



## Subject card

Subject name and code	Modern Physics, PG_00047661						
Field of study	Informatics						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2021/2022		
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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Atomic, Molecular and Optical Physics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Sebastian Bielski				
	Teachers		dr inż. Ireneusz Linert				
			dr hab. inż. Maciej Demianowicz				
			dr Maciej Kuna				
			dr inż. Sebastian Bielski				
			mgr inż. Michał Jurkowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: Fizyka współczesna (Informatyka)_21/22 - Moodle ID: 15221 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15221">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15221</a>						
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	30		3.0		42.0	75
Subject objectives	The aim of the subject is to provide students with the basic knowledge of physics helpful in further education.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U02] can perform tasks related to the field of study in an innovative way as well as solve complex and nontypical problems, applying knowledge of physics, in changing and not fully predictable conditions		Student solves simple problems of quantum mechanics and simple problems concerning electricity and magnetism.		[SU1] Assessment of task fulfilment		
	[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions		Ability to perform simple measurements of physical quantities and to prepare reports, including error analysis.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	[K6_W02] Knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study		Student lists and explains the basic physical phenomena, concepts and laws concerning electromagnetism, theory of relativity and basics of quantum mechanics. Student solves simple problems of quantum mechanics and electromagnetics.		[SW1] Assessment of factual knowledge		

Subject contents	Lecture Electromagnetism. The vector electric field property. Magnetic field in vacuum. Electric and magnetic field of moving charge. Biot-Savart law. Magnetic field around a long wire. Lorentz force. Magnetic force on a current carrying wire. Ampere's laws. Interaction of two parallel long wires. Faraday's law. Maxwell's equations. Einstein's postulates. Lorentz transformation and its consequences. The polarization of light. Black body radiation. Photoelectric phenomenon. Compton effect. Bohr model. Wave-particle duality. De Broglie's hypothesis. The Heisenberg uncertainty relations. Schrodinger's wave equation - examples of solutions. Hydrogen atom and hydrogen-like ion. Spin of an electron. Emission and absorption of light. Stimulated emission. Laser operation principle.  <		
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