

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		Communication Hardware Programming		
Lecturer (for lectures)		Maleš-Ilić P. Nataša, Stanković Ž. Zoran		
Lecturer/associate (for exercises)		Atanasković S. Aleksandar		
Lecturer/associate (for OFE)		Stošić P. Biljana, Eferica M. Predrag		
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Acquiring basic knowledge of hardware platform architectures, procedures and tools for their programming.			
Course outcomes	Knowledge of the architecture of the programmable hardware platforms - FPGA, DSP, SDR. Possibility to apply methods and tools for programming hardware platforms. (LabVIEW / MATLAB / Simulink, Stateflow Tools, VHDL)			
Course outline				
Theoretical teaching	Programmable hardware platforms - FPGA, DSP, SDR. Software implementation of digital transmitter and receiver. Methods for transferring a communication model developed in LabVIEW / MATLAB / Simulink environment to the desired DSP / FPGA / SDR platform. Using the Stateflow tool for modeling and simulating functional block diagrams and the state transfer for data processing on the hardware platform. Basics of VHDL. Using the HDL encoder for the synthesis of the VHDL / Verilog code according to the source code developed in the MATLAB / Simulink environment and its transfer to the desired DSP / FPGA platform.			
Practical teaching (exercises, OFE, study and research)	Research work of students related to solving specific tasks through individual and team projects.			
Textbooks/references				
1	Mark Zwolinski, Digital System Design with VHDL, 2nd edition, Prentice Hall, 2004			
2	Steven T. Karris, Digital Circuit Analysis and Design With Simulink Modeling and Introduction to CPLDs and FPGAs, Orchard Publications, 2007			
3	Robert W Stewart, Kenneth W Barlee, Dale S W Atkinson, Software Defined Radio using MATLAB & Simulink and the RTL-SDR, Strathclyde Academic Media, 2015			
4	Bruce A. Black, Introduction to Communication Systems - Lab Based Learning with NI USRP and LabVIEW Communications, NTS Press 2014			
5	Robert W. Heath, Digital Wireless Communication - Physical Layer Exploration Lab Using the NI USRP, NTS Press, 2012			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	2	0	0
Teaching methods	Lectures, computational exercises, practical laboratory work, team project, consultations			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	10	Written exam		
Exercises	40	Oral exam	30	
Colloquia				
Projects	20			