University of Gdańsk

Subject card

Subject name and code	Elementary Analysis and Ecological Stoichiometry - lecture, PG_00205015		
Field of study	Oceanography		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
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	1.0
Learning profile	academic	Assessment form	exam
Conducting unit	Laboratory of Marine Environmental Protection -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Dorota Burska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

Detailed description of the methods of analytical chemistry, 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 describing environmental processes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 proficiently use specialized terminology used in the field of chemical analytics and ecological stoichiometry in discussing contemporary scientific hypotheses regarding global change	[SU4] 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	has an in-depth understanding of the latest scientific hypotheses on the functioning of the marine and terrestrial environments, including the role of stoichiometry of ecological stoichiometry in predicting global changes on different time scales	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
[OCEANMU2-W01] knows and understands in-depth specialized terminology used in oceanography and related sciences (in Polish and a selected foreign language)	knows to an in-depth degree the specialized terminology used in in elementary analysis and ecological stoichiometry in Polish	[SW4] test/exam - oral or written
[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 on 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 processes in the marine environment and coastal zone, as well as the complex relationships between the chemical composition of the elements of the animate and inanimate environment and the processes in it	[SW4] 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 in particular in the field of the studied specialty, a in problematic situations, supports oneself with knowledge experts	He is prepared to critically evaluate his knowledge and received content in the field of natural sciences, in particular in the field of contemporary hypotheses/problems in oceanography	[SK3] text preparation/written work [SK4] test/exam - oral or written

Subject contents

1 Instrumental analysis, theoretical basis of elemental 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 combustion products, 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: major biochemical compounds and plant cellular structures.5 Stoichiometry of plants and animals in aquatic and terrestrial environments, 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).

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	51.0%	30.0%
problem discussion	51.0%	10.0%
thematic study	51.0%	60.0%

Recommended reading	Basic literature	1. Bobrański B., 1979, Quantitative analysis of organic compounds, PWN,Warsaw, (in Polish)2, Bolałek 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,
	Supplementary literature	1. Uścinowicz 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, inernet sites of scientific projects/programs with global reach
	eResources addresses	
Example issues/ example questions/ tasks being completed	Examples of study topics: Contents of C, N, S, P in soil in Poland and their changes over time, Modeling 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,. Major effects in the ecosystem (structural and functional) caused by a change in the ratio of N and P supply to the environment,	
Work placement	Not applicable	

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