GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electrodynamics, PG_00067031		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Microwave and Antenna Engineering -> Faculty of Electronics Telecommunications and Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Piotr Kowalczyk	
	Teachers	dr hab. inż. Piotr Kowalczyk dr hab. inż. Rafał Lech	

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

Presentation of the basic phenomena relating to electrostatic fields, magnetostatic fields and electromagnetic fields taking place in a free space and different media.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] can perform tasks related to the field of study in an innovative way as well as solve complex and nontypical problems, applying knowledge of physics, in changing and not fully predictable conditions	Student is able to study the properties of static and electromagnetic fields in various coordinate systems, determine the fields in the interface between different media, calculate the power balance.	[SU4] Assessment of ability to use methods and tools
[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	The student knows the laws of electrodynamics, properties of fields in the interface between different media, power balance and electromagnetic waves properties.	[SW1] Assessment of factual knowledge

Subject contents	1: Coulomb's Law2: Electric Field Intensity3: Integral Calculus and Continuous Charge Distribution4: Field Intensity Generated by Continuous Charge Distribution5: Flux, Divergence and Gauss-Ostrogradsky Theorems6: Gauss's Law7: Voltage, Current and Electrical Resistance8: Work and Power of Electric Current and the Relationship Between Electric Field Intensity and Potential9: Electric Capacitance10: Magnetic Field and Lorentz Force11: Biot-Savart Law and Ampère's Law12: Rotation, Stokes' Theorem and Local Ampère's Law13: Electromagnetic Induction, Concept of Inductance14: Mutual Inductance and Global and Local Faraday's Law15: Maxwell's Hypothesis and Equations; Electromagnetic Waves
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
	50.0%	40.0%
	50.0%	60.0%

Recommended reading	Basic literature	1. W. Zieniutycz "Podstawy pól i fal elektromagnetycznych" Wydawnictwo PG 2022 2. P. Kowalczyk, R. Lech, W. Zieniutycz: Podstawy elektromagnetyzmu w zadaniach, skrypt PG 2007. 3. David J. Griffiths: Podstawy elektrodynamiki, PWN, Warszawa, 2001. 4. Materials available in the related course on the eNauczanie platform
	Supplementary literature	D. K. Cheng: Fields and waves Electromagnetics, Addison-Wesley Publishing Company, 1983
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Give the formula (in integral and differential form) and discuss Gauss's law 2. Give the formula (in integral and differential form) and discuss Faraday's law of induction 3. Give the formula (in integral and differential form) and discuss Ampere's law	
Work placement	Not applicable	

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