

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Common		
Type and level of studies		Doctoral studies		
The name of the course		Microelectronics		
Lecturer (for lectures)		Prijic D. Zoran		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)				
Number of ECTS	10	Course status (obligatory/elective)	Elective	
Prerequisites				
The objectives of the course are such that the PhD student will:				
<ul style="list-style-type: none"> - Learn in detail about certain types of analog microelectronic circuits and their models; - Learn about certain types of digital microelectronic circuits and their models; - Be able to analyze and design electronic products that contain analog and digital microelectronic circuits. 				
Course objectives				
Learning outcomes are defined so that a PhD student will:				
<ul style="list-style-type: none"> - Distinguish the areas of application of certain types of analog microelectronic circuits and describe their functioning, using the model of the appropriate level of complexity; - Distinguish the areas of application of certain types of digital microelectronic circuits and describe their functioning, using the model of the appropriate level of complexity; - Design an electronic product that contains analogue and digital microelectronic circuits, according to the given functional and technical specifications. 				
Course outcomes				
Course outline				
Analog microelectronic circuits in practice: General principles of design of analogue microelectronic circuits; Power supply in integrated circuits and active load; Design of circuits with operational amplifiers (CMOS, bipolar, BiCMOS, JFET); Differential and multistage amplifiers; Feedback and stability; The effects of nonideality; Active higher order filters; Oscillators and function generators; A / D converters. Digital microelectronic circuits in practice: Digital circuits in MOS technology; Sequential logic circuits; MOS memory, SRAM, DRAM, Flash; Data converters. Optional: Digital circuits in bipolar technology. ECL and modified ECL circuits. TTL circuits. Logical circuits with Schottky diodes. Digital circuits in BiCMOS technology.				
Theoretical teaching				
Study research work in the field of analogue or digital microelectronic circuits, according to student affinity.				
Practical teaching (exercises, OFE, study and research)				
Textbooks/references				
1	A. Hastings, „The Art of Analog Layout“, 2nd Ed., Pearson Education, 2006.			
2	R. Jaeger, T. Blalock, „Microelectronic Circuit Design“, 5th. Edition, McGraw-Hill, 2016.			
3				
4				
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
3	0	0	0	0
Teaching methods				
Lectures; Consultations. Active participation in scientific and research projects.				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures			Written exam	
Exercises			Oral exam	50
Colloquia				
Projects		50		