GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electrodynamics, PG_00038434		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Katedra Elektrotechniki i Inżynierii Wysokich Napięć -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Adam Młyński	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	15.0	0.0	0.0	60

E-learning hours included: 0.0

Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16952

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	10.0	55.0	125

Subject objectives

Understanding the fundamental rights of electromagnetic fields. Ability to apply the calculation of the electromagnetic field with technical problems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W03	The student is able to perform engineering calculations of the electromagnetic field and use peripheral models.	[SW1] Assessment of factual knowledge
K6_K05	The student is able to assess the influence of the electromagnetic field on living organisms and technical devices. The student knows the dangers associated with strong electromagnetic fields	[SK5] Assessment of ability to solve problems that arise in practice
K6_U04	The student is able to apply the known methods to calculate the electromagnetic field and use peripheral models.	[SU4] Assessment of ability to use methods and tools
K6_W02	The student knows how to describe electric and magnetic fields, the student can describe the phenomena occurring in the electric and magnetic fields.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

Electrostatics: Coulomb's law, Gauss law, electric field and potential, conductor in an electric field, capacitance of various systems lining and wires, dielectrics, polarization, dielectric multilayer, insulation electric strength. Field of the flow current, resistance conductors with different shapes. Magnetostatics: Ampères law, magnetic flux density, Biot-Savarts law, coefficient of self and mutual inductance, dia-, para- and ferromagnetic, mag-netization curve, magnetic circuits, forces. Faradays law, induced and rotational electromotive force, skin and proximity effect.

Prerequisites and co-requisites

Knowledge of vector algebra. Learn how to calculate derivatives of functions of several variables. Understand the concept of integral linear, surface and volume.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>The written examination</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Midterm colloquium</td><td>60.0%</td><td>25.0%</td></tr>
<tr><td>Reports on laboratory exercises</td><td>60.0%</td><td>25.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Zahn M.: Pole elektromagnetyczne. PWN Warszawa 1989
Griffiths D.J.: Podstawy elektrodynamiki. PWN Warszawa 2001
Krakowski M: Elektrotechnika teoretyczna. Pole elektromagnetyczne, tom 2. PWN, Warszawa 1980
Piątek Z., Jabłoński P.: Podstawy teorii pola elektromagnetycznego. WNT, Warszawa 2010
Sikora R.: Teoria Pola Elektromagnetycznego. WNT, Warszawa 1997
Sikora J., Skoczylas J., Sroka J., Wincenciak S.: Zbiór zadań z teorii pola elektromagnetycznego. Oficyna Wyd. Politechniki Warszawskiej. Warszawa 2004
Zimny P.: Wykłady z elektrodynamiki technicznej. www.ely.pg.gda.pl/tiwe.</td></tr>
<tr><td>Supplementary literature</td><td>Feynman R.P., Leighton R.B., Sands M.: Feynmana wykłady z fizyki (tom II). PWN Warszawa 2001
Kurdziel R.: Podstawy elektrotechniki. WNT, Warszawa 1965
Rawa H.: Podstawy elektromagnetyzmu. Wydawnictwo Politechniki Warszawskiej</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Calculate the electric field intensity distribution of a given system point charges placed at specified points in the Cartesian coordinate system.
2.What condition should meet the dimensions of the coaxial cable to the maximum intensity of the electric field in the cable was minimal.
3. Calculate the capacity of single core cables, coaxial cables having a length L = 5 km, the wire diameter is d = 30 mm, the inner diameter of the screen, D = 40 mm and the relative permittivity of the dielectric is w = 3.5.
4. Calculate the leakage coaxial cable of length L = 1.5 km, the diameter of the vein is d = 30 mm, the inner diameter of the screen, D = 40 mm, and is the conductivity of insulation = 20 μS / m.
5. Calculate the unit inductance own two-wire line, the wires of diameter d spaced apart at a distance h.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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