GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MONITORING AND ANALYSIS OF ENVIRONMENTAL POLLUTION, PG_00064304		
Field of study	MONITORING I ANALITYKA ZANIECZYSZCZEŃ ŚRODOWISKA		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marek Tobiszewski	
	Teachers	dr hab. inż. Marek Tobiszewski prof. dr hab. inż. Bożena Zabiegała dr inż. Natalia Jatkowska dr inż. Paweł Kubica prof. dr hab. inż. Andrzej Wasik dr inż. Małgorzata Rutkowska dr inż. Bartłomiej Cieślik dr inż. Tomasz Majchrzak dr hab. inż. Mariusz Marć prof. dr hab. inż. Piotr Konieczka	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	15.0	0.0	75
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 1872 MONITORING I ANALITYKA ZANIECZYSZCZEŃ ŚRODOWISKA https://enauczanie.pg.edu.pl/2025/course/view.php?id=1872						

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	75	5.0	45.0	125

Subject objectives	The aim of the subject is getting knowledge from environmental and monitoring of environment and legislation. The aim is improvement of analytical laboratory practice.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K01] critically evaluates the content of cognitive and practical problems	Angielski is able to use analytical techniques to determine typical environmental pollutants	[SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce
[K7_U02] carries out experiments using properly selected techniques and apparatus, taking advantage of new developments in technology and related fields	is able to use analytical techniques to determine typical environmental pollutants	[SU4] Ocena umiejętności korzystania z metod i narzędzi
[K7_U06] applies computer, statistical and specialised database methods to solve scientific and technological problems in technology and related fields	Angielski knows and understands the standards that determine the state of the environment	[SU2] Ocena umiejętności analizy informacji
[K7_W04] recognises scientific, technological, organisational and economic opportunities and constraints in technology and related fields	is able to select a standard procedure for a specific analytical problem	[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym

Subject contents

Organizational classes, the role of analytics and terminology Trace analytics problems Priority pollution Speciation analytics biomonitoring Green analytical chemistry Monitoring networks. Telemonitoring Anthropocene Validation of analytical procedures Passive samplers micro-plastics Radon analysis. Asbestos analysis Metabolomics and Proteomics Indoor air quality Zero exam

Prerequisites and co-requisites

basic knowledge from environmental chemistry and analytical chemistry

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
examination	50.0%	50.0%
project	50.0%	20.0%
mean from laboratory classes	50.0%	30.0%

Recommended reading

Basic literature	Metody instrumentalne w kontroli zanieczyszczeń środowiska, praca zbiorowa pod red. J. Namieśnika, skrypt PG, Gdańsk 1992 Secondary effects and pollutants of the environment, J. Namieśnik, T. Górecki, W. Wardencki, B. Zygmunt, L. Torres, skrypt PG, Gdańsk 1993Pobieranie próbek środowiskowych do analizy, J. Namieśnik, J. Łukasiak, Z. Jamrógiewicz, PWN, Warszawa 1995 Fizykochemiczne metody kontroli zanieczyszczeń środowiska, praca zbiorowa pod red. J. Namieśnika i Z. Jamrógiewicza, PWN, Warszawa 1998 Przygotowanie próbek środowiskowych do analizy, J. Namieśnik, Z. Jamrógiewicz, M. Pilarczyk, L. Torres, WNT, Warszawa 2000 Pestycydy, występowanie, oznaczanie i unieszkodliwianie, praca zbiorowa pod red. M. Biziuka, WNT, Warszawa 2001 Kontrola i zapewnienie jakości wyników pomiarów analitycznych, praca zbiorowa pod red. P. Konieczki i J. Namieśnika, WNT, Warszawa 2007 Zarys ekotoksykologii, praca zbiorowa pod red. J. Namieśnika i J. Jaśkowskiego, EKO-Pharma, Gdańsk 1995
Supplementary literature	-
eResources addresses	

Example issues/ example questions/ tasks being completed	Goals of environmental monitoring. What environmental compartments are monitored? Basic analytical metrological parameters. Why extraction is performed before final determination? What is the goal of environmental tracers application? Give examples of environmental tracers. What requirements should it meet? What are processes that lead to loss of liquid sample representativeness. What are the measures to avoid them? What is speciation analysis? Explain terms: group speciation, individual speciation, screening speciation and physical speciation. Give examples. What are advantages of total parameters application over more traditional approach to monitoring? What are advantages of biomonitoring over more traditional approach to monitoring? What are the requirements for bioindicator organism? Give examples of such organisms Suggest analytical technique that can be applied to determine benzene in water samples. Suggest appropriate sampling technique, sample preparation and final determination technique. List 5 solventless sample preparation techniques and describe two of them. Principles of dispersive liquid-liquid microextraction technique. List the elements of quality assurance/quality control system. Suggest analytical technique that can be applied to determine toluene in the air during this examination. Suggest appropriate sampling technique, sample preparation and final determination technique. Freons physicochemical properties, areas of application, environmental concerns and their naming. Burial sites genesis, environmental problems, remediation. Characteristics of the sample collected for analysis. What is environmental fate of contaminants? Explain: emission, imission and transboundary pollutants. What are the modes of location of analytical device in relation to investigated object? Which mode is the most beneficial and why? Characteristics of clean rooms. Process of ultrapure water production. What parameters are TEQ and TEF? What is environmental specimen bank?

	Role and tasks of environmental specimen banks. Describe aspiration, sedimentation and isolation modes of samples collection. Give examples. What are total parameters. What are advantages of their application. Give examples. Ways of total hydrocarbons parameter determination in air samples. What is the principle of SYMBIO system operations? Pros and cons of SF_6 application as environmental tracer. Principle of emission measurement by environmental tracing method. Application of environmental tracers. Describe areas of application. What compounds are applied as environmental tracers? Give examples. Features of ideal environmental tracer. Explain terms: bioavailability, bioaccumulation, bioconcentration, biomagnification and biotransformation. What are the features of organism to be used in BEWS? Why toxicological tests should be introduced to environmental monitoring? What are the limitations of chemical monitoring? What is derivatization and what is its purpose? Factors influencing concentration of radon in habituated buildings. Describe SPME extraction. Factors influencing SPME extraction efficiency. Discuss stationairy phases applied in SPME fibres. Discuss SPME sorbent selection process.
Practical activites within the subject	Not applicable

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