University of Gdańsk

Subject card

Subject name and code	Hydrophysics - lecture, PG_00091495						
Field of study	Water Management and Protection of Water Resources						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2024/2025			
Education level	undergraduate studies		Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study Subject group related to practical vocational preparation			
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				
Conducting unit	Katedra Geofizyki -> Faculty of Oceanography and Geography						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Marcin Paszkuta					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		15.0	15.0	60	
Subject objectives	1. To familiarise students with the basic physical phenomena and processes, the laws governing them and the methods of studying them. 2. To learn and understand the basic laws responsible for the physical phenomena occurring in the hydrosphere. 3. To provide the knowledge and skills necessary to - use mathematical tools to describe physical phenomena; - make, analyse and interpret observations of nature. 4. To lay the foundations for the effective study of other courses.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-W04] research techniques, methods and tools currently used in water management and protection of water resources both in the field of natural sciences and social sciences, including basic statistical and information technology tools that make it possible to describe, model and interpret data on phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships in social-ecological systems	K_W01 - Knows and understands at an advanced level basic processes and phenomena of the physical processes and phenomena in the aquatic environment (concerning content - points A1, B1 and B3)	[SW4] test/exam - oral or written
[GWOZWL3-W01] in advanced basic biological, physical and chemical processes and phenomena, as well as analyzes their mutual relations and course in relation to natural environment and socio-ecological systems	K_W04 - Knows basic statistical tools to interpret data concerning phenomena and processes observed during laboratory experimentslaboratory experiments (concerning content - point B3)	[SW4] test/exam - oral or written

Subject contents

A. Problems of the lecture
A.1 Part 1 Fundamentals of Physics (15 hours)
A.1.1 Motion of a material point: Characteristics of motion. Uniform and non-uniform rectilinear motion. Curvilinear motion by example of motion on a circle. Relativity of motion.
A.1.2 Dynamics: Force. Newton's 1st - 3rd principles of dynamics. Types of forces in nature. Work. Conservative and non-conservative forces. Energy Mechanical energy. Principle of conservation of energy.
A.1.3 Mechanical oscillation: Dynamics of oscillation (equilibrium state, energy changes). Parameters describing oscillations of an oscillator. Natural and forced. Resonance phenomena.
A.1.4 Waves: Definition of a wave. Classification of waves. Parameters characterising a wave. Wave phenomena. Energy transmitted by waves.
A. 1.5 Thermodynamics: Basic concepts. Main principles of thermodynamics.
A.2 Part 2 Physical phenomena in the hydrosphere (15 hours)
A.2.1 Forces acting on ocean water masses, equilibrium and types of movement of water masses.
A.2.2 Seawater, its molecular structure and physical properties.
A.2.3 Inflow of solar energy and interaction of light with the aquatic environment.
A.2.4 Molecular and turbulent exchange of mass, heat and momentum in water bodies.

Prerequisites and co-requisites

Assessment methods and criteria

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

Recommended reading

Basic literature	1. Halliday D., Resnick R., Walker J., 2007. Podstawy fizyki - tom 1. Mechanika, PWN, Warszawa. 2. Halliday D., Resnick R., Walker J., 2007. Podstawy fizyki - tom 2. Mechanika, drgania i fale, termodynamika, PWN, War-szawa. 3. Halliday D., Resnick R., Walker J., 2007. Podstawy fizyki - tom 3. Elektryczność i magnetyzm. PWN, Warszawa. 4. Halliday D., Resnick R., Walker J., 2007. Podstawy fizyki - tom 4. Fale elektromagnetyczne, optyka i teoria względności, PWN, Warszawa. 5. Halliday D., Resnick R., Walker J., 2007. Podstawy fizyki - tom 5. Fizyka współczesna, PWN, Warszawa. 6. Orear J., 2008. Fizyka, tomy 1, 2., WNT, Warszawa. 7. Dera J., 2003. Fizyka morza, PWN, Warszawa. 8. Massel S.R., 2010. Procesy hydrodynamiczne w ekosystemach morskich. Wydawnictwo Uniwersytetu Gdańskiego.
Supplementary literature	1. Hewitt P.G., 2010. Fizyka wokół nas, PWN, Warszawa. 2. Resnick R.,Halliday D., 1999. Fizyka (części 1, 2).,PWN, Warszawa. 3. Born M., Wolf E., 1988. Principles of Optics. Pergamon Press, London.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	A. Problems of the lecture A.1 Part 1 Fundamentals of Physics (15 hours) A.1.1 Motion of a material point: Characteristics of motion. Uniform and non-uniform rectilinear motion. Curvilinear motion by example of motion on a circle. Relativity of motion. A.1.2 Dynamics: Force. Newton's 1st - 3rd principles of dynamics. Types of forces in nature. Work. Conservative and non-conservative forces. Energy Mechanical energy. Principle of conservation of energy. A.1.3 Mechanical oscillation: Dynamics of oscillation (equilibrium state, energy changes). Parameters describing oscillations of an oscillator. Natural and forced. Resonance phenomena. A.1.4 Waves: Definition of a wave. Classification of waves. Parameters characterising a wave. Wave phenomena. Energy transmitted by waves. A. 1.5 Thermodynamics: Basic concepts. Main principles of thermodynamics. A.2 Part 2 Physical phenomena in the hydrosphere (15 hours) A.2.1 Forces acting on ocean water masses, equilibrium and types of movement of water masses. A.2.2 Seawater, its molecular structure and physical properties. A.2.3 Inflow of solar energy and interaction of light with the aquatic environment. A.2.4 Molecular and turbulent exchange of mass, heat and momentum in water bodies.
Work placement	Not applicable

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