

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Physics, PG_00044357								
Field of study	Civil 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	Part-time studies		Mode of delivery			at the university			
Year of study	1		Language of instruction			Polish			
Semester of study	1		ECTS credits			8.0			
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	Subject supervisor		dr inż. Marcin Dampc						
of lecturer (lecturers)	Teachers		dr inż. Marcin Dampc						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	25.0	20.0	9.0	0.0		0.0	54	
	E-learning hours inclu	uded: 0.0							
	Adresy na platformie eNauczanie: Fizyka WILIŚ Niestacjonarne - Moodle ID: 962 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=962								
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	54		7.0		139.0		200	
Subject objectives	 Deeper understanding of the laws of classical physics. Acquaintance with the laws of modern physics which are the base of modern technology. Put up the physical problems and resolwed them, in relation to future engineering problems. Create practices in the use of physical devices, taking measurements and study the results. 								
Learning outcomes	Course out	Course outcome		Subject outcome		Method of verification			
	[K6_U02] is able to define basic calculation models used in computer calculations		Can use integral and inifinitesimal calculs in physics problems. Efficiently use vectors.			[SU4] Assessment of ability to use methods and tools			
	[K6_W01] has knowledge of selected branches of mathematics, physics and chemistry, which is a base of construction subjects, such as construction theory and material technology and id needed to formulate and solve typical problems of civil engineering		Possess knowledge on machanics, optics, hydrostatics and atomic physics.			[SW1] Assessment of factual knowledge			

Subject contents	translation and rotation motions. Newtons laws. Dynamics of a rigid body: the rotational motion around a fixed axis, moment of inertia, principal axes, Steiner (parallel axis) theorem, torque and angular momentum, Newtons equation of rotational motion, precession and gyroscopes. The conservation laws in mechanics. Fluids statics: Pascal and Stokes laws. Fluids dynamics. Bernoulli equation. Flow of real liquids. Stokes law. Reynolds number. Mechanical oscillations and waves. Free, damped and driven oscillations. Mechanical resonance. Beats. Decomposition of periodical oscillations into harmonic components. Kinds of waves. Kinematical equation of a plane harmonic wave. Wave velocity. Diffraction and interference examples. Standing waves. Doppler effect. Ultrasounds. OPTICS. Spectrum of electromagnetic waves. Geometrical optics: the laws of light reflection and refraction, prism. Wave optics: polarization, diffraction and interference, diffraction grating. Spectral analysis of light, optical spectrometer. Quantum properties of radiation: thermal radiation, photoelectric effect, photons. ATOMIC PHYSICS. Bohr model of the hydrogen atom. X-rays. Lasers: stimulated emission, laser action, kinds of lasers, applications. Hologrphy.De Broglie waves. Heisenberg uncertainty principle. TUTORIALS 1. Kinematics quantities. Motion with a constant acceleration. 2. Newtons laws. Force and torque. 3. Moment of inertia. 4. Work, kinetic and potential energy, the conservation law of mechanical energy. 5. Conservation law of angular momentum. 6. Simple and damped harmonic oscillators. 7. Characteristics of waves. Standing waves. 8. Priperties of light. 9. Diffraction grating. 10. Thermal radiation. 11. Photoelectric effect. 12. Bohr"s model of hydrogen atom. LABORATORY (student performs 3 experiments from the following list) 1. Determination of the acceleration due to gravity using a simple pendulum. 2. Determination of the sound velocity in air using a resonance method and superposition of perpendicular oscillations. 6. Determinati						
Prerequisites and co-requisites	Elementary physics from the second	lary school					
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Laboratory	60.0%	20.0%				
	Midterm colloquium	50.0%	30.0%				
	Written exam	50.0%	50.0%				
Recommended reading	Basic literature	asic literature 1.Marta Skorko, FIZYKA, W-wa ,PWN. (dowolne wydanie). 2. Cz Bobrowski, FIZYKA krótki kurs, W-wa, WNT.(dowolne wydanie).					
	Supplementary literature 1.Jerzy Masalski, FIZYKA dla inżynierów. część I, W-wa, WNT. (dowolne wydanie).						
	eResources addresses	Fizyka WILIŚ Niestacjonarne - Moodle ID: 962 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=962					

Example issues/	I. A body at rest in a system is capable of doing work if:				
example questions/					
	A. the potential energy of the system is positive				
	B. the potential energy of the system is negative				
	C. it is free to move in such a way as to decrease its kinetic energy				
	D. it is free to move in such a way as to decrease the potential energy of the system				
	E. it is free to move in such a way as to increase the potential energy of the system				
	II. Two wires made of diferent materials have the same uniform current density. They carry the				
	same current only if:				
	A. their lengths are the same				
	B. their cross-sectional areas are the same				
	C. both their lengths and cross-sectional areas are the same				
	D. the potential diferences across them are the same				
	E. the electric ⁻ elds in them are the same				
	III. In the formula F = qv × B :				
	A. F must be perpendicular to ~v but not necessarily to ~B				
	B.F must be perpendicular to ~B but not necessarily to ~v				
	C. v must be perpendicular to ~B but not necessarily to ~F				
	D. all three vectors must be mutually perpendicular				
	E. F must be perpendicular to both ~v and ~B				
Work placement	Not applicable				