

**Subject card**

Subject name and code	, PG_00121047						
Field of study	Oceanography						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	postgraduate studies	Subject group			Optional subject group		
Mode of study	full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish Polish		
Semester of study	3	ECTS credits			2.0		
Learning profile	academic	Assessment form					
Conducting unit	Pracownia Transformacji Substancji Toksycznych -> Katedra Oceanografii Chemicznej i Geologii Morza -> Faculty of Oceanography and Geography						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Magdalena Beldowska					
	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	7.0		25.0	62	
Subject objectives	Learning about the circulation of metals in the marine environment, with particular emphasis on re-emission and remobilisation.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[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	can explain the causes and effects of changes in the concentration of metals in different elements of the marine environment marine environment			[SW4] test/exam - oral or written		
	[OCEANMU2-W05] knows and understands the principles of planning and conducting field and laboratory research as well as advanced methods and tools of scientific research, especially in the field of the studied specialty	can explain the need for carry out research on the circulation of metals in the marine environment marine environment			[SW4] test/exam - oral or written		
Subject contents	<ol style="list-style-type: none"> <li>1. Characteristics of metals (including toxicity), their sources and uses;</li> <li>2. Metals in the atmosphere;</li> <li>3. Metals in seawater;</li> <li>4. Metals in marine organisms (including bioconcentration, bioaccumulation, biomagnification);</li> <li>5. Metals in marine sediments;</li> <li>6. Metals input to the sea (including remobilisation from land);</li> <li>7. Impact of climate change on the environmental cycling of metals.</li> </ol>						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written/oral exam	51.0%	100.0%
Recommended reading	Basic literature	Piotr Szefer, Metals, metalloids, and radionuclides in the Baltic Sea ecosystem, 2002 Elsevier  Alina Kabata-Pendias, Arun B. Mukherjee. Trace Elements from Soil to Human, 2007 Springer	
	Supplementary literature	the latest scientific publications from renowned journals	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Describe how and why the concentration of metals in the water column changes using the Baltic Sea as an example.</li> <li>2. List the biotic/abiotic factors affecting the bioaccumulation of metals in marine organisms. Describe the influence of several factors.</li> <li>3. What parameters should be measured when studying changes in lead concentration in bottom sediments. Discuss briefly the influence of five of these.</li> <li>4. What factors need to be taken into account when estimating metal inputs to the sea.</li> <li>5. How does climate change affect the circulation of metals in the marine environment</li> </ol>		
Work placement	Not applicable		

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