GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Environmental monitoring, PG_00057601						
Field of study	Green Technologies						
Date of commencement of studies	October 2023		Academic year of realisation of subject	2026/2027			
Education level	first-cycle studies		Subject group	Obligatory subject group in the field of study 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	4		Language of instruction	Polish			
Semester of study	7		ECTS credits	2.0			
Learning profile	general academic profile		Assessment form	assessment			
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. Bożena Zabiegała				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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		2.0	18.0		50
Subject objectives	Gaining knowledge about broadly understood environmental monitoring. Getting to know the methods/ systems used to carry out environmental monitoring tasks in Poland. Getting to know the objectives of the State Environmental Monitoring. Familiarize the student with problems related to the assessment of the quality of individual elements of the environment (air, soil and water) on the basis of the obtained measurement results, interpretation of the obtained results and prediction of effects on the environment.						

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	Is able to define an environmental problem and justify the necessity and method of its resolution	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
[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 of the principles of monitoring all environmental components and possesses the necessary expertise to assess the state of the environment based on monitoring data obtained independently or from available databases.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_K06] has awareness of the importance of non-technical aspects and effects of engineering activities, including its impact on the environment and the associated responsibility for decisions.	The student is aware of the significance of the threats arising from the lack of care for the condition of all environmental components. He/she is able to justify the necessity of making decisions aimed at reducing the negative impact of human activity on the environment.	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness

Subject contents

Course content – lecture
Genesis, objectives and tasks of environmental monitoring - Environmental monitoring in Poland and other countries - Environmental protection services in Poland - Monitoring networks (scope and structure) - Measurement networks (methods of construction, etc.) - Databases on the environment. Use of geographical information system - Selection of environmental elements for monitoring (air, water, soil, groundwater, directly endangered soil, traffic pollution, biological material, food, etc.) - Basics for the selection of monitoring areas and sampling sites for analysis - Range of monitored parameters (chemical compounds, physicochemical parameters, group parameters, toxicity, radiation level, noise) - Control and measurement devices used in environmental monitoring Biomonitoring (comparison with physicochemical methods, scope, criteria for the selection of indicator organisms, etc.) Assessment of the quality of individual elements of the environment Remote sensing and use of GIS

Prerequisites and co-requisites

knowledge of subjects pursued in earlier years of studies, in Environmental Chemistry, Physical Chemistry and Analytical Chemistry

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
"Project – assessment of the implementation of a group project task	60.0%	50.0%
Lecture – assessment of the student's engagement during the lecture conducted in the form of a seminar/conversatory, and/or a written test as an additional activity to verify knowledge.	60.0%	50.0%

Recommended reading	Basic literature	Chunlong Zhang, Fundamentals of Environmental Sampling and Analysis, Wiley Interscience, John Wiley and Sons, Inc., Hoboken, New Jersey, 2007; L.M.L. Nollet, Handbook of Water Analysis, Marcel Dekker, New York 2000 L.H. Keith, Principles of Environmental Sampling, American Chemical Society, Danvers (MA, USA) 1996; C.N. Hewitt, Instrumental Analysis of Pollutants, Elsevier Applied Science, London 1996 Hildebrandt, A., Lacorte, S. and Barcelo, D., Sampling of water, soil and sediment to trace organic pollutants at a river-basin scale, Anal. Bioanal. Chem., 386, 1075, 2006; Madrid, Y. and Zayas, Z.P., Water sampling: Traditional methods and new approaches in water sampling strategy, Trends Anal. Chem., 26, 4, 2007; Spellman Frank R.; The Science of Water, Concepts and Applications; CRC Press, Taylor & Francis Group; second Edition; 2008
	Supplementary literature	Annual reports of the Voivodship Inspectorates for Environmental Protection Reports of the Regional Atmosphere Monitoring Agency in the Gdańsk Agglomeration;(ARMAAG)
	eResources addresses	Basic https://www.gov.pl/web/gios -
Example issues/ example questions/ tasks being completed	1. Air quality management in Poland 2. Monitoring of particulate matter PM10 PM2.5, methodologies, method of monitoring, selection of measuring points 3.Olfactometry in air quality monitoring, possibilities and limitations 4. Tropospheric ozone, sources of origin, monitoring 5. Remote sensing in air monitoring, LIDAR techniques,	
Practical activites within the subject	Not applicable	

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