

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Control Systems		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Modulation Techniques		
Lecturer (for lectures)		Nikolić B. Zorica		
Lecturer/associate (for exercises)		Nikolić B. Zorica		
Lecturer/associate (for OFE)		Nikolić B. Zorica		
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course	Acquiring the basic knowledge related to signal analysis and modulation techniques.			
Course outcomes	Theoretical knowledge. Mastering the use of appropriate software simulation. Working on a DSP platform.			
Course outline				
Theoretical teaching	Introduction. Shift keying (FSK, PSK, MSK, ASK, QAM). Multilevel modulation schemes. Pseudorandom carrier modulations. Pseudorandom sequences and their properties. Modulation with direct sequence (DS) and frequency hopping (FH). Principles of synchronization. Basic principles of OFDM technique. Synchronization and channel estimation in OFDM systems.			
Practical teaching (exercises, OFE, study and research)	Computational and laboratory exercises are performed in the area of digital modulation, modulation with direct sequence and frequency hopping.			
Textbooks/references				
1	Z. Nikolic: Spread spectrum systems performance (in Serbian), Faculty of Electronic Engineering Niš, 2006, Edition: Monographs			
2	Z. Nikolic, N. Milosevic, B. Dimitrijevic: Multiplex signal transmission (in Serbian), Faculty of Electronic Engineering Niš, 2006, Edition: textbooks			
3	Z. Nikolic, N. Stojanovic, D. Pokrajac, V. Smiljanic, N. Milosevic: Laboratory exercises for Basics of telecommunications and Digital telecommunications (in Serbian), Faculty of Electronic Engineering Niš, 1999			
4	S. Glisic: Spread Spectrum Systems (in Serbian), Belgrade, 1981			
5	I. Stojanovic: Fundamentals of telecommunications (in Serbian), Gradjevinska knjiga, Belgrade, 1977			
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	Oral teaching in the classroom, laboratory exercises.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	10	Written exam	20	
Exercises	10	Oral exam	20	
Colloquia	40			
Projects				