

Study Programme: Applied Mathematics – Data Science		
Course Unit Title: Graph Theory		
Course Unit Code: MDS05		
Name of Lecturer(s): Miloš Stojaković		
Type and Level of Studies: Master studies		
Course Status (compulsory/elective): Compulsory		
Semester (winter/summer): Summer		
Language of instruction: English		
Mode of course unit delivery (face-to-face/distance learning): Face-to-face		
Number of ECTS Allocated: 6		
Prerequisites: none		
Course Aims: 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:		
<p>Knowledge of basic concepts of graph theory, and understanding of standard theorems along with their proofs.</p> <p>Familiarity with basic algorithms on graphs.</p> <p>Comprehending the covered topics as a whole; ability to solve standard problems that were not encountered before.</p>		
Syllabus:		
<i>Theory</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>Practice</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.		
Required Reading:		
J.A. Bondy, U.S.R. Murty: Graph Theory, Springer, Berlin, 2008.		
V. Petrović, Teorija grafova, PMF, Novi Sad, 1998. 29.		
R. Diestel, Graph Theory, Springer, Heidelberg, 2010.		
Weekly Contact Hours:	Lectures: 2	Practical work: 3

Teaching Methods: Lectures; revisions of the material; active students' participation in problem solving; lab reports, application of the taught material on real-world examples

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	Final exam	points
Active class participation		written exam	
Practical work		oral exam	50
Preliminary exam(s)	50	Course project	
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.