

**Subject card**

<b>Subject name and code</b>	Elementary Analysis and Ecological Stoichiometry - lecture, PG_00204977						
<b>Field of study</b>	Oceanography						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2027/2028		
<b>Education level</b>	Master's studies	<b>Subject group</b>			Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	2	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	3	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			exam		
<b>Conducting unit</b>	Laboratory of Marine Environmental Protection -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	Subject supervisor		dr hab. Dorota Burska				
	Teachers						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		1.0		9.0	25
<b>Subject objectives</b>	A detailed description of analytical chemistry methods, including the principles of CHNS/O elemental analyzers, used in the analysis of the basic elemental composition of environmental material. Obtain knowledge of the contribution of elements to the elements of the animate and inanimate environment and the role of ecological stoichiometry in the description of environmental processes.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OCEANMU2-U08] is able to prepare a study of a given issue/ problem in Polish and a selected foreign language in written form (short scientific text, documented research work) and orally (paper, presentation) and discuss with specialists on topics related to oceanographic issues, with particular emphasis on the studied specialty	Able to discuss topics concerning regional and global changes in the marine environment	[SU1] oral statement/conversation/discussion
	[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	Knows in depth the course of biogeochemical in the marine environment and the coastal zone coastal zone, as well as the complex relationships between chemical composition of the elements of the animate and inanimate and processes occurring in it	[SW4] test/exam - oral or written
	[OCEANMU2-W01] knows and understands in-depth specialized terminology used in oceanography and related sciences (in Polish and a selected foreign language)	Knows in depth specialized terminology used in elementary analysis and ecological stoichiometry in Polish	[SW4] test/exam - oral or written
	[OCEANMU2-W04] has an in-depth understanding of the latest research trends in oceanography, as well as the possibilities for practical application of related achievements; evaluates their usefulness and limitations in solving scientific research problems, and critically analyzes and assesses their applicability	Knows in depth the latest scientific hypotheses concerning the functioning of the marine and terrestrial environments, including the role of ecological stoichiometry ecology in predicting global changes at different time scales	[SW1] oral statement/conversation/discussion [SW3] text preparation/written work
	[OCEANMU2-U02] is able to fluently and accurately use scientific terminology when presenting and discussing oceanographic issues, and to propose and justify innovative solutions	Can fluently use specialized terminology used in the field of chemical analytics and ecological stoichiometry in discussing contemporary hypotheses scientific hypotheses regarding global changes	[SU4] test/exam - oral or written
	[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	Can fluently use specialized terminology used in the field of chemical analytics and ecological stoichiometry in discussing contemporary hypotheses scientific hypotheses regarding global changes	[SK3] text preparation/written work [SK4] test/exam - oral or written
Subject contents	<p>1 Instrumental analysis, theoretical basis of elementary analysis, construction and principle of operation of selected elemental analyzers. Chemical substances used in elemental analysis. 2 Methods of mineralization of environmental samples, method of dynamic combustion of matter in the presence of oxygen and quantitative measurement of the products of combustion, sub-satutes of statistical analysis and validation of chemical methods in environmental studies. 3 Stoichiometry, homeostasis, Redfield equation - definitions and assumptions. 4 Carbon, nitrogen and phosphorus selection hypothesis in biochemical evolution. C,N,P: the main compounds biochemical and cellular structures of plants. 5 Stoichiometry of plants and animals in aquatic and terrestrial, dynamics and interactions. 6 C,N,P,S in selected marine and terrestrial elements. 7 The role of stoichiometry in marine environmental processes (e.g., carbon sequestration, biogeochemical models, paleoclimate studies).</p>		
Prerequisites and co-requisites			

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	51.0%	10.0%
	thematic study	51.0%	60.0%
	problem discussion	51.0%	30.0%
Recommended reading	Basic literature	<p>1. Bobrański B., 1979, Quantitative analysis of organic compounds, PWN, Warsaw, ( in Polish)2. Bolalek J., (red.) 2010, Physical, biological and chemical studies of marine bottom sediments. Gdansk University Press, Gdansk ( in Polish)3. Sterner R.W., Elser J.J., 2002, Ecological Stoichiometry: The Biology of Elements from Molecules to the Biosphere, Waleńczak Z., 1987, Geochemia organiczna, Wydawnictwa Geologiczne, Warszawa,</p>	
	Supplementary literature	<p>1. Uścińowicz Sz., (red.) 2011, Geochemistry of Baltic Sea surface sediments, Polish Geological Institute-National Research Institute, Warsaw ( in Polish)2. Selected publications related to the topic of the class, internet sites of scientific projects/programs with global reach</p>	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>Sample study topics: Contents of C, N, S, P in soil in Poland and their changes over time, Modeling of biogeochemical processes, Characterization of fuels based on the content of the main elements (C, H, O, S) of combustible organic matter, Written test/exam: Oxidizing substances used in elemental analysis. The most important effects in the ecosystem (structural and functional) caused by changes in the proportions of N and P supply to the environment,</p>		
Work placement	Not applicable		

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