

COURSE DESCRIPTION CARD

Faculty of Electrical Engineering										
Field of study	Electrical and Electronic Engineering							Degree level and programme type	master's degree, full time programme	
Specialization/ diploma path								Study profile		
Course name	TCP/IP Networks and Applications							Course code	IS-FEE-20004W	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter	
	30				15			No. of ECTS credits	6	
Entry requirements	Network Technologies or equivalent.									
Course objectives	Acquiring detailed knowledge of family of TCP/IP protocols and their applications.									
Course content	History of family of TCP/IP protocols, their architecture and development. Structure of IP packets in version 4 and 6. Addressing devices in IP networks. IP multicast groups and multicast addressing. Structure of TCP segment and UDP datagram. TCP communication session. Flow control in TCP transmission. Auxiliary protocols used in TCP/IP networks: ICMP, ARP, DHCP and other. Static and dynamic routing in TCP/IP networks. Idea of autonomous system (AS). Interior and exterior routing protocols. Obtaining provider independent (PI) IP addresses. Virtual Local Area Networks (VLAN). IP routing between VLANs. MPLS networks. Network Address Translation protocol (NAT). Traffic aggregation and load balancing in TCP/IP networks. Voice over IP (VoIP) technology. Selected services in TCP/IP networks.									
Teaching methods	lecture, specialization workshop.									
Assessment method	lecture: tests; specialization workshop: evaluating the student's performance in classes, presentation on given subject.									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
LO1	can describe of a process of layered communications in TCP/IP networks;									
LO2	has comprehensive knowledge of functioning of main and auxiliary protocols used in TCP/IP networks and their cooperation (including application protocols);									
LO3	is capable of explaining flow control methods used by TCP protocol;									
LO4	is able to describe organization of external routing in the Internet;									
LO5	can differentiate and explain packet forwarding processes in									

	IP networks with classical routing and with label-based switching (MPLS);		
LO6	depicts advanced configurations of networks and applications including VLAN technology, server clusters and cloud-based solutions;		
LO7	can prepare multimedia presentation on given subject connected with module content		
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	tests on lecture content	L	
LO2	tests on lecture content, evaluating the student's performance in classes	L, SW	
LO3	tests on lecture content, evaluating the student's performance in classes	L, SW	
LO4	tests on lecture content, evaluating the student's performance in classes	L, SW	
LO5	tests on lecture content	L	
LO6	tests on lecture content	L	
LO7	evaluating the student's presentations	SW	
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	30	
	participation in specialization workshop	15	
	participation in specialization workshop	15	
	work on presentations	20	
	implementation of project tasks (homework)	40	
	preparation for and participation in exams/tests	30	
	TOTAL:	150	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		45	2
Student workload – practical activities		90	4
Basic references	1. Mahbub H., Raj J.: High performance TCP/IP networking. Prentice Hall, 2003. 2. Sportack M.: IP addressing fundamentals. Cisco Press, 2002. 3. Comer D.E.: Internetworking with TCP/IP, vol 1. Prentice Hall, 2005. 4. Stevens W.R., Wright G.R.: TCP/IP illustrated, vol. 1-3. Addison-Wesley, 2001. 5. Bourke T.: Server load balancing. O'Reilly Media, 2001.		
Supplementary references	1. Comer D.E., Stevens D.L.: Internetworking with TCP/IP, vol 2. Prentice Hall, 1998. 2. RFC documents (available at www.rfc-editor.org).		
Organisational unit conducting the course	Department of Photonics, Electronics and Light Technique	Date of issuing the programme	
Author of the programme	Andrzej Zankiewicz, Ph.D. Eng.	09.02.2020	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar