I017	Obligatory - Semester 5	**Introduction to Computer Networks and Services**	L+P+S 1+1+0	ECTS 3

Course objectives. The main objectives are to teach students essentials of computer network and services and help students understand the operation of the web server and communication protocols. In addition, students will practice programming skills for server-client and P2P (peer to peer) technology.

Course prerequisites. Introduction to Computer Science, Introduction to Programming.

Syllabus.
1. Introduction. Intranet, Internet. OSI multi-level reference model. Communications: protocols and services, packets, handshakes.
2. Understanding networking concepts. Network layers: physical link, data link, medium access. Topology of computer networks. Routers (LS and DV algorithms).
3. Protocols: UDP, TCP/IP, HTTP, FTP, Telnet, SSH. Domains, hosts, sockets, TLS, SSL.
4. Distributed systems. Models and services (file and WEB servers, client-server, RPC, P2P). Naming, security, caching.
5. Network programming. UDP and TCP in server/client multithreaded environment. Deadlocks.

Expected learning outcomes.
After completing the course, students are expected to:
- demonstrate the knowledge at a level that includes aspects of contemporary knowledge in the field of computer networks and services;
- apply their knowledge and understanding in a way typical of the profession and be able to argue and solve problems in the field of computer networks and services;
- be able to communicate information, ideas, problems and solutions to both experts and non-experts;
- possess learning ability for continuing their studies at a higher level.

Teaching methods and student assessment. Students' knowledge is continuously assessed through homework. In lectures, students study principles of computer networks and their services (ftp, web services, RPC, P2P). In exercises, students should become able to solve programming techniques and acquire some skills referring to usage of network services and protocols. The final examination consists of a seminar paper and an independent programming project, and it takes place after the completion of all lectures and exercises.

Can the course be taught in English: Yes.

Basic literature:
1. Kurose, Ross: Computer Networking - A Top-down Approach Featuring the Internet, 3rd Ed., Addison-Wesley
2. D. Matijević, Reviewed teaching materials available on the course website

Recommended literature:
1. J. Goerzen, B. Rhodes: Foundations of Python Network Programming: The Comprehensive Guide to Building Network Applications with Python, 2nd Ed, Apress
2. D.E. Comer, Internetworking with TCP/IP Vol.1: Principles, Protocols, and Architecture, Prentice Hall, 4th edition, 2000.
3. E. Cerami, Web Services Essentials, O'Reilly UK, 2002.
4. T. Lammle, CCNA: Cisco Certified Network Associate Study Guide, Third Edition, Sybex, 2002.
5. A. S. Tanenbaum, Computer Networks, Prentice Hall, 4th edition, 2002.
6. B. Stroustrup, The C++ Programming Language, Addison Wesley, 2000.