University of Gdańsk

Subject card

Subject name and code	Environmental chemistry, PG_00103534		
Field of study	Environmental Protection		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	Bachelor's studies	Subject group	Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish Polish
Semester of study	5	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. inż. Anna Białk-Bielińska	
	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

- To become familiar with the basic issues of environmental chemistry, including the chemical processes occurring in its various components;
- To develop the ability to independently assess factors relevant to chemical processes occurring in the environment;
- To familiarize with the main environmental pollutants;
- To develop the ability to assess the exposure of various components of the environment to the presence of chemical compounds and the effects that this presence brings;
- To familiarize with methods of preventing the harmful effects of chemical compounds in the environment;

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OŚL3_U04] Uses specialist language in the discussion and properly uses the nomenclature in the field of environmental protection and individual disciplines related to it.	Discusses issues of environmental chemistry in understandable language, using correct nomenclature.	[SU4] test/exam - oral or written
[OŚL3_K05] Identifies the level of her/his knowledge and skills, demonstrates the need to update knowledge about the environment and its protection, demonstrates the need for continuous professional training and personal development.	The student is able to define gaps in his knowledge and fill them by searching and citing the literature on the subject, thereby understanding the need for further education.	[SK1] oral statement/conversation/ discussion
[OŚL3_W09] Describes the basic methods, techniques and tools that allow the rational use, shaping and restoration of natural resources.	Identifies preventive measures for the harmful effects of selected chemical compounds on various components of the environment and human health.	[SW4] test/exam - oral or written
[OŚL3_W05] Explains the course of natural and anthropopressional physical, chemical and biological processes and phenomena occurring in nature at various levels of matter organisation.	The student correctly solves tests and answers open questions on the knowledge of environmental chemistry.	[SW4] test/exam - oral or written
[OŚL3_W08] Explains the mechanisms of economic and consumer pressure on the environment and recognises the possibilities of reducing it using the latest knowledge and scientific achievements.	Understands the relationships associated with the ecotoxicity of selected environmental pollutants and characterizes the methods used to assess it.	[SW4] test/exam - oral or written
[OŚL3_W10] Describes the principles of environmental protection based on legal regulations and instruments of applying law in environmental protection and from the point of view of economy and management of environmental resources; enumerates general aspects of the economic activity of entities.	Knows the basic regulations on the management of chemical substances and their environmental risk assessments.	[SW4] test/exam - oral or written
[OŚL3_U08] Correctly concludes based on the available data from various sources.	Draws correct conclusions from the available literature data as well as the obtained experimental results.	[SU4] test/exam - oral or written
[OŚL3_W02] Characterises the relationships and relationships between various disciplines of natural sciences and science, uses knowledge of mathematics, physics, chemistry and biology in the description of basic concepts, concepts and principles in environmental protection.	Able to assess the exposure of individual environmental components to the presence of chemical compounds depending on the manner and scale of their use, using appropriate information tools as well as literature data.	[SW4] test/exam - oral or written

Subject contents

Lecture topics: chemistry of the lithosphere, hydrosphere and atmosphere, including: the cycle of matter and biogeochemical cycles (C, N, O, P, S); basic environmental problems (acid rain, greenhouse effect, smog, ozone hole); environmental pollutants (sources and their fate, effects of presence); selected physicochemical properties of chemicals vs. predicting their environmental fate; the concept of environmental risk; ecotoxicological studies in assessing the effects of the presence of chemicals in the environment.

Prerequisites and co-requisites

Knowledge of the basics of general, inorganic, organic and analytical chemistry including: 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.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam with open and closed questions	51.0%	100.0%

Recommended reading

Basic literature	J. Naumczyk, Environmental Chemistry, Wydawnictwo Naukowe PWN, 2017. G.W. vanLoon, S.J. Duffy, Environmental Chemistry, Wydawnictwo Naukowe PWN, 2008.

	Supplementary literature	B. Głowniak, E. Kempa, T Winnicki: Podstawy ochrony srodowiska, PWN, Warszawa,1985. S.F. Zakrzewski, Podstawy toksykologii srodowiska, Wydawnictwo naukowe PWN B. Dobrzanski, S. Zawadzki; Gleboznawstwo, Panstwowe Wydawnictwo Rolnicze i Lesne U. Pokojska "Przewodnik metodyczny do analizy wod" Wydawnictwo UMK w Toruniu, Torun 1999 W. Szczepaniak "Metody instrumentalne w analizie chemicznej" PWN 2005 B. Gomołka, E. Gomołka., "Cwiczenia laboratoryjne z chemii wody" Wydawnictwo Politechniki Wrocławskiej, Wrocław 1992 I. Hermanowicz, K. Dojlido, "Fizyczno-chemiczne badanie wody i sciekow",Wyd. Arkady, Warszawa 1999 W. Łoginow, W. Cwojdzinski, J. Andrzejewski, Chemia rolna przewodnik do cwiczen dla studentow wydziału rolniczego i zootechnicznego, Akademia Techniczno-Rolnicza im. Jana i Jedrzeja Sniadeckich, Bydgoszcz 1996 L. Wachowski, P. Kirszensztejn; Cwiczenia z Podstaw Chemii Srodowiska, Uniwersytet im. Adama Mickiewicza w Poznaniu, Poznan 1999
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Soil consists of (multiple choice test):a) about 45% organic fraction, about 25% air, about 25% water and 5% mineral fractionb) About 45% mineral fraction, about 25% air, about 25% water and 5% organic matterc) Fulic acids, humic acids and humins are counted among the humus compounds found in the soil organic fraction. d) The mineral fraction includes clay minerals such as kaolinite, montmorillonite, illite, among others. 2) Name two types of smog and explain how they differ, under what conditions they occur. 3. Two chemicals are given: A with logP=7 and B with logP=0.5. Please choose the correct answers (multiple choice test):a) A is a more lipophilic compoundb) B is more lipophilicc) B is a more hydrophilic compoundd) B chemical can be assumed to exist mainly in an aqueous environment with very poor sorption or bioaccumulation potential	
Work placement	Not applicable	

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