

## 关。GDAŃSK UNIVERSITY 创 OF TECHNOLOGY

## Subject card

Subject name and code	The fundamentals of electrotechnics 2, PG_00042012								
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering								
Date of commencement of studies	October 2020		Academic year of realisation of subject			2021/2022			
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study			
						research in the field of study			
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			3.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Faculty of Electrical and Control Engineering								
Name and surname	Subject supervisor		dr hab. inż. Jacek Horiszny						
of lecturer (lecturers)	Teachers		dr hab. inż. Jacek Horiszny						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory Project		t	Seminar	SUM	
of instruction	Number of study hours	15.0	0.0	15.0	0.0		0.0	30	
	E-learning hours included: 0.0								
	Adresy na platformie eNauczanie:								
Learning activity and number of study hours	Learning activity Participation ir classes include plan		I didactic         Participation in           ed in study         consultation hours		Self-study SUM				
	Number of study hours	30		3.0		42.0		75	
Subject objectives	Characteristics of three-phase unbalanced systems, familiarization with power measurement methods in symmetrical and unbalanced 3-phase systems, methods of analysis of nonlinear circuits, familiarization with basic electronic components and systems, analysis of transient circuits, analysis of circuits powered by periodic non-sinusoidal voltages.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K6_K02		can work in a team that compiles and connects the elements of an electric circuit, measures electrical quantities, prepares reports and protocols on measurements			[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills [SK3] Assessment of ability to organize work			
	K6_W03		is able to analyze electrical circuits in dynamic states, describes circuits with differential equations, solves transient circuits described by first and second order equations, knows and understands the principle of operation of basic electronic components, analyzes non-linear circuits with electronic elements			[SW3] Assessment of knowledge contained in written work and projects			
	K6_W05		defines a three-phase circuit, determines symmetry conditions, solves simple three-phase circuits, analyzes the consequences of asymmetry of a three-phase circuit, recognizes systems for measuring active and reactive power in three-phase circuits, solving simple circuits with periodic non-sinusoidal supply			[SW3] Assessment of knowledge contained in written work and projects			

Subject contents	Three-phase circuits: unbalanced systems, power measurements in three-phase systems. Nonlinear DC circuits: linearity and non-linearity of elements and circuits, methods of analysis, iterative methods, linearization, basics of semiconductor elements operation, basic electronic components, simple electronic circuits. Transients in linear circuits: classical method of transient state analysis, forced and free components, initial conditions, circuits described by a differential equation of the first and second order. Circuits powered by periodic non-sinusoidal voltages: Fourier series, application of the superposition method, power of non-sinusoidal currents						
Prerequisites and co-requisites	Knowledge of the DC circuits theory and the theory of single-phase and three-phase symmetrical circuits						
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Written exam	55.0%	70.0%				
	Midterm colloquium	55.0%	30.0%				
Recommended reading	Basic literature	Bolkowski S.: Elektrotechnika teoretyczna. Vol 1. Teoria obwodów elektrycznych. WNT, Warszawa 2001 Krakowski M.: Elektrotechnika teoretyczna. Tom 1. PWN, Warszawa 1999					
	Supplementary literature	Cholewicki T.: Elektrotechnika teoretyczna. Vol 1 i 2. WNT, Warszawa 1972					
	eResources addresses						
Example issues/ example questions/ tasks being completed	<ol> <li>Calculate current and power in given symmetrical three-phase circuit with star-connected load.</li> <li>Calculate current and power in given symmetrical three-phase circuit with delta-connected load.</li> <li>Calculate current and power in given three-phase four-wire circuit with asymmetrical star-connected load.</li> <li>Calculate current and power in given three-phase three-wire circuit with asymmetrical star-connected load.</li> <li>Calculate current and power in given three-phase three-wire circuit with asymmetrical star-connected load.</li> <li>Calculate current and power in given three-phase three-wire circuit with asymmetrical delta-connected load.</li> <li>Calculate currents and power in given three-phase three-wire circuit described by first-order differential equation.</li> <li>Calculate currents and voltages in the transient state of the circuit described by second-order differential equation.</li> </ol>						
	8. Calculate current in a simple circuit with periodic non-sinusoidal supply.						
Work placement	Not applicable						