

Subject card

Subject name and code	Environmental chemistry, PG_00121256						
Field of study	Environmental Protection						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
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		
Semester of study	5		ECTS credits		2.0		
Learning profile	academic		Assessment form				
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	0.0	0.0	30.0	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	• Become familiar with the basic issues of environmental chemistry, including the chemical processes occurring in its various components; • Develop the ability to independently assess factors relevant to chemical processes occurring in the environment; • Familiarize with the main environmental pollutants; • Develop the ability to assess the exposure of various components of the environment to the presence of chemical compounds and their effects; • Familiarize with methods of preventing the harmful effects of chemical compounds in the environment; • Familiarize with basic environmental problems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report
	[OŚL3_W10] Describes the principles of environmental protection based on basic 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 [SW2] presentation/project/paper/report
	[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.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[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 [SW1] 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 [SW1] oral statement/conversation/discussion
	[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 [SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report
	[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 [SW2] presentation/project/paper/report
Subject contents	Topics of laboratory exercises: selected physicochemical properties of soils, toxicity of herbicides to plants (phytotoxicity), mineral fertilization and mobility of heavy metals in soils, selected physicochemical properties of water, phosphates in the environment removal from natural waters and processes of leaching from soil, chemistry of the atmosphere - acid rain		
	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.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	reports	51.0%	50.0%
	partial tests	51.0%	50.0%
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. Główniak, E. Kempa, T. Winnicki: Podstawy ochrony środowiska, PWN, Warszawa, 1985. S.F. Zakrzewski, Podstawy toksykologii środowiska, Wydawnictwo naukowe PWN B. Dobrzański, S. Zawadzki; Gleboznawstwo, Państwowe Wydawnictwo Rolnicze i Lesne U. Pokojńska "Przewodnik metodyczny do analizy wód" Wydawnictwo UMK w Toruniu, Toruń 1999 W. Szczepaniak "Metody instrumentalne w analizie chemicznej" PWN 2005 B. Gomołka, E. Gomołka., "Ćwiczenia laboratoryjne z chemii wody" Wydawnictwo Politechniki Wrocławskiej, Wrocław 1992 I. Hermanowicz, K. Dojlido, "Fizyczno-chemiczne badanie wody i ścieków", Wyd. Arkady, Warszawa 1999 W. Łoginow, W. Cwojdzinski, J. Andrzejewski, Chemia rolna przewodnik do ćwiczeń dla studentów wydziału rolniczego i zootechnicznego, Akademia Techniczno-Rolnicza im. Jana i Jędrzeja Śniadeckich, Bydgoszcz 1996 L. Wachowski, P. Kirszensztein; Ćwiczenia z Podstaw Chemii Środowiska, Uniwersytet im. Adama Mickiewicza w Poznaniu,
	eResources addresses	Adresy na platformie eNauczanie:
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 fraction (b) about 45% mineral fraction, about 25% air, about 25% water and 5% organic matter (c) fulvic 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. The pH of acid rain is 3. The EC50 is	
Work placement	Not applicable	

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