GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physics in the experiment, PG_00063139		
Field of study	Materials Engineering		
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	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of New Functional Materials For Energy Conversion -> 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. Beata Bochentyn	
	Teachers	dr hab. inż. Beata Bochentyn	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	0.0	0.0	0.0	60

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	60	5.0	35.0	100

Subject objectives

Familiarization with the basic laws of classical physics, with particular emphasis on broadly understood mechanics. Acquisition of skills in analyzing physical phenomena and solving technical problems based on the laws of physics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] has advanced knowledge of physics and chemistry, including facts, concepts, methods, and theories that enable the description and explanation of complex mechanical and physical phenomena as well as chemical processes; understands their key role in the advancement of civilization	Knows the basic issues of classical mechanics, kinematics and dynamics of translational and rotational motion. He can describe oscillating and wave motion.	[SW1] Assessment of factual knowledge
[K6_U01] is able to analyse and solve complex and non-standard scientific and technical problems in materials engineering based on his knowledge, using appropriate analytical, computational, numerical, simulation, or experimental methods	Acquires the ability to analyze experimental data. He can analyze physical phenomena by making the necessary drawings. He obtains the final results by deriving them from the laws of physics. Applies unit conversions and performs numerical calculations.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U06] is able to integrate acquired information, interpret it, draw conclusions, and formulate and justify opinions using specialist terminology in writing or by actively participating in discussions	Prepares to solve physics problems using the recommended textbooks. Recalls basic physical laws and understands them.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task

Subject contents

Course content – lecture

Physics in Experiment I introduces students to concepts related to various branches of physics, which will be explained through experimental demonstrations.

LECTURE - lecture, discussion, and experimental demonstrations on the following topics:
- Mathematical apparatus, analysis, and presentation of physical measurement results: units (conversions, SI system), vector algebra
- Uniform and uniformly varying rectilinear motion
- Projections: vertical, horizontal, and oblique
- Newton's dynamics of the translational motion of a material point (including pulleys, plane)
- Conservation of energy and momentum in translational motion
- Kinematics of rotational motion (circular, angular parameters, centripetal acceleration). Centripetal and centrifugal forces. Conservative forces. Inertial forces. Inertial and non-inertial frames.
- Rigid body mechanics. Simple and Damped Oscillatory Motion
- Mechanical Waves

EXERCISES - Solving computational problems on the following topics:
- Mathematical framework, analysis, and presentation of physical measurement results: units (conversion, SI system), vector algebra
- Uniform and uniformly varying rectilinear motion
- Projections: vertical, horizontal, and oblique
- Newton's dynamics of the translational motion of a material point (including pulleys, planes)
- Laws of conservation of energy and momentum in translational motion
- Kinematics of rotational motion (circular, angular parameters, centripetal acceleration). Centripetal and centrifugal forces. Conservative forces. Inertial forces. Inertial and non-inertial frames.
- Rigid body mechanics.
- Simple and damped oscillatory motion
- Mechanical Waves

Prerequisites and co-requisites

non

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
passing the exercises	50.0%	50.0%
writing exam	50.0%	50.0%

Recommended reading

Basic literature

[1] K. Jezierski, K. Sierański, I.Szlufarska, *Fizyka -- Repetytorium, zadania z rozwiązaniami, kurs powtórkowy dla studentów I roku i uczniów szkół średnich*, Oficyna Wydawnicza Scripta, Wrocław 2005

[2] M.Herman, A.Kalestyński, L.Widomski, *Podstawy Fizyki dla kandydatów na wyższe uczelnie i studentów*, WN PWN, Warszawa 2004

[3] J.Jędrzejewski, W.Kruczek, A.Kujawski, *Zbór zadań z fizyki dla uczniów szkół średnich i kandydatów na studia*, WNT, Warszawa, 2000

[4] D.Halliday, R.Resnick, J.Walker, *Podstawy Fizyki*, PWN, Warszawa

Supplementary literature

[1] D.Halliday, R.Resnick, J.Walker, *Podstawy Fizyki*, *Zbiór zadań*, PWN, Warszawa

[2] Zbiór zadań z fizyki, skrypt Politechniki Gdańskiej, *http://www.mif.pg.gda.pl/zz/*

[3] W.Moebs, S.J.Ling, J.Sanny, *Fizyka dla szkół wyższych*, Tom 1, OpenStax Polska *https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1*

eResources addresses

Example issues/ example questions/ tasks being completed

Practical activites within the subject

Not applicable

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