

Subject card

Subject name and code	Elementary Analysis and Ecological Stoichiometry - laboratory, PG_00204976						
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		4.0		
Learning profile	academic		Assessment form		credit		
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	0.0	0.0	45.0	0.0	0.0	45
	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	45		3.0		52.0	100
Subject objectives	Preparation of environmental samples for analysis: homogenization methods, removal of interfering substances/compounds, wet and dry mineralization, use of component extraction, weighing methods. Skill in proper operation, including calibration of automatic analyzers using the CHNS/O elemental analyzer as an example. Analysis of the elemental composition of C,H,N,S in a variety of environmental material.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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;	Plans and correctly implements the next steps of analytical work in the elemental analysis of environmental samples with critical data analysis. Carries out the work both independently and as part of a team in various roles, including leadership	[SK8] observation of student's independent or team 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 proficiently use specialized terminology applied to chemical analytics and ecological stoichiometry in presenting and discussing contemporary scientific hypotheses on global change	[SU3] text preparation/written work
	[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	Can independently conduct an analysis of elemental composition in various environmental materials and verify its reliability	[SU3] text preparation/written work [SU8] observation of student's independent or team work
	[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 the specialized terminology used in elementary analysis and ecological stoichiometry in Polish	[SW2] presentation/project/paper/report
	[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	Be able to prepare in Polish a study of an issue in the form of a report and a poster, and to discuss issues concerning the marine environment	[SU3] text preparation/written work
[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	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	
Subject contents	<p>1.Principles of operation of CHNS analyzer; calibration of the device from analytical standards and reference materials taking into account the environmental matrix.2. Preparation of solid, semi-liquid samples for analysis: marine sediments, lake sediments with different grain size and organic matter content, soils, suspended solids, marine organisms, higher plants.3. Determination of the percentage of C,H,N,S in selected organic compounds of known chemical composition and in environmental samples.4. Calculation of the empirical and sum formula of a compound, verification of the results obtained, evaluation of the uncertainty of the results and determination of the degree of chemical contamination.5. creation of a database of results (own, archival, model, satellite, literature results).6. oral and graphical presentation of selected issues related to the elemental composition of environmental elements (analysis of C:N:P:S results in depth gradient, latitudinal, trophic chain).</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	class work	51.0%	10.0%
	poster/presentation	51.0%	20.0%
	worksheet/report	51.0%	70.0%

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. Gluch I., Balcerzak M., (red), 2007, Analytical chemistry, Laboratory exercises, Warsaw University of Technology Publishing House, Warsaw (in Polish). 4. Namieśnik J., Jamrógiewicz Z., (red.), 1998, Physicochemical methods of environmental pollution control, WNT, Warsaw (in Polish).
	Supplementary literature	Selected publications related to the topic of the class, project websites/databases/environmental models
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>Work sheet: environmental sampling (e.g., coastal zone) description of sampling methods and analytical methods used (procedures, conversions, error analysis), tabular and graphical presentation of results, , summary (methodological notes, description of results) Poster: sample topics: Methods for the determination of carbon forms in environmental material using elemental analysis, Change in the content of carbon forms in soil along the profile of the shoreline - city park in Gdynia Class work: health and safety rules in the field, care of equipment, organization of the workstation</p>	
Work placement	Not applicable	

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