University of Gdańsk

Subject card

Subject name and code	Mechanics, PG_00182289						
Field of study	Physics						
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	1		ECTS credits	8.0			
Learning profile	academic		Assessment form	exam			
Conducting unit							
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	45.0	45.0	0.0	0.0	0.0	90
	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	90		0.0		110.0	200
Subject objectives	Academic-level understanding of the fundamental branch of physics known as mechanics: kinematic and dynamic physical quantities, laws of dynamics of a material point and systems of material points.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZL3_W06] knows and understands the principles of non-relativistic or relativistic mechanics	The student knows and understands: – definitions of physical quantities and regularities of physical phenomena in the field of classical mechanics of a material point; – definitions of: reference frame, trajectory, velocity, acceleration, distance, force, momentum, angular momentum, work, kinetic and potential energy; – Newton's laws of motion; – the laws of conservation of energy, momentum, and angular momentum; – the law of universal gravitation and the laws of planetary motion, Kepler's laws; – the description of motion relative to inertial and non-inertial reference frames; – types of dissipative forces and their effect on motion; – basic concepts and definitions of dissipation theory.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
	[FIZL3_U03] can apply the formalism of classical physics to describe phenomena at the macroscopic level	The student is able to: – formulate and solve kinematic and dynamic equations of motion of a material point and systems of material points, – qualitatively analyze physical phenomena using the tools of classical mechanics.	[SU1] oral statement/conversation/ discussion [SU3] text preparation/written work
	[FIZL3_W01] has advanced knowledge of physical concepts, principles and theories, understands their historical development and significance not only for physics, but also for other exact and natural sciences and cognition of the world	Student: – knows and understands the limitations of physical models of classical point particle mechanics; – knows the history of the development of mechanics and its impact on other areas of knowledge about the world.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW3] text preparation/written work

<table>
<tr><td>Subject contents</td><td>I. Kinematics of a material point

1. Description of motion (position, velocity, acceleration).

2. Description of motion in different coordinate systems (Cartesian, natural, polar).

3. Transformation of kinematic equations of motion (relative to different reference systems).

II. Dynamics of a material point

1. First law of motion (Newton's first law of motion).

2. Second law of motion (Newton's second law of motion).

3. Third law of motion (Newton's third law of motion).

4. Principle of conservation of mechanical energy (kinetic energy, potential energy, work).

5. Dissipative forces.

III. Mechanics of systems of material points

1. Equations of motion for a system of material points.

2. Two-body problem.

3. Momentum, angular momentum, and energy of a system of material points.

4. Center of mass system.

5. Collisions and fundamentals of scattering theory.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>colloquium (classes)</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>oral exam (lecture)</td><td>51.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>not applicable</td></tr>
<tr><td>Supplementary literature</td><td>not applicable</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>not applicable</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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