University of Gdańsk

Subject card

Subject name and code	Physical Laboratory I - Mechanics, PG_00207659						
Field of study	Nuclear safety and radiological protection						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group 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	academic		Assessment form		credit		
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Joanna Gondek				
	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		0.0		55.0	100
Subject objectives	Broadening knowledge and understanding of the kinematics and dynamics of a material point and a rigid body by independently conducting selected physical experiments in this field of physics, compiling and interpreting their results.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BJORL3_W02] Has an advanced understanding of the role of physical and chemical experiments, mathematical theoretical models approximating reality, and computer simulations in scientific research methodology; is aware of technological, apparatus, and methodological limitations in scientific research.	The student knows and understands: – basic concepts, physical quantities, and the laws governing mechanical phenomena, – the role of physical experiments in understanding the laws governing mechanical phenomena, – experimental limitations in the study of mechanical phenomena, – the concept of measurement accuracy; – the construction and operating principles of basic measuring instruments used in mechanics experiments.	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[BJORL3_U02] Has the ability to perform measurements of basic quantities used in physics and chemistry; can develop, describe and present the results of simple experiments and computer simulations; can perform quantitative analyses and formulate qualitative conclusions on this basis; can estimate measurement uncertainties.	The student is able to: – present and apply knowledge of mechanics in experimental work, – plan and conduct physics experiments in mechanics, – use basic equipment and measuring instruments, – collect measurement data, – perform a quantitative analysis of the obtained measurement data, – apply mathematical methods to describe and analyze physical phenomena in mechanics, – determine the uncertainty of the obtained measurement data, – draw qualitative conclusions about the phenomenon under study from the obtained experimental results.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[BJORL3_K06] Is prepared to make independent decisions, working as part of a team, and taking responsibility for the consequences of his actions.	The student is aware of: – the importance of independent work, – the need to develop the habit of independently seeking solutions to the tasks set before them, – the importance of teamwork, collaborative problem-solving, and seeking the information necessary to solve problems, – the need to adhere to professional ethics by conducting physics experiments and writing reports with integrity.	[SK1] oral statement/conversation/ discussion [SK2] presentation/project/paper/ report
[BJORL3_W03] Has advanced knowledge and understanding of the principles of planning and conducting simple physical and chemical experiments and analyzing obtained results; has knowledge and understanding of the fundamentals of measurement uncertainty as applied to experiments, the base SI units and the most important derived units, as well as other systems of units.	The student knows and understands: – basic models, quantities, and laws of physics in mechanics; – the role of physics experiments and observation in understanding physical phenomena; – the principles of planning and conducting physics experiments, with an emphasis on investigating mechanical phenomena; – the principles of collecting and analyzing measurement data; – methods for calculating the uncertainty of measurement data; – units of physical quantities in mechanics from various systems of units; – the fundamentals of numerical analysis and basic software packages for presenting results and analyzing measurement data.	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

Course outcome	Subject outcome	Method of verification
[BJORL3_U06] Is able to use basic application software packages for presentation of results and data analysis.	The student is able to: – use computer software to analyze and present measurement data, – use computer tools and application software packages to present measurement results in the form of graphs and perform various mathematical operations on measurement data (e.g., linear regression);	[SU2] presentation/project/paper/ report
[BJORL3_U09] They are able to plan and carry out their own learning independently, organize their work both individually and in a team, and collaborate with others as part of a team.	The student is able to: – plan and reliably conduct a physics experiment – complete assigned tasks on time, – plan their own learning, – work in a group to ensure the experiment is conducted correctly, – constructively evaluate and provide feedback on their own work and that of other group members.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report

Subject contents	Measurement methods in classical physics using electronic techniques. Planning measurements, constructing measurement systems, performing measurements, evaluating measurement uncertainty. Experimental study of the basic principles of phenomena and the properties of mechanical: determining the moment of inertia of a rigid body (Oberbeck pendulum) determining the relative viscosity coefficient of a liquid using an Oswald viscometer determining the viscosity coefficient of a liquid (Stokes experiment) determining Young's modulus study of air flow velocity determining the value of Earth's gravitational acceleration using a reversible pendulum determining the value of the acceleration of a normal flat pendulum determining the stiffness modulus of a wire using the dynamic method determining the moment of inertia of a Maxwell pendulum study of Archimedes' principle study of accelerated rectilinear motion on an inclined plane study of projectile motion study of curvilinear motion study of the of the mechanical energy conservation principle study of the dependence of the viscosity coefficient on temperature acoustic resonance determining the hearing threshold and isophonic curves
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
oral responses	51.0%	40.0%
reports	51.0%	60.0%

Recommended reading	Basic literature: not applicable
	Supplementary literature: not applicable
	eResources addresses:
Example issues/ example questions/ tasks being completed	not applicable
Work placement	Not applicable

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