



Subject card

Subject name and code	Physics I, PG_00039391						
Field of study	Medical and Mechanical Engineering, Medical and Mechanical Engineering						
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	1	ECTS credits			5.0		
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 inż. Ireneusz Linert				
	Teachers		dr inż. Ireneusz Linert				
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						
Fizyka 1 - kurs dla specjalności IMM oraz MiBM niestacjonarne - Moodle ID: 7126 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=7126							
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		10.0		70.0	125
Subject objectives	To know physical quantities and phenomena, to describe, analyse and understand more complex physical problems with the use of advanced mathematics						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U01		The student learns the methods of solving and analyzing physical problems. With this knowledge he can solve other engineering problems.		[SU4] Assessment of ability to use methods and tools		
	K6_W02		the student knows the theoretical basis of classical physics		[SW1] Assessment of factual knowledge		
	K6_U05		Student is able to solve analytically physical problems in the area of classical physics. With this knowledge he can solve other engineering problems in the field of mechanical and medical engineering		[SU1] Assessment of task fulfilment		
Subject contents	<p>LECTURE: Introduction: International system of units. Standards of units. Description of motion. Newton's law. Work, energy, power. Conservation of energy. Centre of mass, linear momentum of a system, conservation of linear momentum – examples. Angular motion of a rigid body, moment-of-the-force, angular momentum, conservation of angular momentum Simple harmonic motion, damped harmonic motion. Forced vibration. Resonance. Mechanical waves. Harmonic waves. Interference of waves. Standing wave. Doppler's effect. Special theory of relativity. Galilean transformation, relativity effects. Lorentz transformation. Electric field. Electric field strength. Coulomb's law. Electric dipole. Gauss's law. Potential of electric field. Potential of a charge system. Potential of a conductor. Electrical capacitance. Electric current: current strength, Ohm's law, Kirchhoff's law, power of electric current Magnetic field: Lorentz's force, charge and conductor with current into magnetic field. Ampere's law. Two parallel conductors with currents. Biot-Savart's law. Conductors and dielectrics, dia-, para- and ferromagnetic materials, phenomenon of electromagnetic induction Geometrical optics: reflection and refraction of light, mirrors, lens, optical fibers.</p> <p>EXERCISE: Solving problems illustrating Newton's laws, translational and rotational motions of bodies. Solving problems applying conservation energy, momentum and angular momentum. Solving problems of simple harmonic motion and damped harmonic motion. Solving problems of propagation waves in elastic medium. Calculation of deflection and velocity of particle of medium during propagation waves. Calculation of dilatation of time and contraction of length using Lorentz's transformation. Solving problems illustrating dependence of mass, momentum and energy of bodies on the velocity. Calculation of the forces, the electrostatic field strength and the electrostatic potential in point charges system, solution of problems using the Gauss' law, calculation of the capacitance of capacitors, calculation of trajectory motion of charged particles in electric and magnetic field, determination of magnetic induction using the Biot-Savart's and Amper's law, solving problems illustrating the phenomenon of electromagnetic induction</p>						

Prerequisites and co-requisites	High school level physics knowledge		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test - solving problems	50.0%	40.0%
	Final exam - theory and problems	50.0%	60.0%
Recommended reading	Basic literature	1. Bobrowski Cz., Fizyka: krótki kurs, WNT, Warszawa 2005 2. Orear J., Fizyka t. 1,2, WNT, Warszawa 1993	
	Supplementary literature	1. Halliday D., Resnick R., Walker J., Podstawy fizyki t. 1,2,3,4 PWN, Warszawa 2003	
	eResources addresses		
Example issues/ example questions/ tasks being completed	A bullet was shot at the angle of α to the horizontal. Find its final velocity and range in its highest point of trajectory is 5 m?		
Work placement	Not applicable		