GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electricity and magnetism, PG_00062714		
Field of study	Technologies for Industry 5.0		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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 none
Semester of study	1	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Division Of Ceramics -> Institute Of Nanotechnology And Materials Engineering -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Tadeusz Miruszewski	
	Teachers	dr inż. Tadeusz Miruszewski	

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	85.0	150

Subject objectives

The aim of the course is to familiarize students with the basic issues related to electricity and magnetism, with particular emphasis on the application of theoretical aspects in industry.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W01] demonstrates knowledge and understanding of mathematics, physics, chemistry and IT tools at the level necessary to formulate and solve typical engineering and technological problems	The student has knowledge of issues related to electricity and magnetism with a view to using them in his future professional work	[SW1] Assessment of factual knowledge
[K6_K01] is aware of the need to constantly update and enrich knowledge and practical skills, and improve professional, personal and social competences	The student has extended and deepened knowledge of electrostatics, direct current and magnetism	[SK2] Assessment of progress of work
[K6_U01] applies knowledge of mathematics, physics, chemistry, IT tools and other engineering disciplines to solve theoretical, engineering and technological problems	Understands the need to update knowledge regarding electrical and magnetic phenomena.	[SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td>Electrostatics1. Electric charge2. Electric field3. The concept of electric potential and electric field intensity4. CapacitorsDirect current1. Definitions of physical quantities2. Microscopic description of electric current3. Ohm's law4. Kirchhoff's laws5. Joule-Lenz law6. Elements of electrical circuits7. Elements of electrical engineeringA magnetic field1. Definitions of physical quantities2. Gauss's law for the magnetic field3. Biot-Savart law4. Ampere's law5. Magnetic properties of solidsElectromagnetic induction. AC1. Coil2. Faraday's law of induction3. Lenz's rule4. Mutual and self-induction5. Alternating current - definition of physical quantities6. RLC systems</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lecture</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Excercises</td><td>50.0%</td><td>50.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>[1] M.Herman, A.Kalestyński, L.Widomski, Podstawy Fizyki dla kandydatów na wyższe uczelnie i studentów, WN PWN, Warszawa

[2] J. Massalski, M. Massalska Fizyka dla Inżynierów, WNT Warszawa

[3] D.Halliday, R.Resnick, J.Walker, Podstawy Fizyki, PWN, Warszawa

[4] Fizyka dla szkół wyższych, Tom 2, wyd. OpenStax Polska</td></tr>
<tr><td>Supplementary literature</td><td>As above.</td></tr>
<tr><td>eResources addresses</td><td>Uzupełniające
Adresy na platformie eNauczanie:</td></tr>
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</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Describe Coulomb's law for point charges.Give the definition of electric field intensity, list the types of electric fields with drawings of the fields.Give Gauss's law for the electrostatic field and its application in one selected case.Direct electric current (DC) provide the definition and conditions of flow of electric current.State and explain Ohm's law and Kirchhoff's law in direct current circuits.Describe the magnetic properties of solids.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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