

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electric Circuits II, PG_00024115								
Field of study	Electrical Engineering								
Date of commencement of studies	October 2025		Academic year of realisation of subject			2025/2026			
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			5.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Faculty Of Electrical And Control Engineering -> Wydziały Politechniki Gdańskiej								
Name and surname	Subject supervisor	dr inż. Joanna Wołoszyn							
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	t	Seminar	SUM	
	Number of study hours	30.0	30.0	0.0	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		8.0		57.0		125	
Subject objectives	Mastering the properties and methods of analysis of the phenomena in coupling magnetic circuit. Mastering the properties and methods of analysis of nonlinear circuits DC. Mastering the properties and methods of analysis of active circuits containing operational amplifiers. Knowledge properties and mastery of methods of analysis of three-phase circuits, symmetrical and non symmetrical , including systems for power and energy measurement. Mastering properties and methods of analysis the periodic non-sinusoidal circuit.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K6_U04		Is able to provide and apply the method and method of mathematical description of the analyzed electrical system.			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools			
	K6_W03		He can solve exemplary tasks from electrical circuits and evaluate the correctness of the solution.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects			
	K6_K05		Is able to assess the threat resulting from the condition and parameters of the electrical system.			[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice			

Subject contents	LECTURES The air-core transformers and transformers with ferromagnetic core. Electrical circuits containing transformers. The analysis of nonlinear circuits DC. Circuit active. Feedback. Operational amplifier. The basic functional circuits with operational amplifiers. The analysis of circuits with operational amplifiers. The analysis of circuits with operational amplifiers. The methods of power and energy measurements in symmetrical circuits. Solving symmetric three-phase circuits. The methods of power and energy measurements in symmetrical circuits. Solving symmetric three-phase circuits. Symmetrical three-phase short circuit. No symmetrical three-phase circuits the methods of analysis. The power in the three-phase no symmetrical circuits. Methods for power and energy measurements in no symmetrical circuits. Linear transformations in three-phase circuits - the method of symmetrical components 0, 1, 2. No sinusoidal periodical signals. Fourier transform and Fourier integrals. Simple and opposite transform. Characteristic of amplitude and phase. Parseval s theorems. Rms. The power in the periodical no sinusoidal signals. Develop a signal in the Fourier series. The electric circuit with periodic no sinusoidal sources. Frequency analysis.						
Prerequisites and co-requisites	Knowledge of the subject Mathematics (04 11 10 02 08). Knowledge of the subject Electrical circuits (04 11 10 01 16)						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Written exam	60.0%	65.0%				
	Midterm colloquium	60.0%	35.0%				
Recommended reading	Basic literature 1. Bolkowski S.: Teoria obwodów elektrycznych. WNT Warszawa 2009 2. Bolkowski S. i in. : Zbiór zadań z elektrotechniki teoretycznej. WNT Warszawa 2009 3. Cichocki A. i in. : Zbiór zadań z elektrotechniki teoretycznej. PWN Warszawa 1985 4.Horiszny J. i in. : Obwody elektryczne w stanie ustalonym. Zbiór zadań. Wydawnictwo PG. Gdańsk 2005. 5. 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 Adresy na platformie eNauczanie:						
Example issues/ example questions/ tasks being completed	 Give the equivalent scheme of a transformer with a ferromagnetic core. Explain with which the physical behomena in the transformer arise individual elements of the equivalent scheme. What the ratings data are given for the transformer iron-core? For a given ratings data calculate a nominal transformer equivalent scheme parameters. Solve the given nonlinear circuit DC. Determine of the static resistance, dynamic resistance and the inearized equivalent scheme of a nonlinear element at the point of work. Give the scheme and derive the formula for the characteristic amplitude (ratio U2/U1) of the following systems containing operational amplifier: a) voltage controlled voltage source inverting and non-inverting, b) the differentiator, c) integrator. For two basic circuits of a symmetrical 3-phase derive the relationship between the phase and wire surrents and the phase and wire voltages. Provide the appropriate size of the phasor graphs. Remove formulas for active power, reactive power and apparent powwer in a symmetrical 3-phase system. Solve the given 3-phase symmetrical circuit. Solve the given 3-phase symmetrical						
Work placement	Not applicable						

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