GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physical laboratory, PG_00063337		
Field of study	Nanotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Witkowska	
	Teachers		

Lesson types

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_U02] is able to analyze and solve complex and non-routine scientific and technical problems in the field of nanotechnology and related disciplines, including physics, chemistry, and materials engineering, based on acquired knowledge and using appropriate analytical, computational, numerical, simulation, or 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.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools

Subject contents

Course content – laboratory
Laboratory exercises include the implementation of the following topics:

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.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Carrying out selected laboratory exercises and preparing a report</td><td>100.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>[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)</td></tr>
<tr><td>Supplementary literature</td><td>[3] W. Moebs, S.J. Ling, J.S. Sanny, Physics for Higher Education, OpenStax, Volume 1-3</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">• 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</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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