GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electricity and magnetism, PG_00051065		
Field of study	Technical Physics		
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 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	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ryszard Barczyński	
	Teachers	dr inż. Kacper Dzierzgowski dr hab. inż. Ryszard Barczyński dr inż. Tadeusz Miruszewski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	45.0	0.0	0.0	0.0	75

E-learning hours included: 0.0

Adresy na platformie eNauczanie:
Elektryczność i Magnetyzm - Moodle ID: 12652
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12652
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https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12652

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	75	5.0	70.0	150

Subject objectives

The aim to to teach students basics of electricity and magnetism.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U01	* Student calculates forces between charges. . * Student explains the terms of current intensity and current density * Student calculates electric circuits parameters. * Student describes mechanisms of conductivity.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
K6_W01	Student describes motion of charges in magnetic field. * Student explains Biot-Savart and Ampere laws. * Student explains Maxwell equations. * Student analyses properties of electromagnetic waves. * Student explains influence of matter on electric and magnetic fields.	[SW1] Assessment of factual knowledge
K6_W02	* Student knows properties of electric charge. Student Student calculates forces between charges. * Student applies Gauss low for electric field calculations. * Student explains the terms of potential and capacitance	[SW1] Assessment of factual knowledge

Subject contents

* Charges, Culomb law, electric field. * Elektric flux, Gauss law. * Electric potential and tension. Conductors in electric field. * Capacitance and capacitors. * Direct electric current. Current intensity and current density. * Mikroscopic model of conduction. Ohma and Joule-Lenz laws. * Currenst sources, electromotive force, Kirchhoff laws. * Mechanisms of conductivity, electric current in gasses, electrolytes, electrolysis. * Eelctric field, Lorenz force, magnetic induction vector (B-field). * Electric motor; motion of charges in magnetic field, mass spectrometer, cyclotron; Hall effect, aurora borealis. * Magnetic field of electric currents; Biot-Savart and Ampere laws. * Faraday law of electromagnetic induction. Lenz law. Electric power generator. * Alternating current in RLC circuit. * Displacement current.Równania Maxwell laws. Electromagnetic wave properties. * Electric and magnetic field in matter. Dielectric polarization. Diamagnetics, paramagnetics, ferromagnetics. * Superconductivity.

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	51.0%	50.0%
Midterm colloquium	51.0%	50.0%

Recommended reading

Basic literature	Podstawowy podręcznik: Dawid Halliday, Robert Resnick, Jearl Walker, Podstawy Fizyki, tom 3, PWN, Warszawa 2006. Władysław Bogusz, Jerzy Garbarczyk i Franciszek Krok, Podstawy fizyki, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2010. Zygmunt Kleszczewski, Fizyka Klasyczna. Skrypt Politechniki Śląskiej. Władysław Tomaszewicz, Przemysław Ciesielski, Elektryczność i magnetyzm. http://www.mif.pg.gda.pl/kfze/wyklady/wyklady.html http://www.mif.pg.gda.pl/homepages/jasiu/stud/EiM/index.html
Supplementary literature	No requirements
eResources addresses	Elektryczność i Magnetyzm - Moodle ID: 12652 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12652 Elektryczność i Magnetyzm - Moodle ID: 12652 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12652

Example issues/ example questions/ tasks being completed

State Gauss law for electric field and give an example of its application.

Work placement

Not applicable