Study programme(s): Informatics (IM), Teaching Informatics (IC)

Level: master

Course title: Graph theory

Lecturer: Miloš Z. Stojaković

Status: obligatory for IM, module "Computer science", otherwise elective

ECTS: 6

Requirements: none

Learning objectives

Teaching students to understand and use various results in graph theory, and master basic algorithms on graphs.

Learning outcomes

Minimal: Students should know all the basic concepts of graph theory and understand standard theorems. In addition, students should be familiar with the basic algorithms on graphs.
Optimal: Students should be able to prove more complex theorems, be able to comprehend the covered topics as a whole, and to solve some standard problems that they have not encountered before.

Syllabus

Theoretical instruction

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 colourings. Matchings, algorithms. Edge colourings. Hamiltonian paths.

Practical instruction

Solving and understanding problems in the mentioned topics in graph theory. Implementation of standard algorithms for dealing with mentioned graph structures. Choosing, modifying and implementing algorithms on the way to solution of more complex problems.

Literature

1. J. A. Bondy, U.S.R. Murty: Graph Theory, Springer, 2008.
2. V. Petrović, Teorija grafova, Novi Sad, 1998.

Weekly teaching load				Other:
Lectures: 2	Exercises: 2	Other forms of teaching:	Student research:	

Teaching methodology

Standard lecturing methods are used. Exercises serve to practise the techniques that students were shown in the lectures, and discuss the possible applications on concrete problems, possibly including a modification of the approach used. In practical part of the exercises, students try to apply the techniques they learned, progressively attacking harder problems towards the end of the course.

Knowledge is tested through the final exam. Exercises comprise tutorials, where teaching assistants give examples, and practicing sessions, where students try to solve problems on their own. In the exam, students demonstrate to what extent they understood the concepts of graph theory and networks.

Grading (maximum number of points 100)

Pre-exam obligations	**Points**	**Final exam**	**points**
Colloquia	**50**	Oral exam	**50**