



Subject card

Subject name and code	Physics, PG_00037399						
Field of study	Biotechnology						
Date of commencement of studies	October 2020	Academic year of realisation of subject	2020/2021				
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	7.0				
Learning profile	general academic profile	Assessment form	exam				
Conducting unit	Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Tomasz Wąsowicz					
	Teachers	dr inż. Ireneusz Linert dr inż. Marcin Dampc dr hab. Tomasz Wąsowicz dr inż. Justyna Szostak dr inż. Ewa Erdmann					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	30.0	0.0	0.0	60
	E-learning hours included: 0.0						
Wykład FIZYKA dla BT 20/21 sem. letni - Moodle ID: 13874 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13874							
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	60	4.0	111.0	175		
Subject objectives	The main objective of the course is: 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_W01	Student can identify and understand physical phenomena and can describe them by the use of theoretical models	[SW1] Assessment of factual knowledge				
	K6_U01	Student can perform an experiment and interpret its results	[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				

Subject contents	<p>LECTURES OPTICS. Spectrum of electromagnetic waves. Geometric optics: the laws of light reflection and refraction, prism. Wave optics: polarization, diffraction and interference, diffraction grating. Quantum properties of radiation: thermal radiation, photoelectric effect, photons. ATOMIC PHYSICS. Bohr model of the hydrogen atom. Vector model of the atom, quantum numbers, spin-orbit coupling and fine structure of spectral lines, Zeeman effect, spin magnetic resonance. X-rays. De Broglie waves. NUCLEAR PHYSICS. Constituents of the nucleus. Nuclear forces and binding energy. Spin and magnetic moment of nucleus. Nuclear magnetic resonance. Exponential decay law. Applications of radioactive isotopes. Fission and fusion reactions. ELEMENTS OF COSMOLOGY.</p> <p>TUTORIALS 1. Geometric optics. 2. Wave optics. 3. Thermal radiation. 4. Photoelectric effect. Bohr's model of hydrogen atom. 5. X-rays. Bragg's law. De Broglie waves. 6. Nuclear forces and binding energy. Exponential decay law.</p> <p>LABORATORY 1. MECHANICS: mechanics of particles and rigid bodies, elastic collisions, hydrostatics. 2. GRAVITATIONAL FIELD: acceleration due to gravity on the Earth. 3. MECHANICAL WAVES: mechanical resonance, standing waves. 4. ELECTRIC FIELD: electric field distribution, dielectric constant, capacitors, resistors. 5. MAGNETIC FIELD: magnetic field of the Earth, magnetic force on a current-carrying conductor. 6. OPTICS: refractive index, interference, polarization. 7. ATOMIC PHYSICS: atomic emission spectra.</p>														
Prerequisites and co-requisites	Knowledge from Physics semester I														
Assessment methods and criteria	<table border="1" data-bbox="451 692 1487 831"> <thead> <tr> <th data-bbox="451 692 798 725">Subject passing criteria</th> <th data-bbox="798 692 1141 725">Passing threshold</th> <th data-bbox="1141 692 1487 725">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 725 798 759">Written exam</td> <td data-bbox="798 725 1141 759">50.0%</td> <td data-bbox="1141 725 1487 759">50.0%</td> </tr> <tr> <td data-bbox="451 759 798 792">Midterm colloquium</td> <td data-bbox="798 759 1141 792">50.0%</td> <td data-bbox="1141 759 1487 792">30.0%</td> </tr> <tr> <td data-bbox="451 792 798 831">Laboratory</td> <td data-bbox="798 792 1141 831">100.0%</td> <td data-bbox="1141 792 1487 831">20.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Written exam	50.0%	50.0%	Midterm colloquium	50.0%	30.0%	Laboratory	100.0%	20.0%
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Example issues/ example questions/ tasks being completed	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 Quantum numbers. Orbital, spin and total angular momentum. Spatial quantization of angular moments Spin-orbit coupling. Fine structure (double) yellow line of sodium														
Work placement	Not applicable														