

Subject card

Subject name and code	Metals in the marine environment - laboratory exercises, PG_00117772						
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	3		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Laboratory of Toxic Substances Transformation -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector						
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	0.0	0.0	30.0	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		5.0		22.0	57
Subject objectives	Practical familiarisation with the analysis of metals in various components of the marine environment.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OCEANMU2-U11] is able to work individually and cooperate in laboratory and field groups, performs various functions in them, including managerial ones, performs various assigned tasks	is able to work in a group in a variety of roles	[SU5] implementation of a problem task
	[OCEANMU2-K06] is ready to think and act in a way enterprising, and based on qualifications, engaging in preparation or implementation of professional tasks	knows how to ask and answer a scientific question based on the collection of samples and their chemical analysis	[SK5] implementation of a problem task
	[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	know how to prepare the laboratory and the equipment for collecting study material	[SW2] presentation/project/paper/report
	[OCEANMU2-K01] is ready to plan, implement and supervise, individually or collectively, next stages of the entrusted task, is ready to take responsibility for its results, cooperates effectively in the team and performs its functions in it various functions, including managerial ones	be able to pose a research problem and use appropriate tools to verify it	[SK5] implementation of a problem task
	[OCEANMU2-U03] can plan and carry out independently advanced research and measurements, both in field and laboratory, using appropriately selected measurement and analytical techniques in the field of oceanography, adequately to the studied specialty and research problem	know how to: prepare a scientific research project, take samples in the field and analyse them in the laboratory	[SU5] implementation of a problem task
	[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	be able to interpret the results obtained from chemical analyses	[SU2] presentation/project/paper/report
Subject contents	1. Sampling for metal analysis 2. Preparation of solid samples for metal analysis 3. Analysis of metals using atomic absorption spectroscopy 4. Metal speciation 5. Preparation and implementation of own project on metals in the marine environment		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	writing and implementing a scientific research project	51.0%	40.0%
	performing an experiment in the laboratory	51.0%	20.0%
	implementation of project task I	51.0%	20.0%
	implementation of project task II	51.0%	20.0%
Recommended reading	Basic literature	Alina Kabata-Pendias, Arun B. Mukherjee. Trace Elements from Soil to Human, 2007	
	Supplementary literature	Selected scientific articles on metals in the marine environment	
	eResources addresses		

Example issues/ example questions/ tasks being completed	1. Does a marina affect metal concentrations in the marine environment? 2. Macroalgae as a bioindicator of metals in the Gulf of Gdansk. 3. What does mercury speciation depend on? 4. Preparation and implementation of a scientific research project on metals in the marine environment. Working in groups of 2-3 persons.
Work placement	Not applicable

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