

SPINAKEr Summer School course
Network Analysis in Complex Environment
Analysis of Weighted Networks

Course description

The course will focus on the visualization and analysis of networks with weighted links. The choice of network layout is influenced by its size and density. For comparability of network nodes, we sometimes need to normalize the weights. We will learn several ways to find important parts of the network.

Subject's learning outcomes

Outcomes in terms of	Examination methods
Knowledge - Student knows and understands:	
Knows the basic concepts of network analysis.	Individual report
Skills - Student can:	
Perform basic analyses of weighted networks using available software.	Individual report
Social competences - Student is ready to:	
Describe real-life relational situations as networks and formulate questions in terms of networks.	Individual report

Calculation of ECTS points

Activity form	Activity hours*
Lecture	12

DEVELOPMENT		
Preparation for classes	10	
Preparation for the exam	30	
Student workload	Hours 40	ECTS 2
Workload involving teacher	Hours 12	ECTS 2

*hour means 45 minutes

Study content

The course will have the following structure:

- basic notions
- obtaining weights (measuring, computing, projections of two-mode networks)
- normalization of weights
- network descriptions on files and network analysis software
- approaches to analysis (with examples)
 - graph visualization (for small or sparse networks)
 - matrix visualization (for dense, not too large networks; clustering)
 - important nodes (centralities)
 - important subnetworks
 - cores
 - islands
 - skeletons
 - clustering and blockmodeling

Analyses will be done using free software R and Pajek.

Course advanced

Activities	Examination methods
In class lectures	Evaluation of an individual network analysis report

Literature

Obligatory

- Course slides

Optional

- Wouter De Nooy, Andrej Mrvar, Vladimir Batagelj: Exploratory Social Network Analysis with Pajek; Revised and Expanded Edition for Updated Software. Structural Analysis in the Social Sciences, CUP, July 2018.
- Vladimir Batagelj, Patrick Doreian, Anuška Ferligoj and Nataša Kejžar: Understanding Large Temporal Networks and Spatial Networks: Exploration, Pattern Searching, Visualization and Network Evolution. Wiley Series in Computational and Quantitative Social Science. Wiley, October 2014.
- Links to networks at <http://vladowiki.fmf.uni-lj.si/doku.php?id=pajek:ev:pde:sources>