GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electrodynamics, PG_00037300		
Field of study	Technical Physics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Optional subject group 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Katedra Fizyki Atomowej i Luminescencji -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor		
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	0.0	0.0	0.0	60

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	60	5.0	60.0	125

Subject objectives

Understand electrodynamics basics

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] analyzes and solves simple scientific and technical problems, based on possessed knowledge, using analytical, numerical, simulation and experimental methods	Student is able to use appropriate tools to solve basic problems in the field of electrodynamics.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information
[K6_W02] has systematized knowledge of the basics of physics, including mechanics, thermodynamics, electricity and magnetism, optics, atomic and particle physics, solid-state physics, nuclear and elementary particle physics	Well-organized knowledge of electrodynamics basics.	[SW1] Assessment of factual knowledge

Subject contents

Electrostatics in vacuum. Scalar potential. Boundary conditions. Gauss law. Poisson, Laplace equations. Multipole expansion. Electric field in medium. Boundary conditions. Anisotropic dielectrics. Stationary magnetic field in vacuum. Ampere's law. Vector potential, Poisson equation. Biot-Savart law. Continuity equation. Magnetic moment. Magnetostatics in medium. Boundary conditions. Anisotropic magnetics. Law of e-m induction. Maxwell's equations. Potentials of e-m field. Gauging. D'Alambert equation. Energy density and flux. Poynting vector. E-m field momentum. Maxwell stress tensor. E-m waves in homogenous and isotropic media. Monochromatic plane wave. Polarisation. Plane e-m wave in a conducting medium. Reflaction and refraction.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Practical exercise	50.0%	50.0%
Written exam	50.0%	50.0%

Recommended reading	Basic literature	J.D. Jackson. Elektrodynamika klasyczna. PWN, Warszawa-1982. D.J. Griffiths, Podstawy elektrodynamiki, PWN, Warszawa 2001 L.A. Wainstein Fale Elektromagnetyczne PWN, Warszawa 1965. W. Batygin , L. Toptygin, Zadania z elektrodynamiki , PWN, Warszawa 1975
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Mulitpole expansion	
Work placement	Not applicable	

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