

Subject card

Subject name and code	Selected topics in sea dynamics, PG_00131530						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		2.0		
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 hab. Witold Cieřlikiewicz				
	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		20.0	52
Subject objectives	To introduce students to the phenomena of sea waves, sea currents - an in-depth discussion of selected issues.To explain to students selected elements of marine dynamics in analytical terms.To prepare students for the practical application of basic issues related to modern marine dynamics.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[HML3-W01] 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		At an advanced level, marine hydrodynamics with its mathematical description; its relationship to the laws of physics and its relationship in relation to natural processes; knows and understands the theoretical foundations of other areas of science necessary to formulate and solve typical tasks related to marine dynamics.		[SW4] test/exam - oral or written		
	[HML3-W02] 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		Phenomena and processes in the hydrosphere and atmosphere and their interrelationships.		[SW4] test/exam - oral or written		
	[HML3-K02] correctly determine the priorities in professional work for the implementation of a task specified by himself/ herself or others		To correctly prioritise their work to achieve a task defined by themselves or others.		[SK4] test/exam - oral or written		

Subject contents	Lectures: Forces acting on a moving fluid element. Basic equations of fluid dynamics - equations of conservation of mass and momentum. Large-scale circulation of water masses in the oceans - geostrophic currents - fundamentals, atmospheric and oceanic boundary layers, Ekman spiral and Ekman pumping, western intensification. Wind pile-ups. Basic equations and simplifications for regular waves. Waves - sine waves, Stokes waves, knoidal waves, solitary waves. Refraction, transformation and refraction of waves in the coastal zone - basics. Statistical characteristics of wind waves. Wave prediction methods.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	colloquium	51.0%	100.0%
Recommended reading	Basic literature	MASSEL S. R.: Procesy hydrodynamiczne w ekosystemach morskich. Wyd. UG, Gdańsk 2010. (in Polish)	
	Supplementary literature	DRUET C., Kowalik Z.: Dynamika morza. Wyd. Morskie, Gdańsk 1970. (in Polish) DRUET C.: Dynamika stratyfikowanego oceanu. Wyd. PWN, Warszawa 1994 (in Polish) DRUET C.: Elementy hydrodynamiki geofizycznej. Wyd. PWN, Warszawa 1995. (in Polish) KNAUSS J. A.: Introduction to physical oceanography. Prentice Hall, 1996. LISICKI A.: Pływy na morzach i oceanach. Wyd. GTN, Gdańsk 1996. (in Polish) MASSEL S. R.: Fluid Mechanics for Marine Ecologists. Springer, 1999 MASSEL S.: Poradnik hydrotechnika. Wyd. Morskie, Gdańsk 1992. (in Polish) MELLOR G. L.: Introduction to physical oceanography. Wyd. AIP Press, 1996.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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