

Specification for the book of courses

Study program		Communications and Information Technologies		
Module		Communications and Information Processing		
Type and level of studies		Master studies		
The name of the course		Principles of Software Radio		
Lecturer (for lectures)		Nikolić B. Zorica, Milošević D. Nenad		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)		Eferica M. Predrag		
Number of ECTS	4	Course status (obligatory/elective)	Obligatory	
Prerequisites				
Course objectives				
Introduction to software radio and devices that can be programmed to operate with different standards. Description of the software radio elements and the analysis of the receiver operation.				
Course outcomes				
Students will be able to understand theoretical foundation of the software radio, recognize elements and principles of software radio operation, use hardware platforms for software radio and create a simple communication chain (transmitter and receiver) based on USRP platform				
Course outline				
Theoretical teaching				
Introduction. Basic principles. Signals and systems, probability and digital transmission review. Basic SDR implementation of a transmitter and a receiver. Receiver structure and waveform synthesis of a transmitter and a receiver. Multicarrier modulation and duplex communications. Spectrum sensing techniques. Applications of software-defined radio. Hardware platforms for software radio.				
Practical teaching (exercises, OFE, study and research)				
Auditory exercises are performed in all thematic areas. Laboratory exercises are performed in the area of: Generating basic signals using FPGA-based platforms, Creating a simple communication chain based on USRP platform, Performance analysis of complex communications systems using a development environment based on USRP platforms.				
Textbooks/references				
1 J. Mitola III, Software Radio Architecture, John Wiley & Sons, 2000.				
2 T. Collins, R. Getz, Di Pu, A. Wyglinski, Software-Defined Radio for Engineers, Artech House Publishers, 2018.				
3 E. Grayver, Implementing Software Defined Radio, Springer-Verlag New York, 2013.				
4 Di Pu, A. Wyglinski, Digital Communication Systems Engineering with Software-Defined Radio, Artech House, 2013.				
5 J. H. Reed, Software Radio: A Modern Approach to Radio Engineering, Prentice Hall PTR, 2002.				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	0	1	0	0
Teaching methods				
Giving lectures, auditory and 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				