GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00057778						
Field of study	Green Technologies						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	first-cycle studies		Subject group		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		English		
Semester of study	3		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Andrzej Wasik				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		10.0		55.0	125
Subject objectives	Familiarize students with the basics of chemical processes occurring in the natural environment, physical chemistry of the atmosphere, water and soil. Presentation of geochemical cycles of the most important elements in the environment. Familiarization with the most important environmental pollutants, their sources and methods of detection.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Is capable of applying the principles of occupational health and safety. Is able to make initial assessment of engineering solutions and actions	notices non-technical, including environmental, aspects of technologies used in environmental protection. Applies the principles of occupational health and safety.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
[K6_W02] has a basic knowledge of chemistry including general chemistry, inorganic, organic, physical, analytical, including the knowledge necessary to describe and understand the phenomena and chemical processes occurring in the environment; measurement and the determination of the parameters of these processes.	The student has knowledge in the field of chemistry necessary to describe and understand phenomena and chemical processes occurring in the natural environment. Knows the methods used for measuring the level of environmental pollution.	[SW1] Assessment of factual knowledge
[K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants	The student has knowledge in the field of soil, air and water protection against pollution and the theoretical methods and types of apparatus used in the analysis of environmental pollution.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture

Atmospheric chemistry. Aquatic chemistry. Soil chemistry. Persistent organic pollutants in the environment. Carbon cycle. Nitrogen cycle. Phosphorus cycle. Oxygen and sulfur cycle. The role of the chemical elements in living organisms. Heavy metals and micronutrients. Environmental analytics. Methods of measuring the degree of pollution. Remote pollution measurement methods.

Course content – laboratory

Atmospheric chemistry. Water chemistry. Soil chemistry; main physicochemical and chemical parameters of water; the effect of complexes on metal mobility; odor nuisance; analysis of VOCs; assessment of the toxicity of soil extracts; determination of mercury in air; determination of fluorides in water; the effect of acid rain on plant vegetation; COD and BOD of water; macronutrients in soil.

Prerequisites and co-requisites

Passed course of Inorganic Chemistry

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	60.0%	70.0%
Laboratory reports	60.0%	30.0%

Recommended reading

Basic literature	Environmental chemistry : a global perspective / Gary W. vanLoon and Stephen J. Duffy.
Supplementary literature	Environmental chemistry / Stanley E. Manahan
eResources addresses	

Example issues/ example questions/ tasks being completed

1. Whats the difference between a macro elements and a micro elements? Give five examples of each group of elements.

2. Why do temperature variations occur with various altitudes of the atmosphere? Give a detailed diagram or graph, justifying the changes.

3. Explain the concepts of nitrification and biological nitrogen fixation.

4. What is the difference between tandem mass spectrometry and regular mass spectrometry? Draw a diagram of single and tandem mass spectrometer.

Practical activites within the subject	Not applicable

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