

Specification for the book of courses

Study program	Electronics and Microsystems			
Module	Electronics and Microsystems			
Type and level of studies	Master studies			
The name of the course	Simulation and Optimization of Electronic Circuits			
Lecturer (for lectures)	Milić Lj. Miljana			
Lecturer/associate (for exercises)	Milić Lj. Miljana			
Lecturer/associate (for OFE)	Milić Lj. Miljana			
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Adoption and systematization of knowledge about algorithms for analysis and optimization of analog and simulation of digital and circuits with mixed signals.			
Course outcomes	Acquiring competencies for implementing optimization procedures in electronic circuits to the extent that qualifies them to develop their own programs for simulation of analogue, digital and mixed signal circuits.			
Course outline				
Theoretical teaching	Analog circuit simulation: The domains of abstraction: DC, AC, time domain. Simulation algorithms. Simulation of linear resistant and reactive circuits. Non-linear resistant circuits simulation. A simulation of nonlinear reactive circuits. Models of basic passive and active components of electronic circuits. Simulation of digital circuits (principle of selection of paths and subsequent events). A simulation of discreet events. A mix of circuits with mixed signals. Methods for evaluating the power and delays. An electronic circuits optimization. The importance of a weight function. Optimization algorithms. Simulated annealing. Evolutionary algorithms. Optimization with limitations. Deterministic and statistical analysis of tolerances. Optimisation procedures in mechanical learning.			
Practical teaching (exercises, OFE, study and research)	Algorithms for analysis of linear and nonlinear circuits in different domains. Algorithms for simulation of digital circuits. Optimizing electronic circuits without using computer programs. This course provides laboratory exercises based on the application of Spice simulator and Optimizer from the OrCAD package.			
Textbooks/references				
1	V. Litovski, Electronic circuit design (in Serbian), Нова Југославија Врање, 2000, ISBN 86-7369-015-3			
2				
3				
4				
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	2	1		
Teaching methods	Lectures with application of the projector; Practical exercises; Laboratory exercises on computer; Consultations; Individual projects			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	10	Written exam		
Exercises		Oral exam	30	
Colloquia				
Projects	60			