

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		Semiconductor Devices		
Lecturer (for lectures)		Danković M. Danijel		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)				
Number of ECTS	10	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Detailed analysis of physical phenomena in semiconductors and semiconductor devices. Study of the specific applications of semiconductor devices in electronic circuits.			
Course outcomes	Detailed knowledge of the semiconductor devices and their applications in the electronic circuits.			
Course outline				
Theoretical teaching	Heavy Doping Effects in Semiconductors. Transport of Carriers. I-h junctions. The effective surface recombination velocity. Diode. Silicon Bipolar Junction Transistors. Heterojunction Bipolar Transistors. Modeling of Bipolar Junction Transistors. Metal-Semiconductor based Devices. Schottky Barriers and Ohmic Contacts. Field Effect Transistors based on Semiconductor Compounds. GaAs MESFET's. Heterostructure Field Effect Transistors (HFETs). MOSFETs. CMOS/BiCMOS. SOI and 3D structures. Low-voltage and Low-power Devices. Power Devices. Power Bipolar Junction Transistors. Power VDMOS transistors. IGBT. Devices Based on SiC.			
Practical teaching (exercises, OFE, study and research)				
Textbooks/references				
1	James M. Fiore, "Semiconductor Devices: Theory and Application", Mohawk Valley Community College Utica, 2019.			
2	Donald A. Neamen, "Semiconductor Physics and Devices: Basic Principles", 4th Edition, McGraw-Hill, 2011, ISBN 978-0-07-352958-5.			
3	Umesh K. Mishra, Jasprit Singh, "Semiconductor Device Physics", Springer, 2008, ISBN 978-1-4020-6481-4.			
4	Simon M. Zee, Ming-Kwei Lee, "Semiconductor Devices - Physics and Technology", 3rd Edition, John Wiley & Sons, 2012.			
5	Simon M. Zee, Kwok K. Ng, "Physics of Semiconductor Devices", 3rd Edition, Wiley Interscience, 2007, ISBN 978-0-471-14323-9			
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	Theoretical teaching, active role in the scientific-research projects, seminars and 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			