University of Gdańsk

Subject card

Subject name and code	Hydrophysics - lecture, PG_00186981		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2027/2028
Education level	Bachelor's studies	Subject group	Obligatory subject group 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	exam
Conducting unit	Department of Geophysics -> Faculty of Oceanography and Geography -> Rector		
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	2.0	43.0	75

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-W08] advanced knowledge and understanding of the key concepts and issues within their field of study in foreign language.	Knows and is able to use basic concepts related to the field of study in English.	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
[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
[GWOZWL3-U12] formulate opinions on a selected topic and prepare small studies in foreign language.	The student is able to formulate opinions on a selected topic and prepare small studies in English.	[SU1] oral statement/conversation/ discussion
[GWOZWL3-W04] research techniques, methods and tools currently used in water management and the protection of water resources, in both the natural and social sciences, including basic statistical and IT tools enabling the description, modelling and interpretation of data concerning phenomena and processes occurring in the aquatic environment, as well as tools for describing relationships within socio-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

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	

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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