



KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez
Unię Europejską w ramach
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Społecznego

UNIA EUROPEJSKA
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FUNDUSZ SPOŁECZNY



Course title		ECTS code	
Radiochemical methods and radiometric techniques for environment		13.3.1224	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	second tier studies (MA)
Faculty of Chemistry	Chemical Business	form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Chemistry	type	second tier studies (MA)
		form	full-time
		specialty	all
Faculty of Chemistry	Environmental Protection	specialization	all
		type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Teaching staff			
dr hab. Dagmara Strumińska-Parulska, profesor uczelni; dr Grzegorz Olszewski			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		2	
Lecture			
The realization of activities			
blended learning, lectures in the classroom			
Number of hours			
Lecture: 15 hours			
The academic cycle			
2022/2023 winter semester			
Type of course		Language of instruction	
an elective course		english	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
Lecture based on the multimedia presentation – in-class or online learning		Final evaluation	
		Graded credit	
		Assessment methods	
		exam	
		The basic criteria for evaluation	
		The criteria according to UG regulations for students	
Method of verifying required learning outcomes			
Online test with 10 questions. Note based on the exam results.			
Required courses and introductory requirements			
A. Formal requirements			
lack			
B. Prerequisites			
lack			
Aims of education			
Familiarize students with the topics of the course content.			

Course contents			
<p>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: digestion and coprecipitation. Radioactive elements separation and purification. Sequential analysis. Radioisotopes activities calculations. Validation. Reference materials. Calibration.</p>			
Bibliography of literature			
<p>Literature required to pass the course Lecture content L'Annunziata M., Handbook of Radioactivity Analysis, Elsevier, 2012 Extracurricular readings Magil J., Galy J., Radioactivity · Radionuclides · Radiation, Springer, 2005</p>			
The learning outcomes (for the field of study and specialization)	Knowledge		
<p>Chemical Business: K_BChII_W02: knows and understands the axiological conditions regarding the use of modern techniques and measuring instruments as well as IT tools in chemistry, taking into account economic aspects K_BChII_U02: is able to define his/her interests, develop them within the chosen field of study and in connection with the subject of the master's thesis by implementing the process of self-education and planning his/her professional career K_BChII_U03: is able to present, based on the current state of knowledge, scientific discoveries and the results of own research in the field of chemical and economic sciences, through skilful debate and public speeches K_BChII_K03: is willing to critically assess the level of his/her own knowledge in the light of the achievements of the studied scientific discipline K_BChII_K04: is willing to properly assess the acquired knowledge, respect it and disseminate it in order to solve specific cognitive and practical issues K_BChII_K05: is willing to act independently for the environment in order to fulfill certain social obligations</p> <p>Chemistry: K_W03: demonstrates in-depth knowledge in the field of modern measuring techniques used in chemical analysis K_W05: has extended knowledge in the field of the specialisation studied K_U03: finds necessary information in specialist literature, databases and other sources, lists basic scientific journals in chemistry K_U04: applies acquired knowledge of chemistry and related scientific disciplines K_U07: defines and implements the directions of own further education K_K01: knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so K_K03: understands the need for systematic work on various projects of a long-term nature and knows how to set priorities for the implementation of undertaken tasks K_K06: undertakes research tasks consciously and responsibly, understanding the social aspects of the practical application of the acquired knowledge and skills and the responsibility related to it</p> <p>Environmental Protection:</p>	<p>knows and understands the basic concepts of radiochemistry, 2. knows basic non-radiometric and radiometric techniques used in radionuclides determination, 3. understands the concept of alpha, beta and gamma spectrometry, 4. has knowledge on the neutron activation analysis, 5. has knowledge about the environmental samples preparation, 6. understands the concept of radioanalytical tracers, 7. knows how to digest, separate and purify some radioactive elements.</p> <th data-bbox="694 862 1524 900">Skills</th> <p>1. understands the concepts of radiometric methods, 2. recognizes the most important spectrometry techniques: alpha, beta, gamma, 3. can present the sequential radiochemical analysis, 4. is able to calculate radioisotopes activities and activity concentrations,</p> <th data-bbox="694 1041 1524 1079">Social competence</th> <p>1. understands the need for further education in the field of radiochemical analysis, 2. demonstrates creativity in designing the sequential analysis for different elements, 3. can transfer knowledge in the society about sources of radiochemical method used in industry and everyday life,</p>	Skills	Social competence

<p>K_OŚII_W03: characterises the effects of human interference in the natural environment and explains the mechanisms of reaction of living organisms to its pollution</p> <p>K_OŚII_W04: chooses methods, techniques and research tools used in environmental protection</p> <p>K_OŚII_U01: on the basis of the acquired knowledge, proposes to solve environmental problems</p> <p>K_OŚII_U02: uses advanced measurement and analytical techniques used in environmental protection</p> <p>K_OŚII_U05: searches, selects and analyses the literature achievements of environmental sciences, including scientific journals and databases, reading and understanding scientific texts in her/his native</p> <p>K_OŚII_K03: undertakes professional and personal challenges, shows activity, undertakes efforts and is characterized by perseverance in undertaking individual and team actions in the field of environmental protection</p> <p>K_OŚII_K10: has a need for continuous professional development</p>	
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