



## Subject card

Subject name and code	Electronics I, PG_00040054						
Field of study	Mechanical 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		
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Wiesław Kordalski				
	Teachers		dr hab. inż. Wiesław Kordalski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	8.0	0.0	15.0	0.0	0.0	23
	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	23		5.0		22.0	50
Subject objectives	The aim is to present fundamentals of electrical engineering.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U05] is able to plant an experiment within the range of measuring the basic operating parameters of mechanical devices using a specialized equipment, interpret the results and reach the correct conclusions		The student is able to find the necessary information in professional literature, databases and other sources to measure the basic parameters of mechanical devices. The student is able to interpret the measurement results and draw conclusions.		[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		
	[K6_W10] possesses basic knowledge on electronics and electrical engineering		Student has an elementary knowledge of electrical engineering and electronics. Student explains principles of operation of basic electronic circuits such as rectifiers and electronic amplifiers.		[SW1] Assessment of factual knowledge		
Subject contents	Lecture list of topics:						
	1. Fundamentals of circuit analysis. 2. Semiconductors in electronics. 3. Semiconductor sensors: piezoresistors, thermistors, photoresistors, gaussotrons, Hall sensor and pressure sensors. 4. Semiconductor diodes and their applications. 5. Bipolar and field effect transistors: current-voltage characteristics and small-signal transistor models. 6. Rectifiers and suppliers. 7. Signal amplifying. 8. Operational amplifiers. 9. CMOS inverter.						
	Laboratory list of topics:						
	1. Introductory remarks. 2. Measurements of static characteristics of selected semiconductor diodes. 3. Current- voltage characteristics of Zener diodes. 4. Measurements of a input stage of an operational amplifier. 5. Selected applications of the operational amplifier. 6. Negative feedback in amplifiers. 7. Bipolar transistor basic configurations of operation. 8. MOS transistor basic configurations of operation. 9. Power amplifier. 10. Amplifier with resonance circuits.						

Prerequisites and co-requisites	No prerequisites.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture - test written at the end of a term.	50.0%	50.0%
	Laboratory - reports of practical exercises.	50.0%	50.0%
Recommended reading	Basic literature	1. J. Watson: <i>Elektronika</i> , WKiŁ, 2002.  2. P. Horowitz i W. Hill: <i>Sztuka elektroniki</i> , WKiŁ, 1996.  3. M. Polowczyk , A. Jurewicz: <i>Elektronika dla Mechaników</i> , Wyd. PG, 2002.	
	Supplementary literature	1. A. Sedra and K. C Smith: <i>Microelectronic circuits</i> , Oxford, 2007.  2. J. Osowski, J. Szabatin: <i>Podstawy teorii obwodów</i> , t.2, WNT.  3. M. Polowczyk , E. Klugmann: <i>Przyrządy półprzewodnikowe</i> , Wyd. PG, 1996.	
	eResources addresses	Adresy na platformie eNauczanie: ELEKTRONIKA, W/L, MiBM, niestacjonarne, sem.04, letni 21/22, (M: 31918W0) - Nowy - Moodle ID: 27238 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27238">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27238</a>	
	Example issues/ example questions/ tasks being completed	The principle of operation of the MOS transistor.	
Work placement	Not applicable		