University of Gdańsk

Subject card

Subject name and code	Physics - lecture, PG_00199127		
Field of study	Marine Hydrography		
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	3.0
Learning profile	practical	Assessment form	exam
Conducting unit	Laboratory of Physical Oceanography -> Department of Physical Oceanography and Climate Research -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Wojciech Brodziński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	45.0	0.0	0.0	0.0	0.0	45

E-learning hours included: 0.0

Additional information:

Lecture with a multimedia presentation.

If necessary, up to 6 hours of classes can be conducted remotely.

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	1.0	29.0	75

Subject objectives

1. Familiarizing students with basic physical phenomena and processes, the laws governing them and methods of their research.

2. Providing knowledge and developing skills necessary for the effective use of subsequent courses on marine physics and marine hydrography.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[HML3-U08] is able to independently use the professional literature available in traditional and electronic form, make an assessment, critical analysis and synthesis as well as the correct interpretation of the information obtained	is able to independently search for information in Polish and English-language specialized literature, as well as on the Internet within the scope of the subject.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
[HML3-U19] is able to plan and implement independent learning and improvement of his/her professional competences	is able to independently develop their knowledge in the field of physics	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
[HML3-W01] knows and understands, at an advanced level, selected facts, phenomena and processes, as well as methods and theories concerning them, explaining the complex relationships between them, constituting basic general knowledge in the field of scientific disciplines forming the theoretical foundations specific to the field of study	knows at an advanced level and correctly describes the basic physical phenomena occurring in nature, including in the hydrosphere, and the laws governing them	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[HML3-W03] knows and understands, at an advanced level, directions of development and the latest discoveries in the field of scientific disciplines forming the theoretical basis appropriate to the field of study	knows and understands at an advanced level physical methods used in oceanographic and hydrographic research	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[HML3-U14] is able to use the applicable terminology in presenting and discussing problems related to the field of study	is able to correctly use the current terminology in the field of physical and natural sciences.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written

Subject contents

A.1 Motion of a material point: Characteristics of motion. Uniform linear motion. Non-uniform linear motion. Motion on a plane. Circular motion. Relativity of motion.

A.2 Dynamics: Force. Newton's 1st - 3rd principles of dynamics. Types of forces in nature. Gravitational force. Work. Conservative and non-conservative forces. Mechanical energy. Principle of conservation of mechanical energy.

A.3 Many body systems, center of mass. Momentum. Principle of conservation of momentum.

A.4 Mechanical oscillations: Parameters describing harmonic oscillations. Equation of vibrations of a harmonic oscillator. Energy in oscillating motion. Free, damped and forced oscillations. Resonance phenomena.

A.5 Waves: Definition of a wave. Classification of waves. Parameters characterizing a wave. Wave phenomena.

A.6 Electricity and magnetism (selected elements). Electromagnetic waves. Spectrum of electromagnetic radiation.

A.7 Corpuscular-wave nature of light.

A.8 Thermodynamics: Basic concepts: temperature, heat. Mechanisms of heat exchange. The first law of thermodynamics. Ideal gas and its transformations.

A.9 Elements of fluid statics: hydrostatic pressure, Pascal's law, buoyancy force, Archimedes' law.

Prerequisites and co-requisites

Knowledge of the basics of higher mathematics.The prerequisite for taking the exam is a passing grade in the auditory and laboratory exercises in Physics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final exam	51.0%	100.0%

Recommended reading	Basic literature	1. Samuel J. Ling, William Moebs , Jeff Sanny, 2018, Fizyka dla szkół wyższych, OpenStax Polska 2. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 1. Mechanika. Wydawnictwo Naukowe PWN. 3. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 2. Mechanika, drgania i fale, termodynamika. Wydawnictwo Naukowe PWN. 4. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 3. Elektryczność i magnetyzm. Wydawnictwo Naukowe PWN. 5. David Halliday, Robert Resnick, Jearl Walker, 2007. Podstawy fizyki - tom 4. Fale elektromagnetyczne, optyka i teoria względności. Wydawnictwo Naukowe PWN.
	Supplementary literature	1. Stanisław R. Massel, 2010. Procesy hydrodynamiczne w ekosystemach morskich. Wydawnictwo Uniwersytetu Gdańskiego. 2. Orear J.: Fizyka. Tom 1 i 2. WNT, 2008.
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. The work done by the resistance force is always: A. Positive, B. Negative, C. Equal to zero, D. Independent of the path along which the object is moving 2. State Archimedes' principle. 3. Is the speed constant in uniform circular motion?	
Work placement	Not applicable	

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