

Study programme(s): Applied Mathematics – Data Science			
Level: master studies			
Course title: Graph Theory			
Lecturer: Miloš Stojaković			
Status: obligatory			
ECTS: 6			
Requirements: -			
Learning objectives			
<ul style="list-style-type: none"> - Understanding and using various results and techniques in Graph Theory, including some of the standard algorithms on graphs. - Ability to prove simple statements, as well as to select appropriate algorithms for a given problem. 			
Learning outcomes			
<ul style="list-style-type: none"> - Knowledge of basic concepts of graph theory, and understanding of standard theorems along with their proofs. - Familiarity with basic algorithms on graphs. - Comprehending the covered topics as a whole; ability to solve standard problems that were not encountered before. 			
Syllabus			
<i>Theoretical instruction</i>			
Graphs and basic graph structures, weighted graphs, search algorithms on trees. Flows in graphs, min-max theorem. Vertex connectivity and edge connectivity. Planar graphs, their basic properties. Stable sets and cliques. Vertex colorings. Matchings, algorithms. Edge colorings. Hamiltonian paths.			
<i>Practical instruction</i>			
Solving and understanding problems in the covered topics in Graph Theory. Studying standard algorithms for dealing with mentioned graph structures. Choosing, modifying and implementing algorithms on the way to solution of more complex problems.			
Literature			
Main:			
27. J.A. Bondy, U.S.R. Murty: Graph Theory, Springer, Berlin, 2008.			
Textbooks (additional):			
28. V. Petrović, Teorija grafova, PMF, Novi Sad, 1998.			
29. R. Diestel, Graph Theory, Springer, Heidelberg, 2010.			
Weekly teaching load			Other:
Lectures: 2	Exercises: 3	Other forms of teaching:	Student research:
Teaching methodology			
Lectures through standard lecturing methods, mostly on blackboard. Exercises include practicing the techniques shown in lectures, discussing the possible applications on concrete problems, possibly including a modification of the approach used; active students' participation in problem solving.			
Grading (maximum number of points 100)			
Pre-exam obligations	points	Final exam	points
Colloquia	50	oral exam	50