



Subject card

Subject name and code		PHYSICS, PG_00064377						
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		2	ECTS credits			6.0		
Learning profile		general academic profile	Assessment form			exam		
Conducting unit		Department Of Physics Of Electronic Phenomena -> 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	30.0	0.0	0.0	75
		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	75	5.0		70.0		150
Subject objectives		<p>The main objective of the course is:</p> <ul style="list-style-type: none"> acquire a certain amount of knowledge of general physics, teach thinking in terms of cause-and-effect relationships and to understand the limitations imposed by the fundamental laws of physics, acquire problem-solving skills encountered in engineering work 						
Learning outcomes		Course outcome		Subject outcome		Method of verification		
		[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		Knows professional terms within the scope of general physics, able to do a report of laboratory exercises on time		[SU1] Assessment of task fulfilment		
		[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		The student is able to critically analyze information obtained from textbooks, the Internet and other sources and is able to prepare a report containing charts and tables from laboratory exercises		[SU4] Assessment of ability to use methods and tools		
		[K6_K03] is aware of the importance of caring for the quality and diligence of the tasks performed, being responsible for their consequences		The student is able to correctly analyze the course of basic physical phenomena based on performed calculations and laboratory experiments, while observing safety rules.		[SK5] Assessment of ability to solve problems that arise in practice		
		[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		The student has the ability to write and read physical formulas, understand the basic physical laws, correctly apply the acquired knowledge in the field of electromagnetism, optics, nuclear and solid state physics to solve various technical problems		[SW1] Assessment of factual knowledge		

Subject contents	ELECTRODYNAMICS. Electromagnetic induction. Faraday's law of mutual induction and self-induction, inductance of an electric circuit. Maxwell's equations for a vacuum. Electromagnetic oscillations in an LC circuit. OPTICS. The spectrum of electromagnetic waves. Geometric optics: the law of reflection and refraction of light, prism. Wave optics: polarization, diffraction and interference of waves, diffraction grating. The spectral analysis of light, optical spectrometer. Quantum optics: thermal radiation, photoelectric effect, properties of photons. ATOMIC PHYSICS. Bohr's model of the hydrogen atom. Vector model of the atom and quantum numbers, spin-orbit coupling and fine structure of spectral lines, the Zeeman effect, electron magnetic resonance. Lasers. X-rays. BASIC QUANTUM MECHANICS. Waves of de Broglie and electron microscope. The Schrödinger equation: the wave function, tunneling. Tunneling microscope.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tutorial	50.0%	25.0%
	Laboratory	50.0%	25.0%
	Oral exam	50.0%	25.0%
	Written exam	50.0%	25.0%
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. 3. Atomy i kwanty, H.Haken, H.C.Wolf, PWN, Warszawa 1997.	
	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. 3. V.Acosta, C.L.Cowan, B.J.Graham. Podstawy fizyki współczesnej, PWN, Warszawa 1981.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Passage of light through a prism and a diffraction grating. Optical spectrometer 2. Thermal radiation. Wien's displacement law and Stefan-Boltzmann law. The weight loss by radiation from the Sun 3. Einstein's equation for the photoelectric effect. What is potential of the copper ball ($W = 4.5\text{eV}$) illuminated by UV radiation with a wavelength of 250nm? 4. Bohr's model of the atom of hydrogen. Bohr orbits. Rydberg formula. Bohr magneton. Calculate the wavelength of the red line of the Balmer series 5. Quantum numbers. Orbital, spin and total angular momentum. Spatial quantization of angular moments 6. Spin-orbit coupling. Fine structure (double) yellow line of sodium 7. Zeeman effect. The red line of cadmium in the magnetic field 8. Precession of a magnetic dipole in the magnetic field. 9. Electron and nuclear magnetic resonance 10. Waves of matter (de Broglie). Wavelength of the speeding electron. The electron microscope 11. The wave function and the probability density. The Schrodinger equation 12. Tunneling and tunneling microscope 		
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.