

Subject card

Subject name and code	Global changes in the marine environment, PG_00117746						
Field of study	Oceanography						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group 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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Marine Ecosystems Functioning -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Filip Pniewski				
	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		3.0		20.0	53
Subject objectives	To familiarise students with the causes, determinants and directions in global changes observed in marine ecosystems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OCEANMU2-U09] can take part in a discussion/debate using substantive arguments, has the ability to formulate opinions based on scientific knowledge and experience and creating synthetic summaries	Students are able to take the floor in a discussion on changes in the marine environment on a global scale using substantive arguments, will be able to formulate opinions on the basis of their knowledge and experience, and will be able to create synthetic summaries of threats to the marine environment.	[SU1] oral statement/conversation/discussion
	[OCEANMU2-K04] is ready to critically evaluate his/her knowledge and received content in the field of natural sciences in particular in the field of the studied specialty, a in problematic situations, supports oneself with knowledge experts	The student is prepared to critically evaluate his/her knowledge and perceived content in the field of marine sciences, in particular the extent of changes and their consequences to the marine environment, and in problematic situations, is able to use the knowledge of experts.	[SK1] oral statement/conversation/discussion
	[OCEANMU2-U05] is able to use source information in Polish and a selected foreign language, including archival and electronic databases, in the field of oceanographic issues, performs critical analysis and synthesis of information	Students are able to make appropriate use of information and verify sources, in Polish and English, on global changes in marine ecosystems, carrying out a critical analysis thereof.	[SU1] oral statement/conversation/discussion
	[OCEANMU2-W06] knows and identifies potential threats to the marine environment on a local and global scale resulting from strong anthropopressure, predicts their effects on various time and space scales	Student knows and identifies potential threats to the marine environment on a global scale resulting from strong anthropopression, and predicts their consequences in relation to the functioning of marine ecosystems and the use of marine resources.	[SW2] presentation/project/paper/report [SW5] implementation of a problem task
	[OCEANMU2-W02] knows and understands complex processes and phenomena occurring in the marine environment, with particular emphasis on the coastal zone, as well as complex relationships between living and non-living elements of the aquatic environment	Student knows and understands to a deeper degree the complexity of phenomena occurring in all zones of the marine environment, including the relationships between living and non-living elements of the marine environment and the changes to which they may be subjected as a result of human activities.	[SW2] presentation/project/paper/report [SW5] implementation of a problem task
Subject contents	1 Climate warming and its consequences. 2 Eutrophication - causes and consequences. 3. Ocean pollution. Marine disasters. Litter in the oceans. 4 Changes in the range of marine organisms. Alien species. 5 Progress and prospects for exploitation of animate and inanimate resources of the oceans. 6. Mariculture development, importance and impact on marine ecosystems.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	report	51.0%	50.0%
	participation in a discusssion	100.0%	50.0%
Recommended reading	Basic literature	1. Kozer J., Mass K., Kothuis B. 2003. Demonstration of environmentally sound and cost-effective shipping. Journal of Cleaner Production. 11: 767-777. 2. Nienhuis P.H. 1992. Eutrophication, water management, and the functioning of Dutch estuaries and coastal lagoons. Estuaries. 15(4): 538-548. 3. Occhipinti-Amborgi A. 2007. Global change and marine communities: Alien species and climate change. Marine Pollution Bulletin. 55: 342-352. 4. Sabine C.L., Feely R.A., Gruber N., Key R.M, Lee K., Bullister J.L., Wanninkhof R., Wong C.S., Wallace D.W.R., Tilbrook B., Millero F.J., Peng T.-H., Kozyr A., Ono T., Rios A.F. 2004. The Oceanic Sink for Anthropogenic CO2. Science. 305: 367-371. 5. Seibel B.A., Fabry V.J. 2003. Marine biotic response to elevated carbon dioxide. Advances in Applied Biodiversity Science. 4: 59-67. 6. Stachowicz J.J., Terwin J.R., Whitlatch R.B., Osman R.W. 2002. Linking climate change and biological invasions: Ocean warming facilitates nonindigenous species invasions. PNAS. 99(24): 15497-15500.	

	Supplementary literature	1. Kozer J., Mass K., Kothuis B. 2003. Demonstration of environmentally sound and cost-effective shipping. <i>Journal of Cleaner Production</i>. 11: 767-777. 2. Nienhuis P.H. 1992. Eutrophication, water management, and the functioning of Dutch estuaries and coastal lagoons. <i>Estuaries</i>. 15(4): 538-548. 3. Occhipinti-Amborgi A. 2007. Global change and marine communities: Alien species and climate change. <i>Marine Pollution Bulletin</i>. 55: 342-352. 4. Sabine C.L., Feely R.A., Gruber N., Key R.M, Lee K., Bullister J.L., Wanninkhof R., Wong C.S., Wallace D.W.R., Tilbrook B., Millero F.J., Peng T.-H., Kozyr A., Ono T., Rios A.F. 2004. The Oceanic Sink for Anthropogenic CO₂. <i>Science</i>. 305: 367-371. 5. Seibel B.A., Fabry V.J. 2003. Marine biotic response to elevated carbon dioxide. <i>Advances in Applied Biodiversity Science</i>. 4: 59-67. 6. Stachowicz J.J., Terwin J.R., Whitlatch R.B., Osman R.W. 2002. Linking climate change and biological invasions: Ocean warming facilitates nonindigenous species invasions. <i>PNAS</i>. 99(24): 15497-15500.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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