

Subject card

Subject name and code	Chemical and radiochemical trace analysis, PG_00054828						
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			1.0	
Learning profile	academic		Assessment form			credit	
Conducting unit	Laboratory of Toxicology and Radiation Protection -> Department of Environmental Chemistry and Radiochemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Grzegorz Olszewski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	15.0	0.0	0.0	0.0	15
	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	15		2.0		8.0	25
Subject objectives	familiarizing students with all issues mentioned in the lecture program content, introducing students to the basics of chemical calculations in radiochemistry, radiological protection, electrochemistry and spectroscopy, developing the ability to independently experiment, perform measurements and solve problems while conducting experiments and measurements.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OŚMU2_U02] Uses advanced measurement and analytical techniques used in environmental protection.	analyzes and solves tasks in radiometry, electrochemistry and spectroscopy, recognizes the basic equipment in radiochemistry, electrochemistry and spectrophotometry and is able to use it appropriately to carry out measurements, is able to calculate the decrease in the activity of radioactive elements over time, is able to calculate the weakening of ionizing radiation by fixed shutters	[SU4] test/exam - oral or written
	[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).	understands the need for further education in trace analysis, demonstrates creativity in independent and team work	[SU1] oral statement/conversation/discussion
	[OŚMU2_K01] Behaves in a professional manner at all times; bears full responsibility for the actions taken relating to the protection of the environment and respects the principles of professional ethics and principles of intellectual honesty.	can present in an understandable way, both orally and in writing correct reasoning from trace analysis, predicts, verifies and criticizes the results experiments, is able to statistically analyze analytical results and critically analyze them evaluation	[SK4] test/exam - oral or written
	[OŚMU2_K02] Recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work.	demonstrates creativity in independent and team work, is careful when handling chemicals,	[SK1] oral statement/conversation/discussion
	[OŚMU2_W09] Applies safety and hygiene principles when working independently on a test or measurement stand in a laboratory or in the field.	knows the basic principles of safe work with substances and mixtures chemicals (radioactive elements)	[SW1] oral statement/conversation/discussion
	[OŚMU2_W04] Chooses methods, techniques and research tools used in environmental protection.	recognizes basic equipment in radiochemistry, electrochemistry and spectrophotometry and is able to use it appropriately to carry out measurements	[SW1] oral statement/conversation/discussion
Subject contents	Issues of the auditorium exercises: basic types of computational tasks related to calculating the activity of radioactive substances, determining working conditions within radiological protection and estimating the attenuation of ionizing radiation, as well as selected electrochemical techniques (potentiometry - assessment of the acidity of natural products, potentiometric titration, use of ion-selective electrodes, electrogravimetry and titration coulometric - determination of antimony(III) or thiosulfate and spectroscopy in the UV-VIS range - spectrophotometric determination of selected ions in aqueous solutions, e.g. Ni(II) and Co(II)).		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test	50.0%	100.0%

Recommended reading	Basic literature	B. Gostkowska Wielkości, jednostki i obliczenia stosowane w ochronie radiologicznej, CLOR, Warszawa 1991, A. Skłodowska, B. Gostkowska Promieniowanie jonizujące a człowiek i środowisko, SCHOLAR, Warszawa 1994 A. Cygański Metody elektroanalityczne, WNT, Warszawa 1995 W. Szczepaniak Metody instrumentalne w analizie chemicznej, PWN Warszawa - Poznań 1979 (A. Cygański Metody spektroskopowe w chemii analitycznej, WNT, Warszawa 1993 A. Cygański, B. Ptaszyński, J. Krystek Obliczenia w chemii analitycznej, WN-T, Warszawa 2000
	Supplementary literature	None
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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