University of Gdańsk

Subject card

Subject name and code	Elementary Analysis and Ecological Stoichiometry - laboratory, PG_00205014		
Field of study	Oceanography		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2028/2029
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, prof. UG	
	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	4.0	51.0	100

Subject objectives

Preparation of environmental samples for analysis: methods of homogenization, removal of substances/ compoundsinterfering substances, wet and dry mineralization, use of component extraction, weighing methods.Skill in proper operation, including calibration of automatic analyzers using the example of an analyzerCHNS/O elemental analyzer. Analysis of the elemental composition of C,H,N,S in a variety of materialenvironmental.

Learning outcomes			
	Course outcome	Subject outcome	Method of verification
	[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 perform an analysis of the composition of elemental composition of various materials 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 specialized terminology used in elementary analysis and ecological stoichiometry in Polish	[SW2] presentation/project/paper/ report
	[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 presenting and discussing contemporary scientific hypotheses regarding global changes	[SU3] text preparation/written work
	[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;	It plans and correctly implements subsequent stages of analytical work in in the field of elementary analysis environmental samples with critical analysis of the data. Performs the work both independently as well as in a team performing various functions in it, including leadership	[SK8] observation of student's independent or team work
	[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 prepare in Polish Polish w the form of a report and a poster As well as discuss topics concerning marine	[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 in particular in the field of the studied specialty, a in problematic situations, supports oneself with knowledge experts	He is prepared to critically evaluate the knowledge he possesses and received content in the field of natural sciences natural sciences, in particular from the scope of contemporary hypotheses/ problems in oceanography	[SK3] text preparation/written work
Subject contents	1 Principles of operation of the CHNS analyzer; calibration of the device from analytical standards and materialsreference materials taking into account the environmental matrix. 2 Preparation of solid, semi-liquid samples foranalysis: marine sediments, lake sediments of different grain size and organic matter content, soils, suspensions,marine organisms, higher plants. 3. Determination of the percentage of C,H,N,S in selected compoundsorganic compounds of known chemical composition and in environmental samples, 4. Calculation of formulaempirical and sum formula of the compound, verification of the obtained results, evaluation of the uncertainty of the results anddetermination of the degree of contamination of chemicals. 5. Creation of a database of results (results ofown, archival, model, satellite, literature). 6. Oral and graphic presentation of selectedissues related to the elemental composition of environmental elements (analysis of C:N:P:S results in thedepth gradient, latitudinal gradient, trophic chain).		
Prerequisites and co-requisites			

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>worksheet/report</td><td>51.0%</td><td>70.0%</td></tr>
<tr><td>poster/presentation</td><td>51.0%</td><td>20.0%</td></tr>
<tr><td>class work</td><td>51.0%</td><td>10.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Bobrański B., 1979, Quantitative analysis of organiccompounds,PWN,Warsaw, (in Polish)2, Bolałek J., (red.) 2010,Physical, biologicaland chemical studies of marine bottomsediments.Gdansk University Press, Gdansk (in Polish)3. Głuch I.,Balcerzak M., (red), 2007,Analytical chemistry, Laboratory exercises,Warsaw University of Technology Publishing House, Warsaw (inPolish).4. Namieśnik J., Jamrógiewicz Z., (red.),1998, Physicochemicalmethods of environmental pollution control, WNT, Warsaw (in Polish).</td></tr>
<tr><td>Supplementary literature</td><td>Selected publications related to the topic of the class, project websites/ databases/environmental models</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Work sheet: environmental sampling (e.g., coastal zone) description of sampling methods andanalytical methods used (procedures, conversions, error analysis), tabular and graphicalpresentation of results, , summary (methodological notes, description of results)Poster: sample topics: Methods for the determination of carbon forms in environmental material usingelemental analysis, Change in the content of carbon forms in soil along the profile of the shoreline - city park inGdyniaClass work: health and safety rules in the field, care of equipment, organization of the workstation</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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