



Subject card

Subject name and code	Environmental Monitoring, PG_00048795						
Field of study	Green Technologies						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2023/2024		
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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Bożena Zabiegała					
	Teachers	prof. dr hab. inż. Bożena Zabiegała					
Lesson types and methods of instruction	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	5.0	40.0	75		
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		
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		
	lecter		60.0%		50.0%		
	project		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	Adresy na platformie eNauczanie:
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>	
Work placement	Not applicable	