

## Specification for the book of courses

<b>Study program</b>		Control Systems		
<b>Module</b>		Computer Control Systems and Measurement Techniques		
<b>Type and level of studies</b>		Master studies		
<b>The name of the course</b>		Computer Systems for Measurement and Control		
<b>Lecturer (for lectures)</b>		Živanović B. Dragan, Dinčić R. Milan		
<b>Lecturer/associate (for exercises)</b>		Miljković S. Goran		
<b>Lecturer/associate (for OFE)</b>		Miljković S. Goran		
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
The aim of the subject is to allow students to introduce with hardware and software of systems for measurement and control, to learn all techniques of connection of single components into complex system, considering the influence of the applied techniques on the measurement accuracy.				
<b>Course objectives</b>				
Student will be able to decide whether to use virtual instruments, centralized or distributed measurement systems to solve project task, which components should be used and to recognize potential problems which could occur in practice.				
<b>Course outcomes</b>				
Student will be able to decide whether to use virtual instruments, centralized or distributed measurement systems to solve project task, which components should be used and to recognize potential problems which could occur in practice.				
<b>Course outline</b>				
Measurement of non-electrical quantities. Connection of sensors, measurement transducers and actuators with computer. Hardware structure of computer-based measurement systems. Standard interface systems for measurement techniques. SCADA systems. Distributed measurement systems. Components of distributed systems. Intelligent measurement transducers. Hardware and software techniques of compensation of measurement results. Intelligent sensors in cars. Electrical isolation in measurement systems. Protocols of industrial networks. Protocols for intelligent sensors in cars. Wireless sensor networks. Virtual instrumentation and virtual laboratories. Examples of practical implementation of computer-based measurement systems. Real-time work. Software design. Internet connection. Calibration of computer-based measurement devices and systems. Automatic test systems. Measurement systems for car testing.				
<b>Theoretical teaching</b>				
Preparation of project tasks and seminar papers in the field of theoretical lectures.				
<b>Practical teaching (exercises, OFE, study and research)</b>				
Preparation of project tasks and seminar papers in the field of theoretical lectures.				
<b>Textbooks/references</b>				
1	D. Denic, I. Randjelovic, D. Zivanovic, „Computer-based measurement systems in industry“, (in Serbian) Faculty of electronic engineering Nis and WUS Austria, script, 2005.			
2	V.Drnđarevic, "Acquisition of measuring data using Computer", (in Serbian) institute of Nuclear Science, Vinca, 1999.			
3	Burns, M., Roberts, G.W., "Mixed-Signal IC Test and Measurement", Oxford Univ. Press, New York, 2001.			
4	Lang, T.T., "Computerized Instrumentation", John Wiley & Sons, 1990.			
5				
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
2	1	1		
<b>Teaching methods</b>				
Lectures with the use of modern presentation techniques and devices, discussion of , student's solutions of the given tasks, consultations, computational exercises.				
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>		<b>Points</b>	<b>Final exam</b>	<b>Points</b>

<b>Activity during lectures</b>	5	<b>Written exam</b>	20
<b>Exercises</b>	20	<b>Oral exam</b>	25
<b>Colloquia</b>	30		
<b>Projects</b>			