Study Programme: Applied Mathematics – Data Science

Course Unit Title: Communication and Storage Networks for Big Data

Course Unit Code: МДС19

Name of Lecturer(s): Dušan Jakovetić

Type and Level of Studies: Master Academic Degree

Course Status (compulsory/elective): Elective

Semester (winter/summer): Winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 6 (5 po novom informatoru)

Prerequisites: None

Course Aims:

- 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:

Theory

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).

Practice

Application examples, modeling

access and core networks: link level and system level models, network simulators.

Required Reading:

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 Contact Hours: 5	**Lectures:** 2	**Practical work:** 3 (2 po novom informatoru)

Teaching Methods:

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

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	40
Colloquia + Homeworks	30 (Colloquia) + 30 (Homeworks)	oral exam	
Preliminary exam(s)		…….	
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.