

Subject card

Subject name and code	Emission of nutrients from Polish agriculture to the Baltic Sea, PG_00091471						
Field of study	Water Management and Protection of Water Resources						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor'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	3		Language of instruction		English		
Semester of study	6		ECTS credits		2.0		
Learning profile	practical		Assessment form				
Conducting unit	Laboratory of the Biogeochemical Cycle of Elements -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Katarzyna Łukawska-Matuszewska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	0.0	0.0	0.0	20
	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	20		2.0		28.0	50
Subject objectives	To gain knowledge about the sources of pollution in the marine environment and their impact on the eutrophication of the Baltic Sea. To learn the basic concepts and terms of water protection. To learn about natural and anthropogenic factors shaping the concentration of nutrients in the Baltic Sea. Cycling of N and P in the marine environment.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GWOZWL3-U15] by solving in groups the assigned problem situations, appropriately set priorities to achieve task defined by themselves or others	Is able to work in a group, set priorities and appropriately plan the activities necessary to complete the task	[SU5] implementation of a problem task [SU8] observation of student's independent or team work
	[GWOZWL3-U12] formulate opinions on a selected topic and prepare small studies in English	I able to formulate opinions on the inflow of pollutants into the sea and the eutrophication of the marine environment and to create small studies in English	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU3] text preparation/written work
	[GWOZWL3-U13] read with understanding specialized scientific texts in Polish and English	Is able to read with understanding scientific publications on anthropopression, including marine inflows and eutrophication in English	[SU1] oral statement/conversation/discussion [SU3] text preparation/written work
	[GWOZWL3-W02] the importance of 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 system of interrelated and interacting components	Knows the importance of scientific knowledge to understand the processes and phenomena that cause pollution marine waters	[SW2] presentation/project/paper/report [SW3] text preparation/written work
	[GWOZWL3-W08] basic concepts and problems in the field of study in English	Knows basic concepts related to anthropopression, including marine inputs and eutrophication in English	[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report [SW3] text preparation/written work
	[GWOZWL3-W09] potential threats and sources of pollution of surface and groundwater resulting from the development of civilization, in particular strong anthropopression	Knows the potential threats to the environment and the sources of marine water pollution	[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report
Subject contents	1. Characteristics of the Baltic Sea catchment area. 2. Classification of nitrogen and phosphorus sources in the marine environment. 3. Nitrogen and phosphorus emissions from agricultural sources and inflow with river waters. 4. Nutrient emissions from the territory of Poland in comparison with other countries in the Baltic Sea catchment area. 5. Nutrient inflow from external sources vs. the ecological state of the Baltic Sea. 6. Eutrophication of the Baltic Sea - status and trends. 7. Cycle of N and P in the marine environment.		
Prerequisites and co-requisites	Basic knowledge of English		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final project (presentation)	51.0%	40.0%
	Activity - participation in the discussion	51.0%	30.0%
	Class assignments (reading, analysis of data)	51.0%	30.0%
Recommended reading	Basic literature	Pastuszek M. i Igras J., 2012. Temporal and spatial differences in emission of nitrogen and phosphorus from Polish territory to the Baltic Sea. Gdynia-Puławy 2012 HELCOM reports available on the websites of Helsinki Commission, Baltic Marine Environment Protection Commission (https://helcom.fi/)	
	Supplementary literature	Wählström, I. <i>et al.</i> (2020) Combined climate change and nutrient load impacts on future habitats and eutrophication indicators in a eutrophic coastal sea. <i>Limnol. Oceanogr.</i> 65 , 21702187. https://doi.org/10.1002/lno.11446 . Murray CJ, Müller-Karulis B, Carstensen J, Conley DJ, Gustafsson BG and Andersen JH (2019) Past, Present and Future Eutrophication Status of the Baltic Sea. <i>Front. Mar. Sci.</i> 6:2. doi: 10.3389/fmars.2019.00002	
	eResources addresses	Supplementary https://helcom.fi/ - HELCOM reports available on the websites of Helsinki Commission	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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