



Subject card

Subject name and code	Electronics, PG_00038074						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024				
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery	at the university				
Year of study	1	Language of instruction	Polish				
Semester of study	2	ECTS credits	4.0				
Learning profile	general academic profile	Assessment form	exam				
Conducting unit	Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marek Turzyński					
	Teachers	prof. dr hab. inż. Piotr Chrzan dr hab. inż. Arkadiusz Lewicki dr hab. inż. Marek Turzyński dr inż. Krzysztof Iwan prof. dr hab. inż. Jarosław Guziński dr hab. inż. Piotr Musznicki					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60	5.0		35.0		100
Subject objectives	Knowledge and analysis of fundamental electronic components and applications.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U08] can design and build systems and devices in the field related to mechatronics and robotics systems	The student knows the principles of operation of elements and electronic systems. Is able to define the functions of an electronic system and can design an electronic system.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W04] has basic knowledge of methods of analysis of direct and alternating current circuits	The student is able to analyze electronic circuits			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_W05] has basic knowledge of the principles of operation of basic electronic, energy and power electronic components and systems	The student is able to explain and knows the mechanisms of physical phenomena occurring in semiconductor materials.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_K05] can think and act in an entrepreneurial way	The student is able to select the parameters of electronic components in order to optimize economic calculations.			[SK5] Assessment of ability to solve problems that arise in practice		
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. Differential and 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. Basic circuit theory.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test	50.0%	50.0%
	Practical exercises	50.0%	50.0%
Recommended reading	Basic literature	Opolski A.: Elektronika dla elektryków. Wydawnictwo PG, BibliotekaCyfrowa PG, 2008. Opolski A. (red.): Elektronika dla elektryków - Laboratorium. Wydawnictwo PG. Gdańsk 2000.	
	Supplementary literature	Hennel J.: Podstawy elektroniki półprzewodnikowej. WNT Warszawa 2003. Boksa J.: Analogowe układy elektroniczne. Wydawnictwo BTC Warszawa 2007. Filipkowski A.: Układy elektroniczne analogowe i cyfrowe. WNT Warszawa 2006.	
	eResources addresses	Adresy na platformie eNauczenie: ELEKTRONIKA [ARiSS][2023/24] - Moodle ID: 36040 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36040	
Example issues/ example questions/ tasks being completed	Field-effect transistors: structure, classification, graphic symbols and current-voltage output characteristics		
Work placement	Not applicable		