



Subject card

Subject name and code		PHYSICS, PG_00063512						
Field of study		Chemistry						
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		
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			exam		
Conducting unit		Institute Of Physics And Applied Computer Science -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)		Subject supervisor		dr hab. inż. Waldemar Stampor				
		Teachers						
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	5.0		50.0		100
Subject objectives		<p>A student</p> <ul style="list-style-type: none"> -correctly writes and reads the physical formulas, -knows principles of vector algebra, -understands the basic laws of physics, -predicts the course of physical phenomena on the basis of known laws, -solves physical problems encountered in mechanics and electromagnetism, -can carry out logical reasoning appropriate to the physical problem being solved, -can actively use the acquired knowledge to solve various technical problems. 						
Learning outcomes		Course outcome		Subject outcome		Method of verification		
		[K6_W01] applies his/her knowledge of selected branches of mathematics and physics to analyse, interpret and solve problems and to describe physical, chemical phenomena and technological processes		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.		[SW1] Assessment of factual knowledge		
		[K6_U02] determines the time required for the task, plans and organises the work of both the individual and the small team in such a way as to ensure that the task is completed within the set time limit		Is able to prepare in advance individually and in a team to solve problems given during classes		[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information		
		[K6_U04] creates detailed documentation of the results obtained from the experiments carried out individually or as part of a team, analysing and interpreting the results in the form of text documents, spreadsheets, graphs, technological diagrams, multimedia presentations using correct chemical nomenclature		Knows terminology in the field of mechanics and electromagnetism and is able to make appropriate charts showing the relationship between physical quantities in physical formulas		[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		

Subject contents	<p>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. Conservation laws in mechanics . Oscillations and mechanical waves . Free, damped and forced vibrations. Mechanical resonance . Beats . Distribution of periodic oscillations in 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 . Electrodynamics force . The interaction of two straight linear wires carrying an electric current. Magnetic dipole and its behavior in an external magnetic field.</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1" data-bbox="451 461 1487 595"> <thead> <tr> <th data-bbox="451 461 794 495">Subject passing criteria</th> <th data-bbox="794 461 1137 495">Passing threshold</th> <th data-bbox="1137 461 1487 495">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 495 794 528">Midterm tests</td> <td data-bbox="794 495 1137 528">50.0%</td> <td data-bbox="1137 495 1487 528">40.0%</td> </tr> <tr> <td data-bbox="451 528 794 562">Oral exam</td> <td data-bbox="794 528 1137 562">50.0%</td> <td data-bbox="1137 528 1487 562">30.0%</td> </tr> <tr> <td data-bbox="451 562 794 595">Written exam</td> <td data-bbox="794 562 1137 595">50.0%</td> <td data-bbox="1137 562 1487 595">30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Midterm tests	50.0%	40.0%	Oral exam	50.0%	30.0%	Written exam	50.0%	30.0%
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Example issues/ example questions/ tasks being completed	<p>1 Moment of inertia . Determination of the moments of inertia of molecules</p> <p>2 The principle of conservation of angular momentum. Man in a spinning chair .</p> <p>3 Examples of harmonic oscillators : pendulum , the weight attached to a spring</p> <p>4 Damped motion. Over time t_1 amplitude of vibrations decreased n_1 times. How many times will decrease the amplitude of vibrations in the time t_2 ?</p> <p>5 Doppler effect . Doppler ultrasound machine.</p> <p>6 Comparison of the basic features of the gravity and electrostatic fields</p> <p>7 Comparison of the basic features of the electrostatic and magnetostatic fields</p> <p>8 Electric dipole . Electric dipole moment . The behavior of the dipole in an external electric field. Determination of the dipole moments of molecules</p> <p>9 Magnetic Dipole . The magnetic dipole moment . The behavior of the dipole in an external magnetic field</p> <p>10 The interaction between two straight parallel conductors carrying electric current . The definition of the ampere</p> <p>11 Lorentz force . Definition of tesla . Motion of charge on a circular orbit in a uniform magnetic field. Mass spectrometer.</p> <p>12 Motion of charge in electric field ($mv^2 / 2 = eU$) . Definition of electronvolt</p> <p>13 Capacitor and coil. Capacitance and inductance . Definition of farad and henry.</p>														
Work placement	Not applicable														

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