

Subject card

Subject name and code	Nuclear Chemistry, PG_00207508						
Field of study	Nuclear safety and radiological protection						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Bachelor'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	2		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit	Laboratory of Environmental Analytics and Radiochemistry -> 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	30.0	30.0	0.0	0.0	0.0	60
	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	60		0.0		65.0	125
Subject objectives	The aim of the course is to familiarize chemistry students with the content of lectures and auditorium exercises in nuclear chemistry and to consolidate the knowledge resulting from the physical and chemical processes occurring in the atomic nucleus.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BJORL3_W01] Has an advanced knowledge and understanding of the main concepts and principles of nuclear physics and chemistry, understands their historical development and significance not only for nuclear safety and radiation protection, but also in the context of the fundamental dilemmas facing modern civilization.	understands nuclear chemistry for nuclear safety and radiological protection and for understanding the modern world; has basic knowledge of biology and ecology	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
	[BJORL3_W04] Has an advanced knowledge and understanding of selected techniques in advanced mathematics to the extent necessary to describe phenomena at the subatomic level and to solve problems in nuclear physics and chemistry.	knows basic techniques in nuclear physics and chemistry	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
	[BJORL3_W03] Has advanced knowledge and understanding of the principles of planning and conducting simple physical and chemical experiments and analyzing obtained results; has knowledge and understanding of the fundamentals of measurement uncertainty as applied to experiments, the base SI units and the most important derived units, as well as other systems of units.	knows how to plan and perform a simple physical or chemical experiment and analyze the obtained results;	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
	[BJORL3_W05] Has advanced knowledge of the elementary components of matter and the types of fundamental interactions between them, the manifestations of these interactions in phenomena occurring at scales ranging from subatomic to subatomic, knows the time and energy scales associated with these phenomena.	has knowledge of the elementary components of matter and ecological aspects of nuclear safety and radiological protection	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW3] text preparation/written work
	[BJORL3_U01] Can formulate the laws of physics and chemistry using mathematical formalism.	can formulate the basic laws of physics and chemistry	[SU1] oral statement/conversation/ discussion [SU3] text preparation/written work [SU4] test/exam - oral or written
	[BJORL3_U04] Can use mathematical and computer apparatus to analyze and solve problems in radiological protection and nuclear safety.	can use mathematical apparatus to analyze and solve problems in the field of radiological protection and nuclear safety	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[BJORL3_U03] Is able to use the formalism of physics and chemistry to describe phenomena in the microworld.	can use knowledge of physics and chemistry to describe the impact of radiation on biological organisms in the natural environment	[SU1] oral statement/conversation/ discussion [SU3] text preparation/written work [SU4] test/exam - oral or written
Subject contents	structure of matter and elementary particles, radioactivity, process of formation of chemical elements, natural and artificial radioactive elements, radiogenic heat of the Earth, nuclear energy, interaction of ionizing radiation with matter, radiation chemistry and radiolysis of water, dosimetry, radiometric and radiochemical methods, isotope separation and labeling methods compounds, use of radionuclides in science, technology and medicine.		
Prerequisites and co-requisites	- knowledge of the theory of the structure of matter and atoms of chemical elements - lecture on the basics of chemistry and physics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test	51.0%	100.0%

Recommended reading	Basic literature	- Bogdan Skwarzec, Environmental radiochemistry, University of Gdańsk Publishing House, 2021, ISBN 978-83-8206-111-6 - Sobkowski J. Jelińska-Kaźmierczuk M., Nuclear chemistry, Adamantan Publishing House, Warsaw 2006, ISBN: 83-7350-080-4
	Supplementary literature	not applicable
	eResources addresses	
Example issues/ example questions/ tasks being completed	- The main elementary particles - Radioactive decay - Radiation doses	
Work placement	Not applicable	

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