

Subject card

Subject name and code	Sampling and its preparing for analysis, PG_00061570						
Field of study	Environmental Protection						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	Master's studies	Subject group			Optional subject group		
Mode of study	full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			2.0		
Learning profile	academic	Assessment form			exam		
Conducting unit	Department of Environmental Analysis -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Joanna Dołżonek				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	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		15.0	50
Subject objectives	The purpose of the lecture is to familiarize students with the issue of sampling and sample preparation, being an integral part of the analytical process, for further stages of chemical analysis.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OŚMU2_K06] Recognises the importance of knowledge in solving encountered cognitive and practical problems and consults experts in the event of difficulties in solving a problem on her/his own.	Upon completion of the course, the student: 1. understands the need for further education enabling him/her to acquire specialized qualifications	[SK4] test/exam - oral or written
	[OŚMU2_W04] Chooses methods, techniques and research tools used in environmental protection.	1. introduces and describes techniques, tools and apparatus sets suitable for environmental sampling: soils, water and ambient air 2. lists factors that cause loss of analytes or contamination of the sample 3. presents and describes methods of sample storage and preservation 4. presents and describes extraction and chromatographic techniques used to prepare samples for specific analysis	[SW4] test/exam - oral or written
	[OŚMU2_K10] Has a need for continuous professional development.	Upon completion of the course, the student: 1. understands the need for further education enabling him/her to acquire specialized qualifications	[SK4] test/exam - oral or written
	[OŚMU2_U06] Defines her/his interests and develops them within the chosen specialisation and themes of her/his master's thesis while implementing the process of self-education and planning of own future career.	1. knows how to propose modern techniques for collecting and preparing samples for chemical analysis 2. uses correct units to express concentrations of trace analytes 3. is able to select appropriate matrices and determine their effect on the preparation of samples for analysis	[SU1] oral statement/conversation/discussion [SU5] implementation of a problem task
[OŚMU2_W05] Describes development directions and the latest discoveries in the field of scientific disciplines related to environmental protection.	1. explains the main objectives and importance of sampling and preparation of samples for analysis 2. defines the concepts of sampling and preparation of samples for analysis	[SW4] test/exam - oral or written	
Subject contents	The content of the lecture includes: learning about modern techniques and general basics of environmental sampling, sample representativeness, sample components, problems of trace analysis, sample fixation and storage and issues related to loss of analytes, matrices and their influence on sample preparation for analysis, sample preparation for analysis by modern separation techniques.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Additional analytical tasks/problems to be solved during the lecture	0.0%	10.0%
	Two written exams (open and test questions)	51.0%	90.0%

Recommended reading	Basic literature	<p>A.1. used during classes</p> <p>Pawliszyn J. Sampling and sample preparation for field and laboratory: fundamentals and new directions in sample preparation. Elsevier, 2002.</p> <p>Mitra S. Sample preparation techniques in analytical chemistry. Wiley, 2003.</p> <p>Namiesnik J., Jamrogiewicz Z., Pilarczyk M., Torres L. Przygotowanie probek srodowiskowych do analiz. WNT, Warszawa, 2000.</p> <p>Namiesnik J., Łukasiak J., Jamrogiewicz Z. Pobieranie probek srodowiskowych do analiz. PWN, Warszawa, 1995.</p> <p>Harvey D. Modern analytical chemistry. McGraw-Hill, USA, 2000.</p> <p>Zhang C.C. Fundamentals of Environmental Sampling and Analysis. Wiley, 2007.</p> <p>Popek E. P. Sampling and analysis of environmental chemical pollutants. Academic Press, California, USA, 2003.</p> <p>A.2. studied independently by the student</p> <p>Namiesnik J., Jamrogiewicz Z., Pilarczyk M., Torres L. Przygotowanie probek srodowiskowych do analiz. WNT, Warszawa, 2000.</p> <p>Namiesnik J., Łukasiak J., Jamrogiewicz Z. Pobieranie probek srodowiskowych do analiz. PWN, Warszawa, 1995.</p> <p>Stepnowski P., Synak E., Szafranek B., Kaczynski Z. Techniki separacyjne. Wydawnictwo UG 2010.</p>
	Supplementary literature	<p>B. Supplementary literature- Scientific publications related to the program content of the subject</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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