University of Gdańsk

Subject card

Subject name and code	Radiochemical methods and radiometric techniques for environment, PG_00179613						
Field of study	Chemistry, Environmental Protection						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
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	English			
Semester of study	4		ECTS credits	4.0			
Learning profile	academic		Assessment form	credit			
Conducting unit							
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	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		20.0		50.0	100
Subject objectives	To acquaint students with the basic radiochemical separations of radioactive elements, radiometric methods and calculation of activity.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OŚMU2_U10] Uses Polish/ English in the field of environmental protection in accordance with the requirements specified for level B2+ of the Common European Framework of Reference for Languages.	can transfer knowledge in the society about sources of radiochemical method used in industry and everyday life	[SU1] oral statement/conversation/ discussion
[OŚMU2_W04] Chooses methods, techniques and research tools used in environmental protection.	can present the sequential radiochemical analysis,	[SW1] oral statement/ conversation/discussion
[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).	has knowledge about the environmental samples preparation	[SU1] oral statement/conversation/ discussion
[OŚMU2_W06] Analyses the impact of human activities on biodiversity and environmental quality on a local, regional and global scale.	can transfer knowledge in the society about sources of radiochemical method used in industry and everyday life	[SW1] oral statement/ conversation/discussion
[OŚMU2_W01] Describes complex phenomena and processes occurring in nature, including those related to the spread of anthropogenic pollution.	is able to calculate radioisotopes activities and activity concentration in environmental samples	[SW1] oral statement/ conversation/discussion
[OŚMU2_W03] Characterises the effects of human interference in the natural environment and explains the mechanisms of reaction of living organisms to its pollution.	Can determine sources of contamination with radioactive elements	[SW1] oral statement/ conversation/discussion
[OŚMU2_K10] Has a need for continuous professional development.	understands the need for further education in the field of radiochemical analysis	[SK1] oral statement/conversation/ discussion
[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.	demonstrates creativity in designing the sequential analysis for different elements	[SK1] oral statement/conversation/ discussion
[OŚMU2_U02] Uses advanced measurement and analytical techniques used in environmental protection.	understands the concepts of radiometric methods, knows and understands the basic concepts of radiochemistry, recognizes the most important spectrometry techniques: alpha, beta, gamma, recognizes the most important radiochemical methods	[SU1] oral statement/conversation/ discussion

Subject contents

Ionizing radiation and nuclear reactions. Radiometric and non-radiometric techniques in radionuclides determination. Nuclear chemistry in trace analysis: alpha, beta and gamma spectrometry. Neutron activation analysis. Environmental samples preparation for radiochemical analysis. Radioanalytical tracers. Radionuclides concentration: precipitation and coprecipitation. Radioactive elements separation and purification. Sequential analysis. Radioisotopes activities calculations. Validation. Reference materials. Calibration.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam / test	51.0%	100.0%

Recommended reading

Basic literature	Jukka Lehto, Xiaolin Hou. Chemistry and Analysis of Radionuclides: Laboratory Techniques and Methodology. 2011 WileyVCH Verlag GmbH & Co. KGaA. ISBN:9783527326587
Supplementary literature	Choppin, Gregory. Radiochemistry and Nuclear Chemistry. Oxford :Academic Press, 2013.
eResources addresses	

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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