

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Electron Devices and Microsystems		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Semiconductor Devices		
Lecturer (for lectures)		Prijjić P. Aneta		
Lecturer/associate (for exercises)		Stojković S. Aleksandra		
Lecturer/associate (for OFE)		Stojković S. Aleksandra, Marjanović B. Miloš		
Number of ECTS		6	Course status (obligatory/elective)	Obligatory
Prerequisites				
Objectives of the course are focused on:				
<ul style="list-style-type: none"> - Study of the structure and principles of the basic semiconductor devices functioning; - Getting acquainted with the current-voltage characteristics and operating area of the devices; - Understanding of the parameters from the datasheets of the devices; - Introduction to the main applications of semiconductor devices in electronic circuits; - Analysis of the behavior of devices within electronic circuits under different operating conditions. 				
Course objectives				
Learning outcomes allow a student to:				
<ul style="list-style-type: none"> - Describe the structure, operation principle and basic parameters that characterize specific groups of semiconductor devices; - Specify the basic applications of semiconductor devices in electronic circuits; - Select the appropriate semiconductor devices for a variety of practical applications based on their datasheets; - Analyze the functioning of devices within electronic circuits from the aspect of parameter tolerances and temperature stability using the LTSpice software tool; - Examine the operation of a given electronic circuit using laboratory measurement instruments (power source, signal generator, oscilloscope, multimeter). 				
Course outcomes				
Course outline				
Introduction. Overview of the basic types of semiconductor devices. Basic properties of semiconductors. Structure, operation principle and characteristics of basic types of diodes. Applications of diodes. Structure, operation principle and characteristics of bipolar junction transistor (BJT). Bipolar junction transistor as a switch. Bipolar junction transistor as an amplifier. Basic amplifier circuits with BJTs. Structure, operation principle and characteristics of junction field effect transistors (JFET). Constant current sources with JFET. Structure, operation principle and characteristics of metal-oxide-semiconductor field effect transistor (MOSFET). NMOS and PMOS field effect transistors. NMOS inverter. CMOS inverter. Multi-junction and other types of semiconductor devices.				
Theoretical teaching				
Classroom exercises (solving problems). PC and laboratory exercises on the topics: Current-voltage characteristics of diodes; Diode rectifiers; Clippers and clampers with diodes; Voltage multipliers; BJT as a switch; BJT as an amplifier; Constant current sources with a JFET; NMOS and CMOS inverter.				
Practical teaching (exercises, OFE, study and research)				
Textbooks/references				
1	R. Boylestad, L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Prentice Hall, New Jersey, USA, 2009.			
2	J. Fiore, "Semiconductor Devices: Theory and Applications", 2019, Online Available: https://www2.mvcc.edu/users/faculty/jfiore/Linear/SemiconductorDevices.pdf			
3	PC and laboratory exercises manuals			
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	0	0
Teaching methods				
Theoretical teaching - using slides; Classroom exercises; PC exercises; Laboratory exercises; Projects presentations.				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points

Activity during lectures	10	Written exam	25
Exercises	10	Oral exam	25
Colloquia	30		
Projects			