

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Common		
<b>Type and level of studies</b>		Doctoral studies		
<b>The name of the course</b>		Software Engineering in Microelectronics		
<b>Lecturer (for lectures)</b>		Pantić S. Dragan		
<b>Lecturer/associate (for exercises)</b>				
<b>Lecturer/associate (for OFE)</b>				
<b>Number of ECTS</b>	10	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>	The acquisition of advanced knowledge in the field of simulation, design and optimization of technological processes, simulation of electrical characteristics of various microelectronic devices and circuits simulation.			
<b>Course outcomes</b>	Student is able to independently use a number of software tools for the design, optimization and analysis of microelectronic devices, circuits and systems.			
<b>Course outline</b>				
<b>Theoretical teaching</b>	Introduction. Modeling and simulation. The application of computers and software tools in the design of microelectronic components and systems. Design of experiment (DOE). Simulation and modeling of technological processes for the production of microelectronic components. Process modeling of ion implantation, diffusion, oxidation, etching and lithographic processes. Simulation of the electrical characteristics of the components. The system of fundamental semiconductor equations, models of mobility, generation and recombination of carriers. Domain simulation discretization and solving systems of partial differential equations. TCAD software tools. Electrical modeling. Models of passive and active components. Parameter extraction. Analytical, physical, numerical modeling and neural networks. Verification and calibration. Structural modeling. 2D and 3D structures. Thermal and mechanical stresses.			
<b>Practical teaching (exercises, OFE, study and research)</b>	In the exercises, individual projects, the project (research paper) and exercises that are performed with the help of a computer, the student is trained independently using commercial software tools for design and simulation of technological process and the electrical characteristics of various semiconductor devices.			
<b>Textbooks/references</b>				
1	Dragan Pantić, Tatjana Pešić, Elva Jovanović, Modeliranje i simulacija u mikroelektronici, Elektronski fakultet u Nišu, 2005.			
2	J.D. Plummer, M.D. Deal, P.B. Griffin, Silicon VLSI Technology, Prentice Hall, 2000.			
3	Course website			
4				
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>
3	0	0	0	0
<b>Teaching methods</b>	Lectures, active involvement in the implementation of research projects, participate in the educational process at the undergraduate and graduate studies, seminars and projects.			
<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>			<b>Written exam</b>	
<b>Exercises</b>			<b>Oral exam</b>	50
<b>Colloquia</b>				
<b>Projects</b>		50		