

§ GDAŃSK UNIVERSITY § OF TECHNOLOGY

Subject card

Subject name and code	Basics of technical physics, PG_00020778								
Field of study	Technical Physics								
Date of commencement of studies	October 2021		Academic year of realisation of subject			2023/2024			
Education level	first-cycle studies		Subject group			Optional subject group Subject group related to scientific research in the field of study			
Mode of study	Full-time studies		Mode of delivery			at the university			
Year of study	3		Language of instruction		Polish Can speak English if necessary.				
Semester of study	5		ECTS credits			6.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Department of Theoretical Physics and Quantum Information -> Faculty of Applied Physics and Mathematics								
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Anna Perelomova							
	Teachers		prof. dr hab. Anna Perelomova						
			dr inż. Ewa Erdmann						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	30.0	0.0	0.0	0.0		30.0	60	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation i classes incluc plan	I didactic Participation in ed in study consultation hours		Self-study		SUM		
	Number of study hours	60		15.0		75.0		150	
Subject objectives	The aim of the course is to present physics and how to describe interesting physical phenomena in a qualitative and quantitative way. There are discussed in the lecture, wherever possible, methods, and phenomena needed to explain the mode of operation of equipment and technologies in various fields.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	K6_U07		A student knows how to apply knowledge in simple technical issues. A student can use an appropriate mathematical apparatus.			[SU3] Assessment of ability to use knowledge gained from the subject			
	K6_W01		A student understands the place of physics and its physical applications in everyday life.			[SW1] Assessment of factual knowledge			
	K6_U08		A student is able to solve problems related to the subject of the lectures and present solutions in writing.			[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment			
	K6_W02		A student understands the relationship of various fields of physics and the common mathematical apparatus.			[SW1] Assessment of factual knowledge			

Subject contents							
	Introduction.						
	Types of physical quantities (tensors, scalars, vectors as tensors of the order 0 and I) and operations on these quantities.						
	Mechanics						
	Newton's principles I, II, III. Force and work. The principle of conservation of momentum. Potential and non- potential forces (3h).						
	Potential energy and the principle of conservation of energy (2h).						
	Harmonic oscillations.Kinetic energy and potential vibrations. Small oscillations. Damped oscillations and the concept of irreversible changes (2h).						
	Rotational dynamics. Angular velocity, angular acceleration. Moment of force, angular momentum (3h).						
	The principle of conservation of angular momentum. Moment of inertia of rigid bodies. Statics of rigid bodies (3h).						
	Fundamentals of Thermodynamics. The zero law of thermodynamics. The first law of thermodynamics. Caloric and thermal equations of state (4h).						
	Specific heat. Ideal gas thermodynamics. The concept of equilibrium and non-equilibrium thermodynamic transformations. Fluxes of mass and heat (4h).						
	Fundamentals of Wave Theory. Sound waves. Wave propagation in confined centers. Standing wave. Interference. Doppler effect. (4h)						
	Shock waves. Dispersion equation. I	Dispersion relations. (4h)					
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	oral examination	50.0%	50.0%				
	completion of the seminar	50.0%	50.0%				
Recommended reading	Basic literature	 Jay Orear, Physics. Volumes 1-2 (any edition) Physics for Colleges, Main Authors: Samuel J. Ling, Truman State University Jeff Sanny, Loyola Marymount University William Moebs, Volumes I- IV (available on the faculty website) 					

	Supplementary literature	R.P. Feynman, R.B. Leighton, M. Sands,,		
		The Feynman Lectures on Physics New Millenium Edition Copyright © 1963, 2006, 2010 by California Institute of Technology, Michael A. Gottlieb, and Rudolf Pfeiffer		
	eResources addresses	Podstawowe		
		https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33590 - course in e-learning		
		Adresy na platformie eNauczanie:		
		Podstawy Fizyki Technicznej - Moodle ID: 33590 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33590		
Example issues/ example questions/ tasks being completed	1. I, II, III Newton's rules2. To calculate the moment of inertia of the rigid body about the axis of rotation.3. To justify that the angle between vectors and the vector modulus are scalars.4. Thermodynamics of an ideal gas.			
Work placement	Not applicable			