



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 fapplications.						
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	<table border="1"> <thead> <tr> <th data-bbox="456 1301 794 1328">Subject passing criteria</th> <th data-bbox="799 1301 1137 1328">Passing threshold</th> <th data-bbox="1142 1301 1481 1328">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1335 794 1361">oral examination</td> <td data-bbox="799 1335 1137 1361">50.0%</td> <td data-bbox="1142 1335 1481 1361">50.0%</td> </tr> <tr> <td data-bbox="456 1368 794 1395">completion of the seminar</td> <td data-bbox="799 1368 1137 1395">50.0%</td> <td data-bbox="1142 1368 1481 1395">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	oral examination	50.0%	50.0%	completion of the seminar	50.0%	50.0%
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oral examination	50.0%	50.0%										
completion of the seminar	50.0%	50.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> Jay Orear, Physics, vol 1-2 (any edition) 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	<ol style="list-style-type: none"> P. Feynman, R.B. Leighton, M. Sands, Lectures on Physics, PWN 										
	eResources addresses	Adresy na platformie eNauczanie:										

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

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