



## Subject card

Subject name and code	Introduction to electronics and electrotechnics, PG_00051068						
Field of study	Technical Physics						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
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			Polish		
Semester of study	4	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład właściwości magnetycznych i elektrycznych materiałów -> Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Zbigniew Usarek					
	Teachers	dr hab. inż. Ryszard Barczyński dr inż. Zbigniew Usarek dr inż. Leszek Litzbarski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60
	E-learning hours included: 0.0						
	Address on the e-learning platform: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17758">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17758</a> Adresy na platformie eNauczanie:						
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		60.0	125
Subject objectives	The aim of the course is to teach students the basics of electronics and electrical engineering, as well as basic skills in the design and testing of simple electronic circuits.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_U06	He or she can estimate the cost of purchasing the components needed to build the designed electronic circuit.	[SU2] Assessment of ability to analyse information
	K6_W05	He or she has knowledge about a selected computer program for simulating electrical circuits.	[SW3] Assessment of knowledge contained in written work and projects
	K6_U05	He or she can design and test an analog circuit fulfilling a specific function.	[SU1] Assessment of task fulfilment
	K6_U04	He or she independently plans and performs laboratory measurements of electrical quantities in accordance with the received guidelines. He or she performs a critical analysis of the obtained measurement results and draws conclusions from them.	[SU1] Assessment of task fulfilment
	K6_W07	He or she knows the structure and principle of operation basic instruments for electronic circuit testing.	[SW1] Assessment of factual knowledge
	K6_W06	He or she knows the basic laws governing electronics. He or she distinguishes between the main types of electronic components.	[SW1] Assessment of factual knowledge
Subject contents	<ol style="list-style-type: none"> <li>1. Basic definitions and laws of electricity</li> <li>2. Classification of electronic components</li> <li>3. Resistors</li> <li>4. Coils and capacitors</li> <li>5. Calculation of electronic circuits</li> <li>6. Passive filters</li> <li>7. Semiconductors</li> <li>8. Diodes</li> <li>9. Bipolar transistors</li> <li>10. Field effect transistors</li> <li>11. Other semiconductor elements</li> <li>12. Manufacturing of semiconductor devices</li> <li>13. Amplifiers and feedback</li> <li>14. Integrated circuits</li> </ol>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assessment of the implementation of laboratory exercises	51.0%	20.0%
	Cost estimate for the purchase of elements for the construction of the designed electronic circuit	51.0%	5.0%
	Final exam (90 min.)	51.0%	50.0%
	Report on the simulation of an electrical circuit	51.0%	5.0%
	Test of knowledge about instruments used in testing electrical circuits	51.0%	5.0%
	Assessment of the implementation of the design of an electric circuit fulfilling a specific function	51.0%	15.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. A. Chwaleba, B. Moeschke, G. Płoszajski, Elektronika, WSiP, Warszawa, 1999.</li> <li>2. S. Bolkowski, Elektrotechnika, WSiP, Warszawa, 2006.</li> <li>3. A. Kloskowski, J. Wawer, Ł. Marcinkowski, Podstawy elektrotechniki i elektroniki, Wyd. Politechniki Gdańskiej, Gdańsk, 2015.</li> <li>4. W. Opydo, Elektrotechnika i elektronika dla studentów wydziałów nieelektrycznych, Wyd. Politechniki Poznańskiej, Poznań, 2005.</li> <li>5. Materials published on e-nauczanie: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17758">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17758</a></li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>1. P. Hempowicz et al., Elektrotechnika i elektronika dla nieelektryków, WN-T, Warszawa, 1999.</li> <li>2. P. Horowitz, W. Hill, Sztuka elektroniki 1, WKŁ, Warszawa, 2018.</li> <li>3. M. Polowczyk, A. Jurewicz, Elektronika dla mechaników, Wyd. Politechniki Gdańskiej, Gdańsk 2002.</li> <li>4. R. Śledziwski, Elektronika dla fizyków, PWN, Warszawa, 1982.</li> </ol>	
	eResources addresses		

Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"><li>1. Describe and illustrate Kirchhoff's first law.</li><li>2. Build an RC low pass filter and determine its cut-off frequency.</li><li>3. Design, build and perform tests of a rumble metal detector.</li></ol>
Work placement	Not applicable