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

Level: master

Course title: Social Networks (IA142)

Lecturer: Miloš M. Radovanović

Status: obligatory in study programme *Teaching Informatics*; elective in study programme *Informatics*

ECTS: 7

Requirements: none

Learning objectives

The objective of the course is to introduce students to the theoretical concepts underlying social network analysis, as well as the techniques and tools for analysis of large-scale social networks.

Learning outcomes

Minimal: At the end of the course, students should be able to apply the basic social network analysis techniques using the existing tools on an illustrative example of a social network.
Desirable: At the end of the course, students should be able to demonstrate understanding of theoretical concepts and algorithms used in social network analysis, as well as their practical application in the analysis of large-scale social networks.

Syllabus

Theoretical instruction

History and examples of social networks. Elements of graph theory for social network analysis (basic definitions, graph types and representations). Metrics and measures of connectivity, distance, centrality, cohesion and similarity for actors and ties in social networks. Graph algorithms for components, cores and cliques in networks. Graph drawing algorithms and social network visualization techniques. Structure and evolution of large-scale social networks. Statistical analysis of social networks and mathematical models of complex networks. Application of graph algorithms in actor ranking, community detection and link prediction. Introduction to advanced topics (diffusion processes, influence maximization, opinion formation, etc.).

Practical instruction

Introduction to social network analysis and visualization tools (Pajek, GUESS, Gephi) and libraries (Jung, iGraph). Analysis of study examples using the mentioned tools and libraries.

Literature

1. D. Easley, J. Kleinberg. *Networks, Crowds and Markets: Reasoning About a Highly Connected World*. Cambridge University Press, 2010.
2. M. E. J. Newman. *Networks: An Introduction*. Oxford University Press, 2010.
3. W. de Nooy, A. Mrvar, V. Batagelj. *Exploratory Social Network Analysis with Pajek*. Cambridge University Press, 2005.

Weekly teaching load				Other:
Lectures: 2	Exercises: 2	Other forms of teaching: 0	Student research: 0	

Teaching methodology

Lectures are based on classical presentation methods involving a video-beam. During exercises, classical teaching methods involving a video-beam are used to analyze study examples. Study examples are practised on the computer, by using the recommended tools and libraries. Students' knowledge is checked through a written test, solution of practical problems, and preparation of a seminar paper that is defended at the end of the course.

Grading method (maximum number of points 100)			
Pre-exam obligations	**points**	**Final exam**	**points**
Test	20	Seminar paper	50
Practical problems	30		