University of Gdańsk

Subject card

Subject name and code	Analysis of trace impurities in the environment, PG_00054825		
Field of study	Environmental Protection		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	Master's 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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Environmental Analysis -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Magda Caban	
	Teachers		

Lesson types							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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	familiarizing students with instrumental methods used in trace analysis, developing the ability to independently perform calculations necessary for the correct interpretation of analysis results, developing the ability to independently select the appropriate analytical technique for a given problem, acquiring the ability to independently design and implement experiments regarding the determination of selected trace environmental pollutants acquiring practical skills regarding procedures in a chromatographic laboratory.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OŚMU2_U02] Uses advanced measurement and analytical techniques used in environmental protection.	1. can perform quantitative and qualitative analyses, 2. uses professional terminology in discussions regarding analytical and instrumental chemistry.	[SU5] implementation of a problem task
	[OŚMU2_W04] Chooses methods, techniques and research tools used in environmental protection.	1. understands the specificity of trace analysis 2. knows and describes advanced techniques and research tools used in trace environmental pollution 3. knows and describes the most common trace environmental pollutants and their properties	[SW4] test/exam - oral or written
	[OŚMU2_W05] Describes development directions and the latest discoveries in the field of scientific disciplines related to environmental protection.	1. knows the structure and principles of operation of advanced scientific and research equipment 2. knows and describes advanced methods for determining selected analytes 3. can present methods of quantitative and qualitative analysis 4. draws conclusions from experimental data	[SW2] presentation/project/paper/ report
	[OŚMU2_U03] Plans and performs research tasks in the field or laboratory and interprets research results on environmental issues (working individually or in a team assuming various roles, including managerial functions).	1. is able to plan and perform experiments in the analytical laboratory and analyze their results, 2. can prepare a report on the performed experiments in Polish, 3. can independently operate scientific and research equipment, 4. follows established analytical procedures	[SU2] presentation/project/paper/ report
	[OŚMU2_K04] Leads the group and bears responsibility for it.	1. shows responsibility for the work performed, 2. demonstrates creativity in group work, taking on various roles, 3. complies with the arrangements made, 4. is cautious/critical when expressing opinions, 5. Appreciates the importance of constructive discussions, 6. understands the need for further education.	[SK8] observation of student's independent or team work
	[OŚMU2_K02] Recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work.	1. can independently operate scientific and research equipment	[SK1] oral statement/conversation/ discussion
Subject contents	Preparation of environmental samples for proper analysis. Qualitative and quantitative analysis using chromatographic and spectroscopic techniques such as: gas chromatography, high-performance liquid chromatography, thin-layer chromatography, UV/Vis spectroscopy, mass spectrometry.		
Prerequisites and co-requisites	Entrance requirementsKnowledge of basic issues in the field of general chemistry, organic chemistry, inorganic chemistry and analytical chemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	report from each class	51.0%	20.0%
	Test	51.0%	40.0%
	short entrance tests	51.0%	40.0%

Recommended reading	Basic literature	Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Monitoring i analityka zanieczyszczeń w środowisku. Wydawnictwo UG 2010 Johnstone W. R. A., Rose M. E., Spektrometria mas, PWN, Warszawa 2001 Witkiewicz Z. Podstawy chromatografii, WNT, Warszawa, 2005. Szczepaniak W. Metody instrumentalne w analizie chemicznej, PWN, Warszawa, 1996. Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Techniki separacyjne. Wydawnictwo UG 2010 Johnstone W. R. A., Rose M. E., Spektrometria mas, PWN, Warszawa 2001 Witkiewicz Z. Podstawy chromatografii, WNT, Warszawa, 2005. Szczepaniak W. Metody instrumentalne w analizie chemicznej, PWN, Warszawa, 1996.
	Supplementary literature	Kocjan R. Chemia analityczna. Podręcznik dla studentów. Tom 2. PZWL, Warszawa, 2000. Szczepaniak W. Metody instrumentalne w analizie chemicznej, PWN, Warszawa, 1996. Witkiewicz Z., Hepter J. Chromatografia gazowa, WNT, Warszawa, 2009.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Preparation of water and soil samples for chromatographic analysis (types of extraction)Qualitative and quantitative analysis using chromatographic techniquesInterpretation of the resultsReference methods	
Work placement	Not applicable	

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