



Subject card

Subject name and code	The fundamentals of electrotechnics 1, PG_00042001						
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			2020/2021		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study		
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			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Horiszny					
	Teachers	dr hab. inż. Jacek Horiszny dr inż. Andrzej Skiba					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0 Adresy na platformie eNauczenie:						
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		5.0		25.0	75
Subject objectives	Providing the definition of basic concepts in electrical engineering on the basis of the theory of electromagnetic field. Presentation of methods of calculating capacitance, inductance, resistance, induced voltage. Acquainting with the methods of analysis of electric circuits and the phenomena occurring in them.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W05	defines potential, voltage, electric current, electric capacity, self and mutual inductance, resistance; calculates the capacity of flat and cylindrical capacitors, mutual inductance of circuits, resistance of conductors and earth electrodes, voltages induced by magnetic flux; solves simple linear DC circuits; solves simple linear 1-phase and 3-phase sinusoidal current circuits; explains the phenomenon of electrical resonance.			[SW3] Assessment of knowledge contained in written work and projects		
	K6_K02	recognizes the potential exposures and hazards occurring in electrical systems			[SK5] Assessment of ability to solve problems that arise in practice		
	K6_W03	calculates parameters of equivalent circuits for elements of the power system			[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Elements of the electromagnetic field theory: electrostatic field, Coulombs law, electric field intensity and electric potential, electric capacity. Electric field of DC currents: resistance of a conductor, earthing. Magnetic field: magnetic field intensity and magnetic induction, self and mutual inductance, electromagnetic induction. Linear DC circuits: electric circuit components, energy and power of electric current, Kirchhoffs laws, superposition, Thevenins theorem. AC circuits: ideal R, L, C components in the AC circuit, phasor solution, complex impedance, complex Kirchhoffs laws, phasor diagrams, active, reactive and complex power, complex Thevenin theorem, symmetrical 3-phase circuits, circuits with magnetic coupling, transformer.						
Prerequisites and co-requisites	Basic knowledge of integral calculus and differential calculus. Basic knowledge of electromagnetism at the high school level.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	55.0%	33.0%
	Written exam	55.0%	67.0%
Recommended reading	Basic literature	Bolkowski S.: Elektrotechnika teoretyczna. Tom 1. Teoria obwodów elektrycznych. WNT, Warszawa 2001 Krakowski M.: Elektrotechnika teoretyczna. Tom 1. PWN, Warszawa 1999	
	Supplementary literature	Cholewicki T.: Elektrotechnika teoretyczna. Tom 1 i 2. WNT, Warszawa 1972	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Define the electric capacitance. 2. Calculate the capacitance of flat and cylindrical condenser. 3. Calculate the currents in DC circuit. 4. Calculate the currents in AC circuit. 5. Calculate the currents in symmetrical 3-phase circuit 6. Calculate the resonant frequency of circuit. 		
Work placement	Not applicable		