GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics laboratory I (mechanics and heat), PG_00034522						
Field of study	Technical Physics						
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	4.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Ireneusz Linert				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	45.0	0.0	0.0	45
	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	45		5.0		50.0	100
Subject objectives	Learn how to perform basic experiments and determine physical quantities related to mechanics and heat.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] is able, individually or in a team, to plan and conduct experiments in physics and related fields, including applied computer science or energy engineering, and to analyse and interpret results and formulate conclusions.	Students can plan and conduct experiments, working individually or in a team (laboratory group). Students acquire the ability to operate and read data from instruments such as calipers, micrometers, scales, thermometers, manometers, vacuum pumps, and autotransformers. Students can assess measurement errors using various uncertainty calculation techniques. They can also prepare reports of results, comparing the obtained results of physical quantities with table values or the results of theoretical calculations. They can draw conclusions regarding the obtained results and the accuracy of the experiment.	[SU1] Assessment of task fulfilment
[K6_W04] has advanced knowledge of the principles of experimental design, experimental methods, measurement techniques and scientific equipment used in physics and related sciences, including their life cycle.	The student possesses knowledge related to planning and conducting an experiment. The student knows the physical phenomena related to the subject of the experiment. Understands that experiments should be repeated several times and under different conditions to minimize measurement errors. They are familiar with various methods and techniques for measuring mass, force, the duration of events in the order of seconds or milliseconds, the increase in length of metal rods with temperature changes, methods for generating negative pressure and the operation of manometers, the operation of thermostats, testing the strength of materials, experimentally determining the center of mass of bodies, and so on.	[SW1] Assessment of factual knowledge
[K6_U08] communicates effectively using specialist terminology in physics and related disciplines, enabling the preparation of reports, publications or presentations, as well as participation in discussion and expression of opinions.	The student is able to prepare a report on the conducted experiment using specialized terminology in the field of physics.	[SU1] Assessment of task fulfilment

Subject contents

Course content – laboratory

1. Determination of a denisty of a liquid.
2. Motion along a straight line with constant acceleration.
3. Free fall of a body - analysis of motion and determination of acceleration due to gravity.
4. Analysis of elastic collisions of two bodies.
5. Determination of a spring constant.
6. Determination of a moment of inertia.
7. Determination of a Young's modulus.
8. Determination of a shear modulus by Gauss method.
9. Investigation of a centripetal force.
10. Determination of a coefficient of linear thermal expansion.
11. Measurement of the boiling point of water as a fucntion of pressure.
12. Determination of thermal conductivity coefficient of selected materials.

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory	60.0%	100.0%

Recommended reading	Basic literature	https://ftims.pg.edu.pl/strona-glowna/wydzial/laboratoria-wydzialowe/i-pracownia-fizyczna https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1 2. D. Holliday, R. Resnick, J. Walker, Fundamental of Physics, 8th Edition, Wiley 2008.
	Supplementary literature	No requirements
	eResources addresses	
Example issues/ example questions/ tasks being completed	Newton's law of gravity.	
Practical activites within the subject	Not applicable	

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