a dominating set, or a proper coloring. Steiner trees. Knapsack problem, Bin packing, TSP. Exact algorithms. Randomized algorithms. Approximation algorithms.			
Required Reading: T.H.Cormen, C.E.Leiserson, R.L.Rivest, C.Stein, Introduction to Algorithms, MIT Press, 2009. F.V. Fomin, D. Kratsch, Exact exponential algorithms, Springer, 2010. V.V. Vazirani, Approximation Algorithms, Springer, 2003. R. Motwani, P. Raghavan, Randomized Algorithms, Chapman & Hall/CRC, 1995.			
Weekly Contact Hours: 4	**Lectures:** 2	**Practical work:** 2	
Teaching Methods: Blackboard lectures, blackboard exercises.			
Knowledge Assessment (maximum of 100 points):			

Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	
Practical work		oral exam	70
Preliminary exam(s)	30	…….	

Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			