



Subject card

Subject name and code	Electric Circuits III, PG_00026206						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
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	Katedra Elektrotechniki i Inżynierii Wysokich Napięć -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Adam Młyński				
	Teachers						
Lesson types and methods of instruction	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						
Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17026							
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		7.0		48.0	100
Subject objectives	Mastering the analysis of electrical circuits with periodic non-sinusoidal source. Mastering the analysis of electrical circuits in transient states in the time and method of operators. Understanding the phenomena in electrical circuits with distributed parameters and their analysis by substitution schemas.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W03		The student solves phenomenon in electrical circuits in the frequency domain. The student solves circuit transients using differential equations and The student describes the long line, explains and analyzes the phenomenon in the line by substitute schemas.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	K6_U04		The student analyzes phenomena in electric circuits in the frequency domain. The student explains and solves circuits in transient states using the differential equations method		[SU1] Assessment of task fulfilment		
	K6_K05		The student assesses the impact of transient formation of the possibility of switching overvoltage. Risk assessment for technical devices.		[SK5] Assessment of ability to solve problems that arise in practice		
Subject contents	Non-sinusoidal periodic signals. Fourier transform and Fourier integral. Develop signal to Fourier series. . Amplitude and phase characteristics. Effective value of signal. Powers of periodic non-sinusoidal circuits. Analysis of circuits with periodic non-sinusoidal excitations. Frequency analysis of circuits. Description of electrical circuits transients in the time domain. Solving circuits I and II orders of equation in transients at constant, sinusoidal and complex excitations. Replacement schemes of electrical circuits. Solutions d'Alambert long line equations. Incident and reflected waves. Conditions at the end of a long line. Analysis of developments in the long line method substitute schemas.						

Prerequisites and co-requisites	Knowledge of the subject Foundations of Mathematics (04 11 10 01 07) Knowledge of the subject Mathematics (04 11 10 02 08) Knowledge of the subject Electrical circuits (04 11 10 01 16)		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam	60.0%	55.0%
	Midterm colloquium	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	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	1. Take the formulas determining the mean value and the effective signal expressed by a Fourier series. 2. Solve the given circuit, the force is expressed in the form of a Fourier series. Calculate the mean value and the effective value of the specified voltage or current signals. 3. For the RL series circuit being connected to a source of alternating sinusoidal SEM to determine the conditions the transition state in solution does not occur component. That the maximum value of the so-called "inrush current" may occur in this case? 4. For a given "first order" circuit write the differential equation and determine the initial conditions. 5. Determine the specified parameter in the given circuit "second order" (R, L or C) to be able to transition occurred in the oscillations. 6. What should be the condition that the wave reaches the end of a long line, there was no reflected wave? Give reasons.		
Work placement	Not applicable		