

Specification for the book of courses

Study program		Control Systems		
Module		Computer Control Systems and Measurement Techniques		
Type and level of studies		Master studies		
The name of the course		Virtual Measurement Instrumentation		
Lecturer (for lectures)		Živanović B. Dragan, Simić M. Milan		
Lecturer/associate (for exercises)		Simić M. Milan, Miljković S. Goran		
Lecturer/associate (for OFE)		Simić M. Milan, Miljković S. Goran		
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Aim of the subject is introduction with concept, hardware and techniques for programming of virtual measuring instruments, as with specific examples of measuring systems.			
Course outcomes	Capability of student to select, on the basis of specific project tasks, components of measuring system and to realize program in „LabVIEW“ graphical programming language.			
Course outline				
Theoretical teaching	Hardware of virtual instruments. Types of acquisition modules, characteristics. Programming language LabVIEW, concept and basic techniques. Front panel, block diagram, functions palettes. Data stream and parallel execution of code segments. Signal analysis. Reduction of measurement errors in virtual instruments. Linearisation, compensation of influential quantities, calibration. Advanced data presentation. Serial communication with separated instruments. Connection of sensors and actuators. Examples for specific implementations of measuring systems.			
Practical teaching (exercises, OFE, study and research)	Laboratory exercises: Learning of LabVIEW programming language basics. Solving of complicated programming tasks. Examples of specific virtual instruments for measurement of temperature, impedance parameters, AD converter characteristics. Realization of project tasks and seminar papers from area of theoretical teaching.			
Textbooks/references				
1	G.C. Barney, "Intelligent Instrumentation", Prentice Hall, New York, 1998.			
2	V.Drndarevic, "Acquisition of measuring data using Computer", (in Serbian) institute of Nuclear Science, Vinca, 1999.			
3	National Instruments, "Measurement and Automation Catalog", National Instruments Catalog.			
4	S. Tumanski „Principles of Electrical Measurement“, Taylor&Francis			
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	1		
Teaching methods	Lectures with using of modern resources for presentation, discussion of students solutions for defined tasks, consultations. Practical teaching will be performed in laboratory equipped with computers.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam		Points
Activity during lectures	10	Written exam		20
Exercises	20	Oral exam		20
Colloquia	15			
Projects	15			