GDAŃSK UNIVERSITY 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 of lecturer (lecturers)	Subject supervisor	dr inż. Joanna Wołoszyn	
	Teachers	dr inż. Joanna Wołoszyn	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
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 in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	20	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 Foundations of Mathematics. Knowledge of the Physics at the secondary school level.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tests during the semester	55.0%	30.0%
	Examination	55.0%	70.0%
Recommended reading	Basic literature	1. Bolkowski S.: Teoria obwodów elektrycznych. WNT Warszawa 2009. 2. Bolkowski S. *at al.*: Zbiór zadań z elektrotechniki teoretycznej. WNT Warszawa 2009 3. Horiszny J. *at al.* : Obwody elektryczne w stanie ustalonym. Zbiór zadań. Wydawnictwo PG. Gdańsk 2005. 4. Kurdziel R.: Podstawy elektrotechniki. WNT Warszawa 1973.	
	Supplementary literature	1. Krakowski M.: Elektrotechnika teoretyczna. T. 1. PWN Warszawa 1999. 2. Mikołajuk K., Trzaska Z.: Elektrotechnika teoretyczna - analiza i synteza elektrycznych obwodów liniowych. PWN Warszawa 1987.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. For a given circuit of DC current write equations according to Kirchhoff's laws allowing to solve the circuit. 2. 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. 3. For block diagram give an idea of Thevenin method. Provide the necessary assumptions for this method. 4. 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: $u(t) = U_m \sin(\omega t + a)$ and $i(t) = I_m \sin(\omega t + b)$. Calculate the active power of the load, in which the voltage and current are periodically changing waveforms. 5. For a given AC circuit create the phasor graph of currents and voltages.		
Work placement	Not applicable		