

Specification for the book of courses

Study program		Computing and Informatics		
Module		Computer Systems Security		
Type and level of studies		Master studies		
The name of the course		Computer Based Sensor Systems		
Lecturer (for lectures)		Denić B. Dragan, Radenković N. Dragan, Dinčić R. Milan		
Lecturer/associate (for exercises)		Dinčić R. Milan		
Lecturer/associate (for OFE)				
Number of ECTS	4	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives				
Introduction of students with operating principles, significance and application of sensors and sensor systems; with techniques for acquisition, processing and analysis of measurement data; with topical sensor systems (telemetry systems, wireless sensor networks, IoT systems); with programming in LabVIEW software; with the realization of sensor systems based on current hardware-software platforms (LabVIEW, Raspberry Pi, FPGA).				
Course outcomes				
Students will obtain theoretical and practical knowledge of modern sensor technologies and systems. Also, students will master knowledge of hardware-software realization of sensor systems using LabVIEW, Raspberry Pi and FPGA platforms.				
Course outline				
Theoretical teaching				
Sensors and sensor systems. Principles of work, importance and application sensors. General structure of computer-based sensor systems. Acquisition of measurement data. Acquisition cards. Protocols for connecting cards to computer. Computer software for Data Acquisition. LabVIEW software package - features, applications, programming. Concept of virtual instrumentation. Realization of sensor systems based on LabVIEW, Raspberry Pi and FPGA platform. Analysis and processing of measurement data. Telemetry systems. Wireless sensor networks. IoT systems.				
Practical teaching (exercises, OFE, study and research)				
Practice, laboratory exercises, realization of project and seminar tasks, with the aim to enable students to acquire practical knowledge related to programming in LabVIEW and to design and implement sensor systems using LabVIEW, Raspberry Pi and FPGA technologies.				
Textbooks/references				
1	D. Denić, I. Randjelović, D. Živanović, "Computer-based measurement systems in industry", Faculty of Electronic Engineering Niš and WUS Austria, script, 2005 (in Serbian).			
2	D. Stanković, "Physical-technical measurements - sensors", University of Belgrade, 1997 (in Serbian).			
3	Robert Bishop, "Learning With LabVIEW", Pearson, 2015.			
4	National Instruments, "Data Acquisition and Signal Conditioning Course Manual", 2012.			
5	John Shovic, "Raspberry Pi IoT Projects", 2015.			
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	0		
Teaching methods		Lectures with application of modern presentation tools, discussion of student solutions, consultations, calculation exercises, laboratory exercises.		
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures		5	Written exam	25
Exercises		20	Oral exam	25
Colloquia		25		
Projects				