

Course Unit Descriptor

Study Programme: Physics			
Course Unit Title: Electronic circuits			
Course Unit Code: F18EK			
Name of Lecturer(s): Full Professor Zoran Mijatović			
Type and Level of Studies: Bachelor Academic Degree			
Course Status (compulsory/elective): Compulsory			
Semester (winter/summer): Winter			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): Face-to-face			
Number of ECTS Allocated: 6			
Prerequisites: Fundamentals of electronics			
Course Aims: To teach students about the main aspects of electronic circuits, analogue and digital complex electronic circuits.			
Learning Outcomes: Understanding the physical principles of semiconductors, functioning of analogue and digital circuits, and application of obtained knowledge in practice.			
Syllabus: <i>Theory</i> Preparation of semiconductor materials. Methods for pn junction and transistors manufacturing. Concentration of free charge carriers. Pn product. Distribution of potential and electric field in pn junction. Currents through pn junction. Breakdown in pn junction. Capacity of pn junction. Amplification properties of FET with the common source and drain. Amplification properties of BJT with common emitter, base and collector. Input and output impedance of BJT. Coefficient α at middle frequencies. BJT with common base and emitter at high frequencies. Amplifiers general, DC and selective. Oscillators. Noise and lock-in amplifier. Arithmetic logic circuits. Half adder and full adder. Addition of binary numbers. Converters parallel to serial and serial to parallel. Decoders. Memories. RAM. ROM. CCD. Digital oscilloscope. <i>Practice</i> Amplification properties of BJT with common emitter and base. Measurements of h – parameters of BJT by dynamical method. Astable multivibrator as a square wave generator. Binary counters. Decoders. A/D and D/A conversion. Digital oscilloscope. Practical realisation of one stage amplifier with BJT and its characterisation.			
Required Reading: 1. M. N. Horenstein, Microelectronic Circuits and Devices, Prentice Hall International Editions, New Jersey, 1996.			
Weekly Contact Hours:	Lectures: 3	Practical work: 2	
Teaching Methods: Lectures and students group work			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	5	written exam	30

Test I and Test II	15	oral exam	40
Preliminary exam(s)	5	
Seminar(s)	5		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			