

<b>Study programme(s):</b> Computer Science				
<b>Level:</b> master				
<b>Course title:</b> Combinatorial Algorithms				
<b>Lecturer:</b> Miloš Stojaković				
<b>Status:</b> elective				
<b>ECTS:</b> 6				
<b>Requirements:</b> Introduction to Algorithms, Discrete Structures 1, Discrete Probability and Statistics				
<b>Learning objectives</b> Students should learn and understand how to use various types of algorithms that deal with discrete data structures and networks.				
<b>Learning outcomes</b> <i>Minimal:</i> 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. <i>Desirable:</i> 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.				
<b>Syllabus</b> 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.				
<b>Literature</b>				
<ul style="list-style-type: none"> <li>• T.H.Cormen, C.E.Leiserson, R.L.Rivest, C.Stein, <i>Introduction to Algorithms</i>, MIT Press, 2009.</li> <li>• F.V. Fomin, D. Kratsch, <i>Exact exponential algorithms</i>, Springer, 2010.</li> <li>• V.V. Vazirani, <i>Approximation Algorithms</i>, Springer, 2003.</li> <li>• R. Motwani, P. Raghavan, <i>Randomized Algorithms</i>, Chapman &amp; Hall/CRC, 1995.</li> </ul>				
<b>Weekly teaching load</b>				
Lectures: 2	Exercises: 2	Practical Exercises: 0	Student research: 0	Other: <b>0</b>
<b>Teaching methodology</b> Blackboard lectures, blackboard exercises.				
<b>Grading method (maximal number of points 100)</b>				
<b>Pre-exam obligations</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>	
<i>Colloquia</i>	<b>30</b>	<i>Oral exam</i>	<b>70</b>	