University of Gdańsk

Subject card

Subject name and code	Chemistry of environmental pollutants, PG_00134597		
Field of study	Chemistry		
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
Semester of study	3	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Katedra Analizy Środowiska -> Faculty of Chemistry		
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 types of environmental pollution
2. To familiarize students with the basics of the transport processes and transformation of pollutants in the environment
3. To familiarize students with methods of predicting environmental properties of substances on the basis of their chemical structure
4. To develop the ability to independently assess environmental hazards on the basis of the structure of chemical compounds

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.	Students are able to assess the exposure of individual environmental components to the presence of chemical compounds depending on the manner and scale of their use according to the current data.	[SW4] test/exam - oral or written
[CHEMMU2_U01] Plans and implements chemical experiments of medium complexity.	Students are able to determine selected physicochemical parameters describing properties of organic compounds by using experimental and computational methods.	[SU4] test/exam - oral or written
[CHEMMU2_W04] Applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis.	Students understand importance of structure-activity relationship of a substance in determining its environmental fate.	[SW4] test/exam - oral or written
[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	During the development of research results and theoretical problems, students identify gaps in their knowledge and complete them by finding and quoting the literature on the subject.	[SK4] test/exam - oral or written
[CHEMMU2_W07] Selects experimental and theoretical techniques to the extent necessary to understand the description and modelling of medium complexity chemical processes.	The student is able to plan the determination of the physicochemical parameters of the compound, and based on them can estimate the environmental fate of the chemical compound.	[SW4] test/exam - oral or written
[CHEMMU2_W12] Knows the principles of occupational health and safety to the extent that allows independent work on a research and/or measurement position.	Students assess the risks, associated with working with chemical compounds, based on the literature and the physical and chemical properties of the substance.	[SW4] test/exam - oral or written
[CHEMMU2_W09] Classifies specialist IT tools used in statistical evaluation of experiment results.	Students are able to assess what tools are appropriate to perform the calculations necessary for the experiment.	[SW4] test/exam - oral or written

Subject contents

Chemical pollution of the environment. Chemistry and physics of interaction of chemicals with components of environment. Environmental fate of selected pollutants: transport, stability and degradation. Global effects caused by the chemical pollution. Basic principles of environmental fate assessment of chemicals basing on structure-activity relationship.

Prerequisites and co-requisites

Completed courses: inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry.

Knowledge of the structure and physicochemical properties of basic groups of organic and inorganic compounds, knowledge of chemical nomenclature, ability to apply basic formulas from stoichiometry, calculation of solution concentrations, use of laboratory glassware, operation of basic measuring instruments, application of safety rules for work in a chemical laboratory.

Assessment methods and criteria

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

Recommended reading

Basic literature

Alloway B.J., Ayres D.C. Chemiczne podstawy zanieczyszczania środowiska, PWN, Warszawa, 1999.

Manahan S.E. Toksykologia środowiska. Aspekty chemiczne i biochemiczne, PWN, Warszawa, 2010.

Van Loon G.W., Duffy S.J. Chemia środowiska, PWN, Warszawa, 2008.

	Supplementary literature	Witkiewicz Z. Podstawy chromatografii. Wydawnictwa Naukowo-Techniczne, Warszawa, 2005. Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Monitoring i analityka zanieczyszczeń w środowisku. Wydawnictwo UG, 2010. Piotrowski J.K. (red.) Podstawy toksykologii. Kompendium dla studentów szkół wyższych. wyd. 2, WNT, Warszawa, 2008. Pigon K. Chemia Fizyczna tom I. Wydawnictwo PWN, Warszawa, 2005. Atkins P.W. Chemia fizyczna. PWN, Warszawa, 2001.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Evaluate the aerobic biodegradation pathways of aliphatic and aromatic hydrocarbons. 2. Based on the presented chemical structures, evaluate the values of the partition coefficient and estimate the ability of compounds to bioaccumulate. 3. Taking into account solubility in water, logP value and sorption capacity, estimate the mobility of the compound in the environment.	
Work placement	Not applicable	

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