



Subject card

Subject name and code	Physics I, PG_00047722						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2021	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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Katedra Fizyki Atomowej, Molekularnej i Optycznej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Patrycja Stefańska-Ptaszek					
	Teachers	dr inż. Ireneusz Linert 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 Adresy na platformie eNauczanie:						
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	Providing the student with the specialist knowledge concerning the basic rules of physics immediately relevant to the technical areas.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W03] knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	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		
	[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 enumerates and explains the basic phenomena, concepts, and laws concerning classical mechanics, mechanics of fluids, statistical physics and thermodynamics. Solves simple problems of classical mechanics, statistical physics and thermodynamics.			[SK2] Assessment of progress of work [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SK4] Assessment of communication skills, including language correctness		

Subject contents	<p>LECTURE</p> <ol style="list-style-type: none"> 1. Kinematics and dynamics of a material point. Principle of conservation of energy. Principle of conservation of momentum and angular momentum. Basic properties of gravitational field. Elements of mechanics of fluids. 2. Heat, work, internal energy, gas transformations. Elements of kinetic theory of gases. Entropy, reversible and non-reversible processes. Laws of thermodynamics. 3. Harmonic oscillator, addition of oscillations. Elastic waves. Basic properties of acoustic waves. Energy density and intensity of wave. Parameters of the medium, wave impedance. 4. Elements of geometrical optics. Wave optics: dispersion, interference, diffraction, and polarization of waves. Basics of holography. Sources of light. 5. Einstein's postulates. Lorentz's transformation and its consequences. Relativistic optics. 6. Structure of atomic nucleus. Nuclear forces. Radioactivity. 7. Wave-particle duality. Wave function. The Heisenberg uncertainty relations. Schrödinger's equation. <p>PRACTICE</p> <ol style="list-style-type: none"> 1. 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. 2. 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. 3. Examples of harmonic motion. Basics of wave motion. Wave energy density, Poynting's vector, wave intensity. 4. Problems related to the interference of light. Diffraction and polarization of light. Fraunhofer single slit diffraction. Malus's law. 											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="454 1550 794 1581">Subject passing criteria</th> <th data-bbox="794 1550 1139 1581">Passing threshold</th> <th data-bbox="1139 1550 1482 1581">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="454 1581 794 1612">Solving of the problems</td> <td data-bbox="794 1581 1139 1612">50.0%</td> <td data-bbox="1139 1581 1482 1612">33.0%</td> </tr> <tr> <td data-bbox="454 1612 794 1644">Knowledge of the lecture material</td> <td data-bbox="794 1612 1139 1644">50.0%</td> <td data-bbox="1139 1612 1482 1644">67.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Solving of the problems	50.0%	33.0%	Knowledge of the lecture material	50.0%	67.0%
Subject passing criteria	Passing threshold	Percentage of the final grade										
Solving of the problems	50.0%	33.0%										
Knowledge of the lecture material	50.0%	67.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. D. Halliday, R. Resnick, J. Walker, Podstawy Fizyki tom 1-5, PWN. 2. Sawieliew I. W., Wykłady z fizyki, volume I-3, PWN. 3. Bobrowski Cz., Fizyka, WNT 4. Collection of physics problems published at the website: www.mif.pg.gda.pl/zz/ 										

	Supplementary literature	1. Orear J., Fizyka, volume 1 i 2, WNT. 2. Resnick R., Halliday D., Fizyka, volume 1 i 2, PWN. 3. R.P. Feynman, Feynmana Wykłady z Fizyki, volume 1-3, PWN. 4. Bujko A., Zadania z fizyki z rozwiązaniami i komentarzami, WNT.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Conservation of energy, momentum, and angular momentum in the system of particles. Simple harmonic motion. Energy density of the longitudinal wave. Universal law of radioactive decay	
Work placement	Not applicable	

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