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	Project	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 in didactic classes included in study plan	Participation in 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. 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	1. Jay Orear, Physics. Volumes 1-2 (any edition) 2. 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	