University of Gdańsk

Subject card

Subject name and code	Chemical Oceanography - laboratory classes, PG_00206132		
Field of study	Oceanography		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2028/2029
Education level	Bachelor'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	Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Katarzyna Łukawska-Matuszewska, prof. UG	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	60.0	0.0	0.0	60
	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	60	5.0	35.0	100

Subject objectives	To learn methods for determining nutrients in seawater. Developing the ability to plan and carry out analytical work and interpreting the results based on the knowledge gained in class and the literature. To learn about the interrelationships between physical, biological and chemical processes in the sea.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OCEANL3-U11] is able to work individually and collaborate in a team, assuming various roles and performing different tasks	Is able to work independently and in a laboratory group while performing chemical analyses, is able to perform various tasks and perform various functions in a group	[SU3] text preparation/written work
[OCEANL3-U04] is able to independently search for information in Polish and foreign specialist literature, as well as on the Internet and in databases	Is able to search for information in the literature on chemical oceanography in Polish and English, as well as on the Internet and in databases	[SU2] presentation/project/paper/ report [SU3] text preparation/written work
[OCEANL3-W05] has an advanced knowledge of techniques, research methods, and tools (mathematical, statistical, and computational) used by oceanographers to describe and interpret processes and phenomena occurring in the marine environment	Knows analytical techniques, research methods and statistical tools used in the work of an oceanographer to describe and interpret chemical processes in the marine environment	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[OCEANL3-W02] has a broad knowledge and understanding of physical, biological, chemical, and geological processes and phenomena occurring in aquatic environments, with particular emphasis on the marine environment	Knows and understands the basic chemical processes occurring in the marine environment	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report [SW3] text preparation/written work
[OCEANL3-K01] is willing to plan and implement, individually or as a team, the subsequent stages of the entrusted task, is willing to take responsibility for the results of these works, effectively cooperates in the team and performs various roles in it	I willing to plan and execute the next steps of chemical analysis and be responsible for the results obtained, is ready to perform various roles in the team	[SK3] text preparation/written work

Subject contents

- Spectrophotometry and atomic absorption in the analysis of nutrients and major ions in seawater (Lambert Beer's law, calibration methods - point and linear);
- Methods of sampling and preservation of seawater samples for chemical analysis;
- Performance of calibration based on chemical standards and determination of nutrients and macronutrients in seawater samples in the coastal zone of the Gulf of Gdańsk;
- Analysis of the obtained results using statistical and graphical methods, error analysis, synthetic presentation of the results in the form of a report, comparison with the data available on the Internet data portals (monitoring data and cruise reports of IMGW, hydrodynamic model, SatBaltic system);
- Analysis and discussion of the obtained results, taking into account the factors affecting the variability of the parameter in the marine environment;
- Analysis and presentation of the variability of concentrations of nutrients and major ions in the ocean;
- Independent organization of the workplace, selection of laboratory techniques and analytical procedures for conducting analyses of nutrients and macronutrients in seawater.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Preparation of a presentation on a given topic.	51.0%	10.0%
Reports	51.0%	30.0%
Test	51.0%	10.0%
Entry tests	51.0%	40.0%
Independent completion of a specified practical task	51.0%	10.0%

Recommended reading

Basic literature

Falkowska L., Bolałek J., Łysiak-Pastuszak E., 1999, Analiza chemiczna wody morskiej, cz. 2., Wyd.UG, Gdańsk (In Polish)
Bolałek J., Falkowska L., 1999, Analiza chemiczna wody morskiej, cz. 1., Wyd. UG, Gdańsk (In Polish)
Korzeniewski K., 1995, Podstawy oceanografii chemicznej, Wyd. UG, Gdańsk (In Polish)

Horne R.A., 1969, Marine chemistry, Wiley, New York
Riley J.P.., Chester R., 1971, Introduction to marine chemistry, Academic Press, London
Riley J.P., Skirrow G., 1975, Chemical oceanography, Wyd. Academic Press, London
Millero F.J., 2002. Chemical Oceanography 2nd ed. CRC Press, Boca Raton, Boston, London, New York, Washington, DC, 490.

	Supplementary literature	Korzeniewski K., 1986, Hydrochemia, WSP, Słupsk, Skrypty i Monografie Stumm W., Morgan J.J., 1981, Aquatic chemistry, Wiley, New York Sienko M.J., Plane R.A., 1980, Chemia. Podstawy i własności, Wyd. PWN, Warszawa Publikacje w czasopismach udostępnione przez prowadzącego.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Performing chemical analysis in seawater. Graphical and statistical processing of results. Searching for information on the occurrence of nutrients and macronutrients in seawater in literature and online sources.	
Work placement	Not applicable	

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