Study programme(s): Applied Mathematics – Data Science

Level: master studies

Course title: Communication and Storage Networks for Big Data

Lecturer: Dušan Jakovetić

Status: elective

ECTS: 6

Requirements: None

Learning objectives

- Understanding fundamental concepts of communication of data across Internet (IP network) and how this infrastructure is used for massive data acquisition, transfer and storage.

Learning outcomes

- Acquired knowledge of fundamental concepts in network communications (basics of communication protocols and layered protocol models)
- Ability to effectively communicate/collaborate with network engineers on both practical and research problems
- Ability to understand massive data acquisition via access networks (Internet of Things concept), massive data transfer via core networks (IP network core) and massive data storage in network storage (network attached storage, cloud infrastructure)
- Ability to model real-world systems using the taught concepts

Syllabus

Theoretical instruction

Introduction to communication networks. Layered protocol architecture – OSI model and TCP/IP model. Network architecture – from access networks to core networks. Modern wireless access networks for massive data gathering (Wireless Sensor Networks, Wi-Fi networks, 3G/4G cellular networks). Internet of Things concept. Introduction to IP networks (Internet). Major protocols in TCP/IP protocol stack (IP, TCP, UDP) and their functionality. Internet services and applications (peer-to-peer networks, content delivery networks). Storage networks and managing big data in IP networks (Introduction to Hadoop).*Practical instruction*Application examples, modeling access and core networks: link level and system level models, network simulators.

Literature

Selected parts of the following book:

3. A. Tannenbaum: Computer Networks*, 5th edition*, Prentice Hall, 2010.
4. Tutorial papers (Internet of Things, Wireless Sensor Networks, Network Storage,Hadoop)

Weekly teaching load				Other: 0
Lectures: 2	Exercises: 3	Other forms of teaching: 0	Student research: 0	

Teaching methodology

Lectures; revisions of the material; active students' participation in problem solving; knowledge tests – colloquia; homeworks.

Grading (maximum number of points 100)

Pre-exam obligations	**points**	**Final exam**	**points**
Colloquia + homeworks	30 (Colloquia) + 30 (Homeworks)	written exam	40