

## Specification for the book of courses

<b>Study program</b>		Communications and Information Technologies		
<b>Module</b>		Communications and Information Processing		
<b>Type and level of studies</b>		Master studies		
<b>The name of the course</b>		Advanced Coding Techniques		
<b>Lecturer (for lectures)</b>		Perić H. Zoran, Jovanović Ž. Aleksandra		
<b>Lecturer/associate (for exercises)</b>		Cvetković M. Aleksandra		
<b>Lecturer/associate (for OFE)</b>				
<b>Number of ECTS</b>		4	<b>Course status (obligatory/elective)</b>	Elective
<b>Prerequisites</b>				
<b>Course objectives</b>		Introduce students with advanced techniques of source and channel coding. Train students to solve problems in the domain of source and channel coding.		
<b>Course outcomes</b>		The student will master the advanced techniques of source and channel coding. It will be able to first analytically analyze problems from domain of source and channel coding, and then to solve them via software implementation.		
<b>Course outline</b>				
<b>Theoretical teaching</b>		Switched-adaptive coding of continuous sources. Adaptive source coding based on robust quantizers. Coding algorithm based on lifting wavelet transform. Adaptive modulation and coding. Design of source coders for fixed and variable length of code words. Lossless compression using the LZ and LZW algorithm. BCJR algorithm decoding of error corection codes. Iterative decoding of codes on graphs (LDPC codes): Sum-product algorithm. Min-sum algorithms. Gallager A and B algorithms.		
<b>Practical teaching (exercises, OFE, study and research)</b>		Solving concrete problems from method units from lectures. Mentor work with students on project assignments.		
<b>Textbooks/references</b>				
1	D. Salomon, Variable-length Codesfor Data Compression, Springer, 2007.			
2	K. Sayood, Introduction to Data Compression, Elsevier, Morgan Kaufmann, 2012.			
3	D. Drajić, P. Ivanis, Introduction in information theory and coding (in Serbian), Academic mind, Belgrade, 2009.			
4	W. E. Ryan, S. Lin, Channel Codes - Classical and Modern, Cambridge University Press, 2009.			
5	Silvio A. Abrantes, From BCJR to turbo decoding: MAP algorithms made easier, <a href="https://paginas.fe.up.pt/~sam/textos/From%20BCJR%20to%20turbo.pdf">https://paginas.fe.up.pt/~sam/textos/From%20BCJR%20to%20turbo.pdf</a>			
<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>
2	1	0	0	0
<b>Teaching methods</b>		Lectures, practical exercises, practical training on computers, project assignments, consultation.		
<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>		5	<b>Written exam</b>	20
<b>Exercises</b>		20	<b>Oral exam</b>	20
<b>Colloquia</b>				
<b>Projects</b>		35		