



Subject card

Subject name and code	Fundamentals of Physics, PG_00047650						
Field of study	Informatics						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research 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		3.0		
Learning profile	general academic profile		Assessment form		exam		
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. Patrycja Stefańska-Ptaszek				
	Teachers		dr inż. Ewa Erdmann				
			dr Maciej Kuna				
			dr inż. Patrycja Stefańska-Ptaszek				
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		3.0		27.0	75
Subject objectives	Providing the student 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 classical mechanics, statistical physics and thermodynamics, oscillatory and wave motion, and of wave nature of light		[SU4] Assessment of ability to use methods and tools [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		Student performs and interprets simple experiments on basic physical phenomena.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [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 enumerates and explains the basic and the complex phenomena, concepts and laws concerning the basics of physics and modern physics.		[SW1] Assessment of factual knowledge		

Subject contents	<p>LECTURE</p> <p>Kinematics and dynamics of a material point. Principle of conservation of energy. Principle of conservation of momentum and angular momentum. Mechanics of rigid body. Basic properties of gravitational field. Heat, work, internal energy, gas transformations. Laws of thermodynamics. Elements of kinetic theory of gases. Maxwell-Boltzmann distributions. Entropy, reversible and non-reversible processes. Harmonic oscillator, addition of oscillations. Elastic waves. Basic properties of acoustic waves. Energy density and intensity of wave. Parameters of the medium, wave impedance. Elements of geometrical optics. Wave optics: light as electromagnetic wave, dispersion, interference, diffraction, and polarization of waves. Basics of holography. Electric field intensity. Electric field of a point-like charge and of a system of charges. Electric potential of a point-like charge and of a system of charges. Relationship between the intensity of electric field and electric potential. Gauss' theorem. Electric dipole.</p> <p>PRACTICE</p> <p>Problems on kinematics of progressive motion, description of the motion in Cartesian system. Velocity, acceleration, normal and tangential acceleration. Problems on kinematics of rotational motion, description of the motion in Cartesian system and in a polar coordinate system. Problems on dynamics of progressive motion, applications of Newton's laws. Dynamics laws in non-inertial frame of reference. Problems on conservation of energy, momentum and angular momentum. Problems related to the first law of thermodynamics in the case of an ideal gas. Problems related to Maxwell distribution. Calculation of entropy changes in reversible transformations of an ideal gas. Examples of harmonic motion. Basics of wave motion. Wave energy density, Poynting's vector, wave intensity. Problems related to the interference of light. Diffraction and polarization of light. Fraunhofer single slit diffraction. Malus's law.</p>																	
Prerequisites and co-requisites																		
Assessment methods and criteria	<table><tr><td>Subject passing criteria</td><td>Passing threshold</td><td>Percentage of the final grade</td></tr><tr><td>Solving the problems.</td><td>50.0%</td><td>33.0%</td></tr><tr><td>Exam.</td><td>50.0%</td><td>67.0%</td></tr></table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Solving the problems.	50.0%	33.0%	Exam.	50.0%	67.0%						
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Example issues/ example questions/ tasks being completed	<p>Explain energy density of wave motion.</p> <p>Enumerate methods of light polarization.</p>																	
Work placement	Not applicable																	