



Subject card

Subject name and code	, PG_00032457						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Electrical Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Adam Młyński				
	Teachers		dr inż. Adam Młyński				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	30.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 7144 OBWODY ELEKTRYCZNE III [ET][2026/27] https://enauczanie.pg.edu.pl/2025/course/view.php?id=7144						
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	45		0.0		0.0	45
Subject objectives	The aim of the course is to obtain competence in the analysis of electrical circuits non-sinusoidal periodic excitations and electric circuits in transient states time domain. To familiarize students with phenomena in electrical circuits with parameters distributed and their analysis using the method of equivalent schemes.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U04		The student is able to describe phenomena in electrical circuits in frequency domain. The student is able to solve problems in electrical circuits transient states using the method differential equations.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W03		The student is able to describe circuits in states transients determined by the equation method differential. The student can describe long line and explain and analyze phenomena in line using the method replacement schemes.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	K6_K05		The student is able to assess the impact of states transition to opportunities the formation of overvoltages switching. The student is able to assess threats to technical devices.		[SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Course content – lecture		
	Non-sinusoidal periodic signals. Fourier transform. Fourier series expansion of the signal. . The effective value of the signal. Powers in periodic non-sinusoidal circuits. Analysis of circuits with non-sinusoidal periodic excitations. Frequency analysis. Description of electric circuits in transient states in the time domain. Solving circuits of order I and II in transient states with constant, sinusoidal and complex excitations. Description of circuits with distributed parameters (long lines) in the time domain. Incident and reflected waves. Conditions at the end of a long line. Analysis of phenomena in a long line using the method of equivalent diagrams.		
	Course content – exercises		
	Practical aspects and examples of calculations for circuits containing excitations with periodic non-sinusoidal signals, calculations of RMS values and power in such circuits. Practical aspects and examples of calculations for circuits in transient states in the time domain. Solving circuits of order I and II in transient states with constant, sinusoidal and complex excitations. Analysis of circuits with distributed parameters using the equivalent circuit method.		
Prerequisites and co-requisites	Knowledge of the subjects: Mathematics and Electrical Circuits, semesters I and II.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam	60.0%	55.0%
	Tests during the semester	60.0%	45.0%
Recommended reading	Basic literature	1. Bolkowski S.: Teoria obwodów elektrycznych. WNT, Warszawa 2009 2. Skiba A.; Tiliouine H.: Stany nieustalone w obwodach elektrycznych. Przykłady i zadania. Wydawnictwo PG. Gdańsk 2022 3. Bolkowski S. i in. : Zbiór zadań z elektrotechniki teoretycznej. WNT, Warszawa 2009 4. Krakowski M.: Elektrotechnika teoretyczna, tom. 1. PWN, Warszawa 1999 5. Cichocki A. i in. : Zbiór zadań z elektrotechniki teoretycznej. PWN, Warszawa 1985 6. Horiszny J. i in. : Obwody elektryczne w stanie ustalonym. Zbiór zadań. Wydawnictwo PG. Gdańsk 2005	
	Supplementary literature	1. Kurdziel R.: Podstawy elektrotechniki. WNT, Warszawa 1973. 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. Derive formulas determining the average and RMS value of a signal expressed in a series Fourier. 2. Solve the given circuit whose forcing is expressed in the form of a Fourier series. Calculate the average value and the RMS value of the given voltage or current waveform. 3. Using the example of a series RL circuit connected to a sinusoidally alternating source, the emf should be determined in under what conditions there will be no periodic component in the transition state in the solution. What is the maximum value of the so-called surge current may occur in this case? 4. For the given "first order" circuit, write the differential equation and determine the initial conditions. 5. Determine the indicated parameter in the given "second order" circuit (R, L or C) so that in the transient state it started to vibrate. 6. What condition should be met so that when the wave reaches the end of the long line there is no reflected wave? Provide justification		
Practical activities within the subject	Not applicable		

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