



Subject card

Subject name and code	Electrodynamics, PG_00037300						
Field of study	Technical Physics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
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	Department of Atomic, Molecular and Optical Physics -> Faculty of Applied Physics and Mathematics						
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_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		
	[K6_U02] Can analyze and solve 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		
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'Alembert 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. Reflection 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	Multipole expansion
Work placement	Not applicable	