



Subject card

Subject name and code	Fundamentals of Electrical Engineering and Electronics 2, PG_00049766						
Field of study	Power Engineering, Power Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject				2022/2023	
Education level	first-cycle studies	Subject group				Obligatory subject group in the field of study Subject group related to scientific research in the field of study	
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	2	Language of instruction				English	
Semester of study	3	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Piotr Chrzan				
	Teachers		prof. dr hab. inż. Piotr Chrzan				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		4.0		41.0	75
Subject objectives	Introduction and analysis of fundamental electronic components, circuits and applications.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_K02] is able to work in a group taking different roles in it, can think and act in an entrepreneurial way, is aware of responsibility for their own work and responsibility for teamwork						
	[K6_W05] has structured knowledge in the field of electrical engineering and electronics, necessary to understand the basics of operation and selection of electrical machines, electricity transmission systems and power electronic devices		Student specifies properties of passive components. Possesses fundamental knowledge on semiconductor and optoelectronic devices.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects	
	[K6_W03] knows the basics of automation and automatic regulation, knows the principles of the selection of electrical devices, drive systems and their control		Student defines functions and features of electronic circuits in automatic systems. Evaluates technical data of generators, oscilloscopes, multimeters and amplifiers.			[SW1] Assessment of factual knowledge	
Subject contents	Laboratory equipment: multimeters, oscilloscopes, measuring probes. Passive electronic components: resistors, capacitors, inductors. Semiconductors: conduction processes, doped semiconductors, pn junction, ms junction. Diodes: switching, rectifier, Schottky, Zener, photodiodes, light emitting diodes, solar panels. Transistors bipolar and unipolar: structure, operation principles, electrical data and characteristics. Optoelectronic components. Amplifiers: technical data, characteristics, influence of negative feedback. Operational amplifiers. Filters. Power amplifiers. Generators. Power supply units. Phase lock loop. Digital circuit technologies. A/C and D/ C converters.						
Prerequisites and co-requisites	Fundamentals of physics and theory of electrical circuits.						
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade	
	Laboratory reports		50.0%			50.0%	
	Test based on lectures		50.0%			50.0%	
Recommended reading	Basic literature		Piotr J. Chrzan: Lectures on Electronics, https://enauczanie.pg.edu.pl/moodle/course/view.php?id=6456				

	Supplementary literature	Nassir H. Sabah: Electronics basic, analog, and digital with PSpice, CRC Press 2009 by Taylor Francis Group LLC, International Standard Book Number-13: 978-1-4200-8708-6 (eBook - PDF)
	eResources addresses	
Example issues/ example questions/ tasks being completed	Describe main operation modes of digital oscilloscope and explain features of the passive voltage probe.	
Work placement	Not applicable	