University of Gdańsk

Subject card

Subject name and code	Hydrophysics - tutorials, PG_00192591		
Field of study	Water Management and Protection of Water Resources		
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 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	2.0
Learning profile	practical	Assessment form	credit
Conducting unit	Department of Geophysics -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	mgr Aleksandra Malecha-Łysakowska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	30.0	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	1.0	19.0	50

Subject objectives

1 To familiarise students with basic physical phenomena and processes, the laws governing them and the methods of their study.
2. To learn and understand the basic laws responsible for physical phenomena occurring in the hydrosphere.
3. To impart knowledge and develop skills necessary to:
- to use mathematical apparatus to describe physical phenomena;
- to make natural observations, to analyse and interpret them.
4. To lay the foundations for the effective study of further courses

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-K05] The student has the ability take responsibility for the safety of their own work and that of others, dealing with emergencies, exercising caution in the laboratory and in the field, responsibility for entrusted equipment and apparatus.	K_K05 - is aware of and reliably evaluates the impact of human activities on the environment aquatic environment	[SK3] text preparation/written work
[GWOZWL3-U07] The student can use literature and other available sources of information, including information technology, multimedia, Internet, databases, and select and critically evaluate information.	K_U16 - Can demonstrate creativity in working independently and in teams, taking on different roles	[SU3] text preparation/written work
[GWOZWL3-W01] The student knows and understands 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_U02 - Can select and independently apply basic research techniques and tools, with established analytical procedures, in environmental research in water management	[SW3] text preparation/written work
[GWOZWL3-U16] The student is able to demonstrate creativity in working independently and in team, taking on a variety of roles, including a leadership role.	K_U07 - Able to use the literature and other available sources of information in physics and to select and critically evaluate information (concerning content substantive content - para. A1, B1 and B3)	[SU3] text preparation/written work
[GWOZWL3-W02] The student knows and understands the importance of advanced knowledge in the sciences allowing to understand the processes and phenomena occurring in the hydrosphere, as well as knowledge of the social sciences and of the Earth's geographic environment - as a a system of interrelated and interacting components.	K_U01 - Able to carry out basic observations of physical processes and phenomena in the laboratory (related to content - point B3)	[SW3] text preparation/written work

Subject contents

Part 1 Fundamentals of Physics (15 hours)
The calculus exercises will cover the topicsreferring to the Fundamentals of Physics.
Part 2 Physical Phenomena in the Hydrosphere (15 hours)

2.1. Solar radiation as a primary source of energy, the role of radiation in energy exchange in water bodies (based on the
laws of blackbody radiation),
2.2 Forces acting in the sea, equilibrium state and simple models of water mass flows.
2.3 Equation of state of sea water, vertical stability of water layers.
2.4 Interaction of light with the aquatic environment - elements of hydro-optics.
2.5 Advection and diffusion fluxes of heat and passive components of water.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	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.
Supplementary literature	For Part 2: Physical phenomena in the hydrosphere 7. Dera J., 2003. Fizyka morza, PWN,Warszawa. 8. Massel S.R., 2010. Procesy hydrodynamiczne w ekosystemach morskich. Wydawnictwo Uniwersytetu Gdańskiego.

	eResources addresses	
Example issues/ example questions/ tasks being completed	Part 1 Fundamentals of Physics (15 hours) The calculus exercises will cover the topicsreferring to the Fundamentals of Physics. Part 2 Physical Phenomena in the Hydrosphere (15 hours) 2.1. Solar radiation as a primary source of energy, the role of radiation in energy exchange in water bodies (based on the laws of blackbody radiation), 2.2 Forces acting in the sea, equilibrium state and simple models of water mass flows. 2.3 Equation of state of sea water, vertical stability of water layers. 2.4 Interaction of light with the aquatic environment - elements of hydro-optics. 2.5 Advection and diffusion fluxes of heat and passive components of water.	
Work placement	Not applicable	

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