

**Subject card**

<b>Subject name and code</b>	Physical Laboratory - Mechanics, PG_00168485						
<b>Field of study</b>	Nuclear safety and radiological protection						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>				2026/2027	
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>				Obligatory subject group in the field of study	
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>				at the university	
<b>Year of study</b>	1	<b>Language of instruction</b>				Polish	
<b>Semester of study</b>	2	<b>ECTS credits</b>				4.0	
<b>Learning profile</b>	academic	<b>Assessment form</b>				credit	
<b>Conducting unit</b>	Faculty of Mathematics, Physics and Informatics -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Joanna Gondek				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	45.0	0.0	0.0	45
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	45		0.0		55.0	100
<b>Subject objectives</b>	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_K07] Is prepared to make independent decisions as well as to work within a team, where assumes responsibility for the consequences of these actions.	The student is aware of: – the need to cooperate with members of the research group in order to correctly conduct a physical experiment; – the need to constructively evaluate their own work and that of other members of the research group; – the need to perform the tasks assigned to them reliably and on time; – the need to comply with the rules on intellectual property protection and the legal and ethical conditions related to research activities.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report
	[BJORL3_K08] He is ready to think and act entrepreneurially.	Student: – is able to precisely formulate problems and doubts related to the task at hand and present their own proposals for solving them.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report
	[BJORL3_U09] Can independently plan and implement his own learning.	The student is able to: – search for reliable sources of knowledge and information; – complete assigned tasks on time.	[SU1] oral statement/conversation/discussion [SU2] 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 use knowledge of mechanics in experimental work, – plan and conduct physical experiments in mechanics, – collect measurement data, – perform quantitative analysis of the obtained measurement data, – apply mathematical apparatus to describe and analyze physical phenomena in mechanics, – use computer software to analyze and present measurement data, – determine the uncertainty of the obtained measurement data, – draw qualitative conclusions about the studied phenomenon from the obtained experimental results.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report
	[BJORL3_W03] Knows how to plan and perform a simple physical or chemical experiment and analyze the results obtained; knows the elements of the theory of measurement uncertainty as applied to experiments; knows the basic units of the SI system and its most important derived units; knows other systems of measurement units.	The student knows and understands: – basic models, quantities, and physical laws in mechanics; – principles of planning and conducting physical experiments with an emphasis on the study of mechanical phenomena; – principles of collecting and analyzing measurement data; – methods of calculating measurement uncertainty; – units of physical quantities in mechanics from various systems of measurement; – the basics of numerical analysis and basic application software packages for presenting results and analyzing measurement data.	[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report
	[BJORL3_W02] Understands the role of physical and chemical experimentation, 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 regularities of mechanical phenomena, – the role of physical experiments in understanding the regularities of 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

Subject contents	<p>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:</p> <p>determining the moment of inertia of a rigid body (Oberbeck pendulum)</p> <p>determining the relative viscosity coefficient of a liquid using an Oswald viscometer</p> <p>determining the viscosity coefficient of a liquid (Stokes experiment)</p> <p>determining Young's modulus</p> <p>study of air flow velocity</p> <p>determining the value of Earth's gravitational acceleration using a reversible pendulum</p> <p>determining the value of the acceleration of a normal flat pendulum</p> <p>determining the stiffness modulus of a wire using the dynamic method</p> <p>determining the moment of inertia of a Maxwell pendulum</p> <p>study of Archimedes' principle</p> <p>study of accelerated rectilinear motion on an inclined plane</p> <p>study of projectile motion</p> <p>study of curvilinear motion</p> <p>study of the of the mechanical energy conservation principle</p> <p>study of the dependence of the viscosity coefficient on temperature</p> <p>acoustic resonance</p> <p>determining the hearing threshold and isophonic curves</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	reports	51.0%	60.0%
	oral responses	51.0%	40.0%
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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