



Subject card

Subject name and code	Basics of technical physics, PG_00020778						
Field of study	Technical Physics						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
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		
Semester of study	5		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Katedra Fizyki Teoretycznej i Informatyki Kwantowej -> 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				
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 ways to describe interesting basic physical phenomena in a qualitative and quantitative way. There are discussed in the lecture, wherever possible, methods, and phenomena needed to explain the principles of equipment and technologies in various faplications.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W01		A student understands the place of physics and its physical applications in everyday life and unity of different field of physics.		[SW1] Assessment of factual knowledge		
	K6_U07		A student is able to apply knowledge in simple technical tasks. A student knows how to use a mathematical tool. A student is able to solve basic tests.		[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W02		A student understands connection of different fields of physics and common mathematical apparatus.		[SW1] Assessment of factual knowledge		
	K6_U08		A student is able to solve tasks related to the topic lectures and present solutions in written form.		[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	<p>Introduction</p> <p>Types of physical quantities (tensors; scalars, vectors as tensors of order 0 and I and operations on these quantities (1h)</p> <p>Mechanics</p> <p>A force. I, II, III Newton's laws. Work of force. The principle of conservation of momentum. Potential and non-potential forces (3h). Potential energy and the law of conservation of energy (2h).</p> <p>Harmonic oscillations. Kinetic and potential energy of vibrations. Small oscillations. Damped oscillations and the concept of irreversible changes (2h).</p> <p>Dynamics of rotational motion. Angular velocity, angular acceleration. Moment of force, angular momentum (3h). Principle of conservation of angular momentum. Moment of inertia of rigid bodies. Statics of rigid bodies (3h).</p> <p>Basics of Thermodynamics.</p> <p>Zeroth law of thermodynamics. The first law of thermodynamics. Caloric and thermal equations of state (4h). Specific heat. Thermodynamics of an ideal gas. The concept of equilibrium and non-equilibrium thermodynamic transformations. Mass and heat fluxes (4h).</p> <p>Basics of wave theory.</p> <p>Sound waves. Wave propagation in confined media. Standing wave. Interference. Doppler effect. (4h) Shock waves. Dispersion equation. Dispersion relations. Solitons(4h)</p>		
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, vol 1-2 (any edition) 2. Physics for higher schools, Main authors: Samuel J. Ling, Truman State University Jeff Sanny, Loyola Marymount University William Moebs, vol. I- IV (available at the Faculty website).	
	Supplementary literature	1. P. Feynman, R.B. Leighton, M. Sands, Lectures on Physics, PWN	
	eResources addresses	Adresy na platformie eNauczanie:	

Example issues/ example questions/ tasks being completed	<p>1.I, II, III Newton's laws .</p> <p>2. To determine the moment of inertia of a rigid body around the axis of rotation.</p> <p>3. To prove that the angle between vectors and the vector's magnitude are scalars.</p> <p>4.Thermodynamics of an ideal gas.</p>
Work placement	Not applicable

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