



Subject card

Subject name and code	Physical laboratory, PG_00063337						
Field of study	Nanotechnology						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Witkowska					
	Teachers	dr hab. inż. Agnieszka Witkowska prof. dr hab. inż. Bogusław Kusz					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	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	30	5.0		15.0	50	
Subject objectives	The aim of the course is to acquire and expand knowledge from selected areas of physics such as: mechanics, geometric and wave optics, electricity and magnetism. Gaining the ability to qualitatively understand selected principles and laws of classical physics and quantitative analysis of selected phenomena from this field. Learning basic techniques and methods of measuring selected physical quantities. Gaining the ability to prepare a scientific report, engineering expertise.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W09] Has knowledge of the structure and operation of scientific instruments, measuring and test equipment and in the field of planning and conducting a physical experiment and critical analysis of its results.	By performing assigned laboratory tasks in the physics laboratory, aimed at solving a specific problem and/or determining a specific physical quantity, the student acquires knowledge in the field of the construction and operation of physical instruments, measuring and research equipment as well as in the field of planning and conducting a physical experiment and critical analysis of its results.			[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U02] can analyze and solve simple scientific and technical problems based on possessed knowledge, applying analytical, numerical, simulation and experimental methods.	While performing assigned laboratory tasks in the physics laboratory, the student analyzes and solves simple scientific and technical problems based on their knowledge, using experimental and analytical methods.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		

Subject contents	Laboratory exercises include the implementation of the following topics: <ol style="list-style-type: none"> 1. Free fall of bodies - analysis of motion and determination of the acceleration of gravity 2. Determination of the coefficient of elasticity of springs 3. Determination of Young's modulus 4. Determining the moment of inertia 5. Determination of the refractive index 6. Determination of the sizes of gaps and obstacles using laser light 7. Study of longitudinal sound waves in rods 8. Determination of the relative permittivity of solids 9. Study of electrical resistance using a Wheatstone bridge 10. Determination of the magnetic field induction in the gap of an electromagnet 11. Study of the distribution of the magnetic field of wire conductors 12. Determination of the horizontal component of the Earth's magnetic field using a compass 								
Prerequisites and co-requisites	Basic knowledge of physics in the field of mechanics, geometric and wave optics, electricity and magnetism. Ability to develop and analyze collected experimental data and to perform analysis of experimental uncertainty.								
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Subject passing criteria</th> <th style="width: 25%;">Passing threshold</th> <th style="width: 25%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Carrying out selected laboratory exercises and preparing a report</td> <td>50.0%</td> <td>100.0%</td> </tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	Carrying out selected laboratory exercises and preparing a report	50.0%	100.0%		
Subject passing criteria	Passing threshold	Percentage of the final grade							
Carrying out selected laboratory exercises and preparing a report	50.0%	100.0%							
Recommended reading	Basic literature	[1] Kozłowski K, Zieliński R, Physics Laboratory, part 1, Gdańsk University of Technology Publishing, 2003 (in Polish) [2] Dudkiewicz J, Kusz B, Physics Laboratory, part 2, Gdańsk University of Technology Publishing, 2002 (in Polish)							
	Supplementary literature	[3] W. Moebs, S.J. Ling, J.S. Sanny, Physics for Higher Education, OpenStax, Volume 1-3							
	eResources addresses	Uzupełniające Adresy na platformie eNauczenie: Pracownia fizyczna - NT 2025 - Moodle ID: 44061 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=44061							
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • Free fall of bodies - analysis of motion and determination of gravitational acceleration • Determination of the elasticity coefficient of springs and their systems • Determination of the light refraction index • Study of longitudinal sound waves in rods • Determination of the relative permittivity of solids • Determination of the horizontal component of the Earth's magnetic field intensity using a tangent compass 								
Work placement	Not applicable								

Document generated electronically. Does not require a seal or signature.