University of Gdańsk

Subject card

Subject name and code	Coastal zone dynamics (Lecture), PG_00196135		
Field of study	Physical geography and geoinformation		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
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	academic	Assessment form	exam
Conducting unit	Laboratory of Geomorphological Reconstructions -> Department of Geomorphology and Quaternary Geology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Patryk Sitkiewicz	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15	1.0	34.0	50

Subject objectives
1. Presentation of the hydrodynamic and geological conditions of the variability of the coastal zone 2. Familiarization with geomorphological processes occurring in the coastal zone 3. Determining the role of human activity in shaping the dynamics of the coastal zone 4. Presentation of natural hazards occurring in the coastal zone

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GFGMU2_U02] is able to precisely and appropriately use terminology in the field of physical geography and geoinformation in oral statements and written works	Can fluently and appropriately use terminology related to processes and forms occurring in the coastal zone in in spoken presentation and written work.	[SU4] test/exam - oral or written
[GFGMU2_U06] is able to provide a comprehensive description of a selected area, explain the causes of physical-geographical diversity, and assess current changes taking place in the landscape, whilst attempting to forecast the future direction of these developments	The student is able to provide a comprehensive characterization of selected coasts, explain the causes of their physico-geographical diversity, evaluate contemporary landscape changes, and propose tentative forecasts regarding their future development.	[SU4] test/exam - oral or written
[GFGMU2_W01] knows and understands to a deepened extent the specificity of Earth sciences in the field of physical geography, its internal structure, research subject and main research directions, the methods applied, conceptual apparatus, as well as practical applications of scientific achievements	Knows and understands the subject of research, the main research directions, the conceptual apparatus of coastal geomorphology, and the practical applications of scientific research in this field.	[SW4] test/exam - oral or written
[GFGMU2_W03] knows and understands in a deepened extent issues in the theory of geographic information systems, basics of organization and operation of spatial information infrastructures and possibilities of using geoinformatics tools in physical geography	Knows how geographic information systems are used in coastal research.	[SW4] test/exam - oral or written
[GFGMU2_U05] is able to integrate knowledge from the discipline of Earth and environmental sciences, explaining and interpreting the interrelationships between environmental processes and phenomena in order to solve research problems in physical geography and geoinformation	Can integrate knowledge in the field of coastal sciences, correctly explaining and interpreting the mutual relations between processes and phenomena occurring in the coastal zone of seas and oceans.	[SU4] test/exam - oral or written
[GFGMU2_K01] is able to behave appropriately in the workplace and in everyday life by critically evaluating information received in the light of their existing knowledge, recognising the importance of knowledge in solving cognitive and practical problems, and, when faced with difficulties, drawing on expert knowledge	The student is ready to critically assess his knowledge of coastal geomorphology, supplement it, and verify it by critically reading the literature on the subject.	[SK4] test/exam - oral or written
[GFGMU2_U03] is able to use academic literature in the fields of physical geography and geoinformation in Polish and English, selecting it appropriately for the research objective	Can effectively use scientific literature in research on the coastal zone of seas and oceans, both in Polish and English.	[SU4] test/exam - oral or written
[GFGMU2_W08] knows and understands in a deepened extent the most important contemporary problems in the field of contemporary climate change and environmental crises on a regional and global scale, their essence, genesis and possible consequences	Knows and understands the processes occurring in the coastal zone of seas and oceans at various spatial scales, as well as their essence, genesis, and possible consequences.	[SW4] test/exam - oral or written

Subject contents

1. Coastal zone basic definitions, boundaries, and internal divisions
2. Time-spatial scales of coastal zone morphodynamics
3. Basics of hydrodynamics
4. Landforms of shore and seafloor
5. Methods for assessing the state and changes in shore and nearshore seabed
6. Coastal protection methods
7. Human impact on the coastal zone dynamics
8. Basics of Integrated Coastal Zone Management

Prerequisites and co-requisites		
Assessment methods and criteria		

Subject passing criteria	Passing threshold	Percentage of the final grade
examination	50.0%	100.0%

Recommended reading	Basic literature	• Basiński T., Pruszak Z., Tarnowska M., Zeidler R. (1993). Ochrona brzegów morskich. Wyd. IBW PAN, Gdańsk. • Davidson-Arnott R. (2019). Introduction to Coastal Processes & Geomorphology. Cambridge University Press, Cambridge. • Druet C. (2000). Dynamika morza. Wyd. UG, Gdańsk • Leontiew O.K., Nikiforow L.G., Safinow G.A. (1982). Geomorfologia brzegów morskich. Wyd. Geol., Warszawa. • Pruszak Z. (1998). Dynamika brzegu i dna morskiego. Wyd. IBW PAN, Gdańsk • Pruszak Z. (2003). Akweny morskie, zarys procesów fizycznych i inżynierii środowiska. Wyd. IBW PAN, Gdańsk. • Rudowski S. (1986). Środowisko sedymentacyjne rewowego wybrzeża morza bezpływowego na przykładzie południowego Bałtyku. Studia Geologica Polonica 87, 1-74
	Supplementary literature	• Bird E. (2011). Coastal Geomorphology. John Willey & Sons, Chichester. • Boniecka, H. (2022). Współczesne doświadczenia i trendy w stosowaniu sztucznego zasilania polskich brzegów morskich i zalewów ze szczególnym uwzględnieniem Półwyspu Helskiego. Przegląd Geograficzny, 94(1), 31-57. • Coastal Wiki, http://www.coastalwiki.org • Dubrawski R., ZawadzkaKahlau E. (2006). Przyszłość ochrony polskich brzegów morskich. Zakład Wydawnictw Naukowych Instytutu Morskiego w Gdańsku, Gdańsk • Dz.U.2018.0.2214. Ustawa z dnia 21 marca 1991 r. o obszarach morskich Rzeczypospolitej Polskiej i administracji morskiej • Rudowski S., Lisimenka A., Kałas M., Wróblewski R., Sitkiewicz P. (2017) Uwagi o stanie dna Przekopu Wisły. Gospodarka Wodna 2017 (2): 58-61. • Rudowski S., RucińskaZjadacz M., Wróblewski R., Sitkiewicz P. (2016). Submarine landslides on the slope of a sandy barrier: A case study of the tip of the Hel Peninsula in the Southern Baltic. Geological Quarterly 60 (2): 407416. • Rudowski S., Sitkiewicz P., Wróblewski R., Makurat K. (2017). Solid rocks on the nearshore seabed - the distribution and potential impact on coastal processes in the Kołobrzeg region, the Southern Baltic. Oceanological and Hydrobiological Studies 46 (1): 6273. • Schwartz M.L. (2005). Encyclopedia of Coastal Science. Springer, Dordrecht. • Sherman D.J. (red.) (2013). Coastal Geomorphology. Treatise on Geomorphology, vol 10. Academic Press, San Diego. • Sitkiewicz P., Wróblewski R., Rudowski S. (2015). The dune coast the state just prior to the construction of hard engineering protection structures (Ustka-Jarosławiec, the Southern Baltic). Oceanological and Hydrobiological Studies 44 (3): 352361. • Sitkiewicz P., Rudowski S., Wróblewski R., Dworniczak J. (2020). New insights into the nearshore bar internal structure using high-resolution sub-bottom profiling: The Vistula Spit case study. Marine Geology 419: 106078. • Szefler K., Rudowski S., Wróblewski R., Sitkiewicz P. (2015). Detailed geomorphological mapping of the sea bottom on the basis the Southern Baltic. GEOBALCANICA 2015: 5155.
	eResources addresses	
Example issues/ example questions/ tasks being completed	What is a wash margin? What is artificial beach nourishment? What are the disadvantages of sea-walls? What type of sea currents are responsible for the greatest number of drownings?	
Work placement	Not applicable	

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