

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Communications and Information Technologies - Communications and Information Processing		
<b>Type and level of studies</b>		Undergraduate Academic Studies		
<b>The name of the course</b>		Satellite Telecommunications		
<b>Lecturer (for lectures)</b>		Đorđević T. Goran		
<b>Lecturer/associate (for exercises)</b>		Panajotović S. Aleksandra		
<b>Lecturer/associate (for OFE)</b>		Panajotović S. Aleksandra		
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>				
The acquisition of knowledge in satellite telecommunications, especially in the field of application of modulation formats and error correction codes. Estimation of system performance in the presence of different interferences. The acquisition of knowledge in the field of different applications of satellite systems.				
<b>Course outcomes</b>				
In the scope of the course the students will: 1) learn basic constituent parts of satellite systems; 2) learn modulation formats and error correction codes that are applied in satellite systems; 3) be able to perform calculations relating multiple access techniques; 4) be able to determine the effects of different interferences on system performance; 5) know the applications of satellite systems.				
<b>Course outline</b>				
<b>Theoretical teaching</b>				
Historical development of satellite telecommunications. Application of satellite systems. Frequency bands. Orbite. Satellite Link Budget. Propagation effects. Satellite and earth station equipment. Characteristics of antennas for satellite systems. Designing a link for the determined average signal to noise ratio. Modulation techniques in satellite systems. Error correction codes in satellite systems. Multiple access to satellite: frequency, time and code multiplex. Satellite mobile Systems. VSAT (Very Small Aperture Terminal) systems. Transmission of radio and television signals via satellite. DVB-S2 and H.264 standards. Internet access via satellite. Navigation systems: Basic principles of positioning using a satellite signal; Satellite navigation systems: GPS, GLONASS, BeiDou-COMPASS, Galileo; Using GPS for car position; Traffic density modeling and time travel estimates.				
<b>Practical teaching (exercises, OFE, study and research)</b>				
Exercises on the board and laboratory exercises will be organized from all method units from the lectures.				
<b>Textbooks/references</b>				
1	T. Pratt, C. W. Bostian, J. E. Allnutt, Satellite Communications, 2nd edition, John Wiley & Sons, USA, 2003.			
2	ITU Handbook on Satellite Communications, 3rd edition, ITU, Geneva, Switzerland, 2002.			
3	L. Castanet (Ed.), Influence of the Variability of the Propagation Channel on Mobile, Fixed Multimedia and Optical Satellite Communications, Shaker Verlag GmbH, Germany, 2008.			
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>
2	2	1	0	0
<b>Teaching methods</b>				
Lectures. Exercises. Laboratory exercises. Consultations.				
<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>		5	<b>Oral exam</b>	30
<b>Colloquia</b>		30		
<b>Projects</b>		10		