

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electric Circuits, PG_00045972								
Field of study	Electrical Engineering								
Date of commencement of studies	February 2024		Academic year of realisation of subject			2023/2024			
Education level	second-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	1		ECTS credits			2.0			
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 hab. inż. Jacek Horiszny								
of lecturer (lecturers)	Teachers		dr hab. inż. Jacek Horiszny						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory Projec		t	Seminar	SUM	
	Number of study hours	15.0	0.0	15.0 0.0		0.0 30		30	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity Participation ir classes include plan		n didactic ed in study	Participation in consultation hours		Self-study S		SUM	
	Number of study 30 hours			10.0		10.0		50	
Subject objectives	Obtaining skills in the use of integral transformations in the theory of electrical circuits: Laplace transforms for the analysis of circuits in the transition state, Fourier transforms in the frequency analysis of circuits, as well as skills in the use of the PSPICE simulation program for the analysis of electrical circuits.								
Learning outcomes	Course outcome		Subject outcome Method of verification						
	K7_W01		knows the basics of the Lapalce transform and Fourier transform, is able to describe an electric circuit in the domain of the operator variable and calculate inverse transforms, is able to calculate frequency spectra of electrical signals			[SW3] Assessment of knowledge contained in written work and projects			
	K7_K02		understands the importance of transient processes in electrical systems, their causes and effects			[SK4] Assessment of communication skills, including language correctness			
	K7_U06		is able to build a model of an electrical system in mathematical form and in a computer simulation environment, is able to set boundary conditions, simulate the system, verify and interpret the results			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task			
Subject contents	Analysis of transient states using the operator method: basics of the Laplace transform, transform of a differential equation, calculation of free and forced response for first and second order equations, inverse transform, operator impedance, Kirchhoff's laws in the operator form, initial conditions in the operator method. Frequency analysis: Fourier series, basics of Fourier transform, spectrum of aperiodic signal, discrete Fourier series, discrete Fourier transform.								
Prerequisites and co-requisites	Knowledge of electrical circuits at the first degree level course.								
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade			
	tasks for the laboratory		55.0%			30.0%			
	written exam		55.0%			70.0%			

Recommended reading	Basic literature	 Bolkowski S.: Teoria obwodów elektrycznych. WNT Warszawa 2012. Osiowski J., Szbatin J.: Podstawy teorii obwodów elektrycznych. WNT warszawa 1998. Papoulis A.: Obwody i układy. WKiŁ Warszawa 1988 				
	Supplementary literature	1. Chua L.O., Pen-Min Lin: Komputerowa analiza układów elektronicznych. WNT Warszawa 1981.				
	eresources addresses	Adresy na platformie eNauczanie: OBWODY ELEKTRYCZNE [ET][2023/24] - Moodle ID: 35963 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35963				
Example issues/ example questions/ tasks being completed	 Calculate the transient current in a given RC, RL or RLC circuit powered by direct or sinusoidal voltage based on the solution of the differential equation using the operator method. Calculate the transient current in a given RC, RL or RLC circuit powered by direct or sinusoidal voltage based on the Laplace equivalent diagram. Expand the periodic current (voltage) waveform into a Fourier trigonometric series. Expand the periodic current (voltage) waveform into a complex Fourier series. Calculate the amplitude and phase spectrum of a continuous signal. Calculate the amplitude and phase spectrum of a discrete signal. 					
Work placement	Not applicable					

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