

Subject card

Subject name and code	Chemistry of environmental pollutants, PG_00134597						
Field of study	Chemistry						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
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		2.0		
Learning profile	academic		Assessment form		exam		
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 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_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
	[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_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_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_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_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_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
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	
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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