



Subject card

Subject name and code	Environmental monitoring, PG_00057601						
Field of study	Monitoring środowiska						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2025/2026		
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 -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Bożena Zabiegała				
	Teachers		prof. dr hab. inż. Bożena Zabiegała				
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						
	eNauczanie source addresses: Moodle ID: 37348 Monitoring Środowiska_2025 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37348						
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_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.	[SK4] Ocena umiejętności komunikacji, w tym poprawności językowej [SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce
	[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.	[SW1] Ocena wiedzy faktograficznej [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym
	[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	[SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu [SU4] Ocena umiejętności korzystania z metod i narzędzi
Subject contents	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
	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%
	"Project – assessment of the implementation of a group project task	60.0%	50.0%

Recommended reading	Basic literature	<p>Chunlong Zhang, Fundamentals of Environmental Sampling and Analysis, Wiley Interscience, John Wiley and Sons, Inc., Hoboken, New Jersey, 2007;</p> <p>L.M.L. Nollet, Handbook of Water Analysis, Marcel Dekker, New York 2000</p> <p>L.H. Keith, Principles of Environmental Sampling, American Chemical Society, Danvers (MA, USA) 1996;</p> <p>C.N. Hewitt, Instrumental Analysis of Pollutants, Elsevier Applied Science, London 1996</p> <p>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;</p> <p>Madrid, Y. and Zayas, Z.P., Water sampling: Traditional methods and new approaches in water sampling strategy, Trends Anal. Chem., 26, 4, 2007;</p> <p>Spellman Frank R.; The Science of Water, Concepts and Applications; CRC Press, Taylor & Francis Group; second Edition; 2008</p>
	Supplementary literature	<p>Annual reports of the Voivodship Inspectorates for Environmental Protection</p> <p>Reports of the Regional Atmosphere Monitoring Agency in the Gdańsk Agglomeration;(ARMAAG)</p>
	eResources addresses	<p>Basic</p> <p>https://www.gov.pl/web/gios -</p>
Example issues/ example questions/ tasks being completed	<p>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,</p>	
Practical activities within the subject	Not applicable	

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