

Subject card

Subject name and code	Physics I, PG_00039391								
Field of study	Medical and Mechanical Engineering, Mechanical and Medical 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	5.0		
Learning profile	general academic profile		Assessment form			exam	exam		
Conducting unit	Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics								
Name and surname	Subject supervisor		dr inż. Ireneusz Linert						
of lecturer (lecturers)	Teachers		dr inż. Ireneusz Linert						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	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: 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 classes include plan				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			

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Prerequisites and co-requisites	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. 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						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Final test - solving problems	50.0%	40.0%				
	Final exam - theory and problems	50.0%	60.0%				
Recommended reading	Basic literature	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	Fizyka 1 - kurs dla specjalności IMM oraz MiBM niestacjonarne Moodle ID: 7126 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=7126					
Example issues/ example questions/ tasks being completed	A bullet was shot at the angle of alfa to the horizontal. Find its final velocity and range in its highest point of trajectiory is 5 m?						
Work placement	Not applicable						

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