GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electrodynamics, PG_00055901		
Field of study	Power Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
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	15.0	0.0	0.0	0.0	30

E-learning hours included: 0.0

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	30	2.0	18.0	50

Subject objectives

Familiarizing students with the phenomena occurring in the electromagnetic field and methods of their description

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	Student is able to calculate the parameters of electrical systems (resistance, inductance, capacitance), electrodynamic forces, induced voltages.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W05] has structured knowledge in the field of electrical engineering and electronics, necessary to understand the basics of operation and selection of electrical machines, electricity transmission systems and power electronic devices	Student knows and understands the concepts of: electric voltage, electric current, resistance, self and mutual inductance, electric capacitance, inducing voltages	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Electrostatics: Coulomb's law, quantities describing the electric field, Gauss's law, Maxwell's laws for electrostatics, electrostatic properties of the environment, electric capacity. Electric flow field: quantities describing the flow field, Maxwell's laws in a conductive environment, electrical properties of the environment, resistance of conductors and earthing. Magnetostatics: Ampere's law, quantities describing the magnetic field, Biot's and Savarte's laws, Maxwell's laws for magnetostatics, self and mutual inductance, magnetic properties of the environment, magnetic circuits, electrodynamic forces. Faraday's law.

Prerequisites and co-requisites

Knowledge of vector calculus. Ability to calculate derivatives of functions of many variables. Knowledge of the concept of linear, surface and volume integrals.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	55.0%	100.0%

Recommended reading

Basic literature

1. Sadiku M. : Elements of Electromagnetics. Oxford University Press, 2006

2.Griffiths D.J.: Fundamentals of Electrodynamics.

	Supplementary literature	1. Feynman R.P., Leighton R.B., Sands M.: Feynman Lectures on Physics (Volume II)
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Calculate the distribution of the electric field strength from the given system of point charges. 2. What condition should the dimensions of the coaxial cable meet so that the maximum electric field strength in the cable is minimal. 3. Calculate the capacitance of a single-core, coaxial cable of length l, whose core diameter is d, the inner diameter of the shield D, and the relative permittivity of the dielectric is, if necessary, 4. Calculate the leakage rate of a coaxial cable of length l, whose core diameter is d, the inner diameter of the shield D, and the insulation conductivity is s.	
Work placement	Not applicable	