University of Gdańsk

Subject card

Subject name and code	Diploma lecture - Modern technologies in environmental analysis, PG_00081852						
Field of study	Chemistry						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2026/2027			
Education level	Bachelor's studies		Subject group	Obligatory subject group in the field of study Optional subject group			
Mode of study	full-time studies		Mode of delivery	at the university			
Year of study	3		Language of instruction	Polish			
Semester of study	6		ECTS credits	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Department of Environmental Analysis -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Łukasz Haliński					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		5.0	15.0	50	
Subject objectives	1. To familiarize students with the basic knowledge of environmental pollution 2. To introduce students to risk assessment and toxic effects of pollutants on organisms 3. To familiarize students with the main steps of the analytical process 4. To introduce students to the basics of methods of extraction, purification and analysis of organic compounds 5. To introduce students to the principles of designing an analytical process on the basis of the nature, structure and properties of a chemical compound 6. Developing the ability to independently propose the course of a simple analytical process.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_U08] Presents in an understandable way the basic facts about chemistry using a scientific language typical of chemical sciences.	Students are familiar with selected contemporary techniques for the extraction, purification and analysis of organic environmental pollutants and are able to indicate the possibilities and limitations of their application.	[SU4] test/exam - oral or written
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	Students are able to propose a simple analytical process based on the properties of a chemical compound and the matrix in which the compound is determined.	[SW4] test/exam - oral or written
[CHEML3_K01] Identifies the level of her/his own knowledge and skills and the need for continuous learning and personal development.	Students are able to identify gaps in their knowledge and demonstrate the ability to independently find the necessary data in the literature.	[SK4] test/exam - oral or written
[CHEML3_W03] Explains the relationship between the structure of matter and its observed properties.	Students know the origin of selected environmental pollutants and understands the relationship between the physicochemical properties of a substance and its behavior in the environment. Students understand the relevance of the structure and properties of the tested chemical compounds in the selection of the most appropriate analytical method.	[SW4] test/exam - oral or written

Subject contents

Classification, sources and fate of selected environmental pollutants. The most important physicochemical properties of environmental pollutants. Stages of the analytical process. Planning the analytical process on the basis of the properties of chemical compounds. Extraction of pollutants from selected environmental matrices. Purification and separation of analyzed substances. Chromatographic and spectroscopic techniques in the analysis of environmental pollutants. The course of the analytical process with examples of selected environmental pollutants. Toxicity of chemical compounds in the environment.

Prerequisites and co-requisites

General chemistry, organic chemistry, inorganic chemistry, analytical chemistry, physical chemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam (120 min)	51.0%	100.0%

Recommended reading

Basic literature	Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Techniki separacyjne. Wydawnictwo UG 2010. Witkiewicz Z. Podstawy chromatografii, Wydawnictwa Naukowo-Techniczne, Warszawa, 2005. Szczepaniak W. Metody instrumentalne w analizie chemicznej, Wydawnictwo Naukowe PWN, Warszawa, 2002.
Supplementary literature	Alloway B.J., Ayres D.C. Chemiczne podstawy zanieczyszczania środowiska, PWN, Warszawa, 1999. Van Loon G.W., Duffy S.J. Chemia środowiska, PWN, Warszawa, 2008. Namieśnik i in. Przygotowanie próbek środowiskowych do analizy, WNT, W-wa, 2000. Johnstone R.A.W., Rose M.E. Spektrometria mas. Podręcznik dla chemików i biochemików. PWN, Warszawa, 2001.
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Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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