University of Gdańsk

Subject card

Subject name and code	Principles of Marine Physics - lecture, PG_00198827						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
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	2		Language of instruction	Polish			
Semester of study	4		ECTS credits	3.0			
Learning profile	practical		Assessment form	credit			
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 Jordan Badur					
	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						
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	Acquire knowledge and understanding of basic laws governing physical processes occurring in the sea						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 and understands the facts, phenomena, and processes in physics, as well as the methods and theories that explain the complex relationships between them, which are essential for understanding the fundamental phenomena and processes occurring in aquatic environments	[SW4] test/exam - oral or written
[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, the concepts and terminology used in the natural sciences, as well as basic concepts in marine science, including the development of oceanographic research	[SW4] test/exam - oral or written
[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 relevant terminology when presenting and discussing issues in the physical sciences	[SU4] test/exam - oral or written
[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 use professional literature on marine physics available in both print and electronic formats, and to evaluate, critically analyze, synthesize, and correctly interpret the information obtained	[SU4] test/exam - oral or written
[HML3-U02] is able to select and apply basic research techniques and tools in the field of aquatic environment research, as well as plan and carry out measurements, develop the obtained results and interpret them correctly	is able to apply basic mathematical and statistical methods to analyze data and describe phenomena and processes occurring in the marine environment	[SU4] test/exam - oral or written
[HML3-K02] is ready to correctly determine the priorities in professional work for the implementation of a task specified by himself/ herself or others	is ready to complete tasks on time, whether working individually or as part of a team	[SK4] test/exam - oral or written
[HML3-W02] knows and understands, at an advanced level, selected phenomena and processes occurring in the hydrosphere, atmosphere, lithosphere and biosphere, their interconnections and relations, as well as practical applications of this knowledge in professional activities related to the field of study	knows and understands, at an advanced level, the physical phenomena and natural processes occurring in aquatic environments, with a particular focus on the marine environment, as well as the practical applications of this knowledge	[SW4] test/exam - oral or written

Subject contents

Black body radiation laws.Solar energy flux at the Earth and its distribution. Molecular structure and physical properties of seawater. Forces acting on water in the ocean. Elements of seawater thermodynamics. Equilibrium and water movement - examples of different type of sea currents, wave and convection. Molecular and turbulent exchange of mass, heat and momentum. Acoustic waves in the sea. Basis of marine optics.

Prerequisites and co-requisites

Differential and integral calculus at elementary level

Assessment methods and criteria

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

Recommended reading

Basic literature	Dera J.: Marine Physics. Wyd. PWN, Warszawa, 1983, 2003. Druet, Kowalik, 1970, Marine dynamics, Wyd. Morskie Gdańsk
Supplementary literature	Massel S.R., 2010. Hydrodynamical processes in marine ecosytems. Wyd. Uniwersytetu Gdańskiego.
eResources addresses	

Example issues/ example questions/ tasks being completed

Analysis of different expressions.for seawater equation of state.

Work placement	Not applicable

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