University of Gdańsk

Subject card

Subject name and code	Nuclear Energetics and Reactor Processes, PG_00167109						
Field of study	Nuclear safety and radiological protection						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2027/2028			
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	3		Language of instruction	Polish			
Semester of study	5		ECTS credits	2.0			
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 hab. Alicja Boryło, prof. UG				
	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		0.0	20.0	50	
Subject objectives	familiarizing students with all issues mentioned in the lecture program content						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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_K01] knows the limitations of his own knowledge and understands the need for further education	understands the need for further education	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written
	[BJORL3_U03] is able to use the formalism of physics and chemistry to describe phenomena in the microworld; is able to use the methodology of biology and ecology to an elementary extent when describing the effects of radiation on biological objects and in the environment	can use the laws of physics and chemistry to describe phenomena in the microworld	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[BJORL3_W09] Has a basic knowledge of the legal and ethical considerations associated with professional activities	has basic legal knowledge related to professional activity	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[BJORL3_W05] has 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; knows the basics of biology and ecology in understanding the biological and ecological aspects of nuclear safety and radiation protection	has knowledge of the elementary components of matter, knows the basics of biology and ecology in terms of understanding the biological and ecological aspects of nuclear safety and radiological protection	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[BJORL3_W01] has a general knowledge of the basic concepts and principles of nuclear physics and chemistry, understands their historical development and their importance not only for nuclear safety and radiation protection, but also for understanding the modern world; has a basic knowledge of biology and ecology	has general knowledge of nuclear physics and chemistry and understands the importance of nuclear safety and radiological protection, has basic knowledge of biology and ecology	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[BJORL3_W06] knows the basic computational methods used to solve typical problems in radiological protection and nuclear safety	knows the basic computational methods used to solve typical problems in the field of radiological protection and nuclear safety	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[BJORL3_K06] Is aware of professionalism and adherence to professional ethics	is aware of compliance with the principles of professional ethics	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written
	[BJORL3_W07] knows the construction and basic principles of operation of scientific apparatus used in radiological protection and aimed at ensuring nuclear safety	knows the structure and basic principles of operation of scientific equipment used in radiological protection and aimed at ensuring nuclear safety	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[BJORL3_U07] Knows how to present in an accessible way the latest developments in radiological protection and nuclear safety and can analyze their legal aspects	can present the latest achievements in the field of radiological protection and nuclear safety	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
	[BJORL3_K05] Understands the need and importance of popularization related to radiological protection and nuclear safety	understands the need to popularize knowledge of radiological protection and nuclear safety	[SK1] oral statement/conversation/ discussion [SK4] test/exam - oral or written
Subject contents	nuclear energy in the world, nuclear reactors, their structure and types, reactor processes in nuclear reactors, reactor accidents and the safety of nuclear power plants, radioactive waste from nuclear power plants, thermonuclear fusion, nuclear energy compared to other methods of obtaining energy, prospects for the development of nuclear energy.		
Prerequisites and co-requisites	passed subjects in environmental radiochemistry and radiological protection as well as nuclear chemistry		

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>written exam</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Z.Celiński, Nuclear energy, PWN, Warsaw (1991), Nuclear energy and society, PWN, Warsaw (1992)
W. Szymański, Nuclear chemistry, PWN, Warsaw 1996.
Sobkowski and M. Jelińska-Kaźmierczuk, Nuclear chemistry, Adamantan Publishing House, Warsaw 2006
B. Skwarzec, Environmental radiochemistry, University of Gdańsk Publishing House, 2021, ISBN 978-83-8206-111-6</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">not applicable</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">What is a fission reaction?
Describe the structure of a nuclear reactor
Describe the processes of nuclear fuel enrichment</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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