University of Gdańsk

Subject card

Subject name and code	Elementary analysis and ecological stoichiometry - laboratory, PG_00117767		
Field of study	Oceanography		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	postgraduate studies	Subject group	Obligatory subject group 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 Polish
Semester of study	3	ECTS credits	4.0
Learning profile	academic	Assessment form	
Conducting unit	Pracownia Ochrony Środowiska Morskiego -> Katedra Oceanografii Chemicznej i Geologii Morza -> Faculty of Oceanography and Geography		
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	5.0	50.0	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-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-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	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-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	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
	[OCEANMU2-U02] can use scientific terminology fluently and appropriately in presenting and discussing problems in the field of oceanography	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-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

Subject contents	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).
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>class work</td><td>51.0%</td><td>10.0%</td></tr>
<tr><td>poster/presentation</td><td>51.0%</td><td>20.0%</td></tr>
<tr><td>worksheet/report</td><td>51.0%</td><td>70.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Bobrański B., 1979, Quantitative analysis of organic compounds,PWN,Warsaw, (in Polish)2, Bolałek J., (red.) 2010, Physical, biologicaland chemical studies of marine bottom sediments.Gdansk University Press, Gdansk (in Polish)3. Głuch 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).</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>Adresy na platformie eNauczanie:</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 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 GdyniaClass 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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