Specification for the book of courses

Study program			Electrical Engineering and Computer Science	
Module			Communications and Information Technologies - Communications and Information Processing	
Type and level of studies			Undergraduate Academic Studies	
The name of the course			Information Theory and Applications	
Lecturer (for lectures)			Đorđević T. Goran	
Lecturer/associate (for exercises)			Cvetković M. Aleksandra	
Lecturer/associate (for OFE)			Cvetković M. Aleksandra	
Number of ECTS	6	**Course status (obligatory/elective)**		Obligatory
Prerequisites				
Course	Gaining basic knowledge in the field of Information theory and coding			
Course outcomes	After passing the exam the student will: 1) know to estimate the capacity of some telecommunication channels; 2) be able to create their own programs for the analysis of source codes such as: Huffman and Ziv-Lempelov; to know software implementation for coding and decoding processes of Convolutional and Cyclic codes; 3) understand the principles of iterative decoding; 4) know basic encryption methods.			
Course outline				
Theoretical teaching	Overview of the system for the transmission and information recording. Discrete memoryless and memory information sources. Continuous source. Entropy of the information source. Basics of compression. Compression Algorithms - Chenon-Fano Process, Huffman's Code, Lempel-Zive Code. Channels for information transmission. Transformation. Channel capacity. Arimoto-Blahut algorithm. error correction coding. Linear block codes. Cyclic codes. Cyclic Redundancy Check (CRC). Convolutional codes. Viterb's algorithm. Software implementation of encoding and decoding of block and convolution codes. Estimation of code gain using Monte Carlo simulations. Principles of iterative decoding. Record information on hard disk and flash memory. Data storage centers. Introduction to cryptology. Examples of interdisciplinary application of Information Theory.			
Practical teaching (exercises, OFE, study and research	Exercises on the board and laboratory exercises will be organized from all method units from the lectures.			
Textbooks/references				
1	D. B. Drajić, P. N. Ivaniš, Introduction to Information Theory and Coding (in Serbian), 4th edition, Akademska misao, Belgrade, 2018.			
2	P. N. Ivaniš, A collection of Solved Problems from Information Theory and Coding (in Serbian), Akademska misao, Belgrade, 2013.			
3	T. M. Cover, J. A. Thomas, Elements of information theory, 2nd edition, John Wiley & Sons, Inc., New Jersey, 2006.			
4	R. H. Morelos-Zaragoza, The art of error correcting coding, 2nd edition, John Wiley & Sons, Ltd, England, 2006.			
5				

Number of classes of active education per week during semester/trimester/year				
Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
2	2	1	0	0
Teaching methods	Lectures. Exercises. Laboratory exercises. Consultations.			

Grade (maximum number of points 100)			
Pre-exam duties	**Points**	**Final exam**	**Points**
Activity during lectures	5	**Written exam**	20
Exercises	5	**Oral exam**	30
Colloquia	30		
Projects	10		