

## 关。GDAŃSK UNIVERSITY 创 OF TECHNOLOGY

## Subject card

Subject name and code	Electric Circuits I, PG_00038386								
Field of study	Electrical Engineering								
Date of commencement of studies	October 2021		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	Part-time studies		Mode of delivery			at the university			
Year of study	1		Language of instruction			Polish			
Semester of study	1		ECTS credits			4.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Faculty of Electrical and Control Engineering								
Name and surname	Subject supervisor	supervisor		dr inż. Joanna Wołoszyn					
of lecturer (lecturers)	Teachers		dr inż. Joanna	dr inż. Joanna Wołoszyn					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	10.0	10.0	0.0 0.0			0.0	20	
	E-learning hours included: 0.0								
	Adresy na platformie	eNauczanie:							
Learning activity and number of study hours	Learning activity Participation ir classes include plan		didactic Participation in ed in study consultation hours		Self-study		SUM		
	Number of study 20 hours		6.0			74.0		100	
Subject objectives	Knowledge and understanding of the laws describing electrical circuits. Mastering the methods of analysis of DC and AC electrical circuits.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K6_U04		Student solves linear DC circuits and linear AC circuits, calculates the electrical circuit power balance, calculates the equivalent resistance of the electric circuit and the voltage of the equivalent Thevenin source, simplifies the circuit.			[SU1] Assessment of task fulfilment			
	K6_W03		The student describes the electric circuit based on Kirchhoff's laws, creates a description of the electrical circuit for the node potential method and methods of loop currents, applies the superposition theorem in the electric circuit, creates a phasor diagram of the currents and voltages in the sinusoidal current circuit.			[SW3] Assessment of knowledge contained in written work and projects			
	K6_K05		The student applies the principles of health and safety at work			[SK5] Assessment of ability to solve problems that arise in practice			
Subject contents	Basic concepts in the theory of electrical circuits. Elements of electrical circuits. Ohm's law. Kirchhoff's law. Classification of signals. Joule's law, power and energy. Tellegen theorem, power balance. Methods of solving DC circuits: similarities, superposition, nodal analysis, loop currents and Thevenin's method. AC circuits. The average and RMS value of the signal. The phasor method. Solving AC circuits using the similarity method, superposition, node potentials, loop currents and the Thevenin method. Phasor diagrams. Power in the AC circuits.								
Prerequisites and co-requisites	Knowledge of the Fou	undations of Ma	athematics. Kno	owledge of the	Physics	s at the	secondary sch	ool level.	

Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	Tests during the semester	55.0%	30.0%			
	Examination	55.0%	70.0%			
Recommended reading	Basic literature	<ol> <li>Bolkowski S.: Teoria obwodów elektrycznych. WNT Warszawa 2009.</li> <li>Bolkowski S. <i>at al.</i>: Zbiór zadań z elektrotechniki teoretycznej. WNT Warszawa 2009</li> <li>Horiszny J. <i>at al.</i>: Obwody elektryczne w stanie ustalonym. Zbiór zadań. Wydawnictwo PG. Gdańsk 2005.</li> <li>Kurdziel R.: Podstawy elektrotechniki. WNT Warszawa 1973.</li> </ol>				
	Supplementary literature	<ol> <li>Krakowski M.: Elektrotechnika teoretyczna. T. 1. PWN Warszawa 1999.</li> <li>Mikołajuk K., Trzaska Z.: Elektrotechnika teoretyczna - analiza i synteza elektrycznych obwodów liniowych. PWN Warszawa 1987.</li> </ol>				
	eResources addresses					
Example issues/ example questions/ tasks being completed	<ol> <li>For a given circuit of DC current write equations according to Kirchhoff's laws allowing to solve the circuit.</li> <li>Give the rules for matching the load to the real source of current. What is the efficiency of the circuit under these conditions? Write the appropriate dependencies.</li> <li>For block diagram give an idea of Thevenin method. Provide the necessary assumptions for this method.</li> <li>Give the definition of active power in the AC circuit. Calculate the active power of the load, which voltage and current are described by the formulas: u(t) = Umsin (ωt + a) and i(t) = Im sin (ωt + b). Calculate the active power of the load, in which the voltage and current are periodically changing waveforms.</li> <li>For a given AC circuit create the phasor graph of currents and voltages.</li> </ol>					
Work placement	Not applicable					