

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Communications and Information Technologies - System Engineering and Radio-Communications		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Wireless Communication Systems		
Lecturer (for lectures)		Marković V. Vera, Maleš-Ilić P. Nataša, Stanković Ž. Zoran		
Lecturer/associate (for exercises)		Dimitrijević Ž. Tijana, Joković J. Jugoslav		
Lecturer/associate (for OFE)		Dimitrijević Ž. Tijana, Milijić R. Marija		
Number of ECTS	5	Course status (obligatory/elective)	Obligatory	
Prerequisites				
Course objectives	Acquiring theoretical and practical knowledge of transmission of information by wireless communication systems.			
Course outcomes	Knowing the basic principles of wireless transmission of information. Knowing the architecture of wireless communication systems. Ability to characterize and analyze the components of the wireless communication system.			
Course outline				
Theoretical teaching	Types of wireless communication systems. Frequency plan. EM radiation. Antennas. The parameters of the antenna. Propagation of electromagnetic waves through the atmosphere. Friss transmission equation. Tropospheric refraction. Reflections from the ground. Diffraction effects. Fresnel zone. Absorption and scattering in the atmosphere. Fading - types, causes, mitigation of this phenomenon on the link. Thermal noise, equivalent noise temperature, noise figure. Fixed microwave links. Microwave link budget. Multiple path propagation. Typical examples of wireless communication systems (mobile, satellite, computer networks).			
Practical teaching (exercises, OFE, study and research)	Auditory exercises: solving practical problems related to the transmission of signals over the air, and analysis of components of wireless systems. Labs: Characterization of wireless system components by measurements and analysis of the components by software tools.			
Textbooks/references				
1	A. F. Molisch, Wireless Communications, John Wiley and Sons, 2010.			
2	B. Марковић, Б. Миловановић, Н. Дончов, З. Станковић, Microwave Communication Systems (in Serbian), Електронски факултет, 2006.			
3	A. Hussain, Advanced RF Engineering for Wireless Systems and Networks, John Wiley & Sons, Inc., 2005.			
4	A. Osseiran, J. F. Monserrat, P. Marsch, 5G Mobile and Wireless Communications Technology, University Press, 2016.			
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; Practical 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	20	
Colloquia	40			
Projects	10			