

## 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>		Design of Microcomputer Measurement Instruments		
<b>Lecturer (for lectures)</b>		Živanović B. Dragan		
<b>Lecturer/associate (for exercises)</b>		Đorđević-Kozarov R. Jelena, Stojković S. Ivana		
<b>Lecturer/associate (for OFE)</b>		Đorđević-Kozarov R. Jelena, Stojković S. Ivana		
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
Microcomputer as a part of a measurement instrument. Introduction with hardware-software structure of particular instruments. Understanding of working principles of analog and digital electronic circuits in instruments. Understanding influences of different ways of realization of some measurement functions on measurement accuracy.				
<b>Course objectives</b>				
The ability of students to understand working principles of instruments based on microcontrollers and to design them according to the required project task and metrological characteristics.				
<b>Course outcomes</b>				
<b>Course outline</b>				
Architecture of microprocessors, microcomputers and DSP. Input-output devices. Analog circuits of measurement instruments. Analog to digital conversion in measurement instruments. Measurement of time and frequency in microcomputer devices. Designing of hardware of microcomputer devices. Examples of practical implementations of microcomputer instruments. Real time work. Software designing. Virtual instruments. Testing in the phase of development of microcomputer devices.				
<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>				
<b>Textbooks/references</b>				
1	J. Valvano, "Embedded Microcomputer Systems - Real Time Interfacing", Cengage Learning, 2011.			
2	M.A.Mazidi, J.G.Mazidi,R.D.McKinlay," The 8051 Microcontroller and Embedded systems", Pearson Education, 2006, ISBN-0-13-197089-5.			
3	Ball, S.R., "Embedded Microporcessor System: real word design", Butterwort-Heinmann, Melburne New Delhi, 2000.			
4	V.Drndarevic, "Acquisition of measuring data using Computer", (in Serbian) institute of Nuclear Science, Vinca, 1999.			
5	Barney, G.C., "Intelligent Instrumentation", Prentice Hall, New York, 1998.			
<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>		10	<b>Written exam</b>	20
<b>Exercises</b>		20	<b>Oral exam</b>	20
<b>Colloquia</b>		0		
<b>Projects</b>		30		