

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Common		
<b>Type and level of studies</b>		Doctoral studies		
<b>The name of the course</b>		Data Communication and Networking		
<b>Lecturer (for lectures)</b>		Đorđević Lj. Goran		
<b>Lecturer/associate (for exercises)</b>				
<b>Lecturer/associate (for OFE)</b>				
<b>Number of ECTS</b>	10	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>	The goal of the course is for students to gain understanding and knowledge in the area of data communication and networking with emphasize on: a) advanced concepts and trends in computer-based systems for efficient and high-speed data communication over various communication media; b) wireless ad-hoc and mobile communications, and wireless sensor networks.			
<b>Course outcomes</b>	Upon completing this course, students are expected to have comprehensive understanding of: a) current data networking technologies and trends; b) various data network architectures; c) various data networking protocols and their applications. Students should also be able to compare different data networks and to perform high level design of data networks.			
<b>Course outline</b>				
<b>Theoretical teaching</b>	Data communications, networks, protocols and standards. Network Models, OSI Model, TCP/IP protocol suite. Physical layer, media and characteristics. Data and signals. Link layer and protocols: error detection and correction, medium access control, flow control, local area networks, Ethernet, IEEE 802.11, Bluetooth. Industrial local area networks. Networking devices. Network layer: addressing, internet protocol, IPv6, routing: unicast, multicast and broadcast routing, intra- and inter-domain routing. Transport layer: UDP and TCP, flow control, congestion control, and quality of service. Application layer: client-server architecture, overview of application protocols. Network management protocols. Multimedia communications: streaming stored audio/video, streaming live audio/video, protocol for multimedia communications. Security: basic principles of cryptography, security services, message confidentiality and integrity, authentication, digital signature, key management. Mobile ad-hoc networks, routing in ad-hoc networks, wireless sensor networks.			
<b>Practical teaching (exercises, OFE, study and research)</b>				
<b>Textbooks/references</b>				
1	B. A. Forouzan, Data Communications and Networking, 4/e, McGraw-Hill, 2007			
2	J. F. Kurose, K. W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 3th Edition, Pearson Education, 2007.			
3	Technical papers from major networking journals and conferences.			
4				
5				
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
3	0	0	0	0
<b>Teaching methods</b>	Lectures, seminars, assignments, and class discussions. Independent and team work of students in solving research-oriented tasks.			
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>	<b>Points</b>	<b>Final exam</b>	<b>Points</b>	
<b>Activity during lectures</b>		<b>Written exam</b>		
<b>Exercises</b>		<b>Oral exam</b>	50	
<b>Colloquia</b>				
<b>Projects</b>	50			