GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics, PG_00060837		
Field of study	Chemical Technology		
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
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Waldemar Stampor	
	Teachers	dr inż. Daniel Pelczarski dr hab. inż. Waldemar Stampor	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	0.0	45

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	45	10.0	65.0	120

Subject objectives

The aim of the course is to acquire specific knowledge in the field of general physics and to acquire appropriate skills to predict the course of physical phenomena based on known laws of physics, necessary to solve future engineering problems

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W01] has knowledge in mathematics, including the solution of equations and inequalities involving elementary functions, differential and integral calculus, elements of vector analysis, statistics, optimisation and numerical methods, has basic knowledge in selected branches of physics, useful for the description and analysis of technological processes	A student gains the basic knowledge in the field of mechanics and electromagnetism defines basic concepts, gives definitions of physical quantities and explains physical laws.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U01] is able to acquire information from literature, databases and other appropriately selected sources, also in English; is able to integrate information obtained, interpret it and make conclusions, formulate and justify opinions	A student -correctly writes and reads physical formulae, -distinguishes scalar and vector quantities, -understands fundamental physical laws, -predicts the following course of actions according to the physical laws, -sets up and solves physics problems in mechanics and electromagnetism. Can critically analyze information obtained on the basis of textbooks, the Internet and other sources.	[SU2] Assessment of ability to analyse information

Subject contents	ABOUT PHYSICS. Physical quantities and their units . Elements of vector algebra . MECHANICS . Kinematics of a particle : rectilinear motion , curvilinear motion, Newton's laws of motion. Dynamics of rigid body : the moment of inertia, principal axes , Steiner's law, torque and angular momentum , equation of rotational motion, gyroscopes and precession. Consevation laws in mechanics . Oscillations and mechanical waves . Free, damped and forced vibrations. Mechanical resonance . Beats . Decomposition of periodic oscillations into the harmonic components . Types of waves. Equation of harmonic plane wave motion . Wave velocity . Examples of diffraction and interference of waves. Standing waves . Doppler effect. Sound intensity level . ELECTROMAGNETISM. Electric field . Coulomb's law . The intensity of the electric field . The electrical potential . The relationship between the intensity of the electric field and potential. An electric dipole and its behavior in an external electric field. Capacitance of the electric capacitor. Magnetic field. Magnetic induction vector . The Lorentz force . Biot- Savart law . Electrodynamic force . The interaction of two straight linear wires carrying an electric current. Magnetic dipole and its behavior in an external magnetic field.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
midterm tests	50.0%	100.0%

Recommended reading

Basic literature	1. D.Halliday, R.Resnick, J.Walker. Podstawy fizyki. T.1 - T.5; PWN, Warszawa 2003. 2. Cz. Bobrowski. Fizyka. Krótki kurs. WNT, Warszawa 2004.
Supplementary literature	1. J.Orear. Fizyka T1 i T2. WNT, Warszawa 2008. 2. J.Massalski. Fizyka dla inżynierów. T.1i T.2; WNT, Warszawa 2007.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

1 Moment of inertia . Determination of the moments of inertia of molecules

2 The principle of conservation of angular momentum. Man in a spinning chair .

3 Examples of harmonic oscillators : pendulum , the weight attached to a spring

4 Damped motion. Over time t1 amplitude of vibrations decreased n1 times. How many times will decrease the amplitude of vibrations in the time t2 ?

5 Doppler effect . Doppler ultrasound machine

6 Comparison of the basic features of the gravity and electrostatic fields

7 Comparison of the basic features of the electrostatic and magnetostatic fields

8 Electric dipole . Electric dipole moment . The behavior of the dipole in an external electric field. Determination of the dipole moments of molecules

9 Magnetic dipole . The magnetic dipole moment . The behavior of the dipole in an external magnetic field

10 The interaction between two straight parallel conductors carrying electric current . The definition of the ampere

11 Lorentz force . Definition of tesla . Motion of charge on a circular orbit in a uniform magnetic field. Mass spectrometer.

12 Motion of charge in electric field (mv2 / 2 = eU) . Definition of electronvolt

13 Capacitor and coil. Capacitance and inductance . Definition of farad and henry.

Work placement

Not applicable