

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. M	dr hab. inż. Maciej Demianowicz						
			dr Maciej Kuna							
			, ,							
			dr inż. Sebastian Bielski							
			mgr inż. Michał Jurkowski							
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t :t	Seminar	SUM		
of instruction	Number of study	15.0	0.0	15.0	0.0		0.0	30		
	hours E-learning hours included: 0.0									
	Adresy na platformie eNauczanie:									
	Fizyka współczesna (Informatyka)_21/22 - Moodle ID: 15221 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15221									
Learning activity and number of study hours	Learning activity Participation in classes includ 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	t is to provide	students with th	ne basic knowl	edge of	physics	helpful in fu	rther 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				

Data wydruku: 27.04.2024 11:14 Strona 1 z 2

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 efect. 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. Laboratory Perfoming a few experiments; conclusions, error analysis						
Prerequisites and co-requisites							
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Knowledge of the lecture material (test)	50.0%	67.0%				
	laboratory: oral answers, reports	50.0%	33.0%				
Recommended reading	Basic literature	Halliday D., Resnick R., Walker J., Fundamentals of physics Openstax, University physics Griffiths D. J., Introduction to Electrodynamics https://ftims.pg.edu.pl/experiments-in-physics					
	Supplementary literature	ntary literature 1. Sidney B. Cahn, Boris E. Nadgorny, and Paul D. Scholten, A Guide To Physics Problems. 2. Jackson J. D., Classical Electrodynamics					
	eResources addresses Fizyka współczesna (Informatyka)_21/22 - Moodle ID: 15221 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15221						
Example issues/ example questions/ tasks being completed	How does the maximum possible kinetic energy of electrons Ek depend on the incident light intensity I? We assume that the energy of each photon is greater than the work function. A) Ek does not depend on I B) Ek increases linearly with I C) Ek decreases linearly with I D) more information is needed						
	According to the Gauss' law the electric flux through any closed surface S A) is always equal to zero B) depends only on the electric charges inside S C) depends only on the electric charges outside S D) depends on both the electric charges inside and outside S						
	The inductance of a solenoid depends on (choose the right answer) A) cross-sectional area of the wire (or the diameter of the wire) and the length of the solenoid B) the length of the solenoid and the cross-sectional area of the solenoid C) the cross-sectional area of the solenoid and the current D) the current and the cross-sectional area of the wire						
	Experiment: determine the moment of inertia of a given object.						
Work placement	Not applicable						

Data wydruku: 27.04.2024 11:14 Strona 2 z 2