University of Gdańsk

Subject card

Subject name and code	Environmental chemistry, PG_00082034		
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
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	1.0
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. 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	1.0	9.0	40

Subject objectives

- Get 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
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	Demonstrates the ability to plan and carry out basic physical and chemical measurements and experiments relevant to chemical processes in the environment.	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[CHEML3_K02] Works individually demonstrating initiative and independence of activity and cooperates in a team fulfilling various roles in it.	The student organizes his own work and that of the team members both in class and in the preparation of the report on the exercise.	[SK8] observation of student's independent or team work
[CHEML3_U06] Uses basic application software packages to solve problems from the field of science.	Can indicate and describe the effects associated with the presence of a chemical compound in the environment, using experimental results and data from the literature.	[SU4] test/exam - oral or written
[CHEML3_W06] Chooses higher mathematics techniques to the extent necessary to understand and describe the physical processes important for understanding chemistry.	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 [SW2] presentation/project/paper/ report
[CHEML3_W13] Enumerates and describes the basic legal and ethical aspects related to scientific, research and didactic work.	The student is able to recognize and name the sources of legal and ethical problems in modern environmental chemistry.	[SW1] oral statement/ conversation/discussion
[CHEML3_W11] Defines the basic principles of occupational health and safety and ergonomics necessary for the proper organization of learning.	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 [SW2] presentation/project/paper/ report
[CHEML3_K01] Identifies the level of her/his own knowledge and skills and the need for continuous learning 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
[CHEML3_W09] Describes the practical applications of IT tools (computer programmes) for chemical calculations and data analysis.	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 [SW2] presentation/project/paper/ report

Subject contents

Topics of laboratory exercises: selected physicochemical properties of soils, toxicity of herbicides to plants (phytotoxicity), mineral fertilization vs. mobility of heavy metals in soils, selected physicochemical properties of water, phosphates in the environment - removal from natural waters and leaching processes from soil, chemistry of the atmosphere - acid rain.

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
reports	51.0%	50.0%
partial tests	51.0%	50.0%

Recommended reading

Basic literature

- J. Naumczyk, Chemia środowiska, Wydawnictwo Naukowe PWN, 2017.
- G.W. vanLoon, S.J. Duffy, Chemia środowiska, 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,
	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 fraction (b) about 45% mineral fraction, about 25% air, about 25% water and 5% organic matter (c) 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. The pH of acid rain is .... 3. EC50 is	
Work placement	Not applicable	

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