


**KAPITAŁ LUDZKI**  
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez  
 Unię Europejską w ramach  
 Europejskiego Funduszu  
 Społecznego

**UNIA EUROPEJSKA**  
 EUROPEJSKI  
 FUNDUSZ SPOŁECZNY


<b>Course title</b>		<b>ECTS code</b>	
Nuclear energy		13.3.1208	
<b>Name of unit administrating study</b>			
null			
<b>Studies</b>			
<b>faculty</b>	<b>field of study</b>	<b>type</b>	pierwszego stopnia
Wydział Chemii	Biznes chemiczny	<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
Wydział Chemii	Chemia	<b>type</b>	pierwszego stopnia
		<b>form</b>	stacjonarne
		<b>specjalty</b>	chemia biomedyczna, chemia kosmetyków, analityka i diagnostyka chemiczna, chemia żywności
Wydział Chemii	Ochrona środowiska	<b>specialization</b>	wszystkie
		<b>type</b>	pierwszego stopnia
		<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
<b>Teaching staff</b>			
dr Grzegorz Olszewski			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		2 classes - 15 h tutorial classes - 15 h student's own work - 20 h TOTAL: 50 h - 2 ECTS	
Lecture			
<b>The realization of activities</b>			
classroom instruction, online classes			
<b>Number of hours</b>			
Lecture: 15 hours			
<b>The academic cycle</b>			
2025/2026 summer semester			
<b>Type of course</b>		<b>Language of instruction</b>	
an elective course		English	
<b>Teaching methods</b>		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
multimedia-based lecture		<b>Final evaluation</b>	
		Graded credit	
		<b>Assessment methods</b>	
		exam	
		<b>The basic criteria for evaluation</b>	
		The criteria according to UG regulations for students.	
<b>Method of verifying required learning outcomes</b>			
<b>Required courses and introductory requirements</b>			
<b>A. Formal requirements</b>			
lack			
<b>B. Prerequisites</b>			
lack			
<b>Aims of education</b>			
Familiarize students with the topics of the course content.			
<b>Course contents</b>			

<p>Nuclear power development, atoms and nuclei, radioactivity, basics of radiation protection and radiotoxicity, nuclear fission, nuclear fusion, chain reactions, reactor theory, types of nuclear power plants, nuclear fuel cycle, reactor chemistry, nuclear safety and security, nuclear waste disposal, nuclear propulsion and nuclear weapons.</p>	
<p><b>Bibliography of literature</b></p> <p>Literature required to pass the course</p> <p>1. Course content</p> <p>Extracurricular readings</p> <p>Bodansky D., Nuclear Energy, Principles, Practices and Prospects, Springer, 2004, Murray R.L., Holbert K.E., Nuclear Energy, Elsevier, 2020.</p>	
<p><b>The learning outcomes (for the field of study and specialization)</b></p> <p>Chemical Business:</p> <p>K_BC_W06: enumerates unit processes and describes issues in the field of technology and chemical engineering</p> <p>K_BCh_W07: describes the construction and operating principles of scientific, technological and control-measuring apparatus</p> <p>K_BCh_U08: uses the chemical nomenclature and engineering terminology properly</p> <p>K_BCh_U09: using the acquired knowledge, skills and various sources of scientific information independently prepares written papers and oral presentations</p> <p>K_BCh_K01: identifies the level of her/his own knowledge and skills as well as the need to update engineering knowledge, continuous professional training and personal development</p> <p>K_BCh_K05: is convinced of the importance of behaving in a professional manner in every situation, taking full responsibility in the field of engineering activities and their impact on the natural environment and compliance with the principles of professional ethics</p> <p>Chemistry:</p> <p>K_W05: has advanced knowledge of the chemical specialisation studied</p> <p>K_U07: prepares documented elaboration on a specific problem in the field of selected chemical and physical issues</p> <p>K_U09: is able to learn independently</p> <p>K_K01: identifies the level of her/his own knowledge and skills and the need for continuous learning and personal development</p> <p>K_K03: establishes priorities in the right way for the implementation of tasks specified by herself/himself and/or by others</p> <p>K_K07: appreciates the need for understandable presentation of selected chemical issues to the public</p> <p>K_K08: formulates opinions in the field of science with caution and criticism in their expression</p> <p>Environmental Protection:</p> <p>K_OŚI_W02: characterises at an advanced level the relationships and relationships between various disciplines of natural sciences and science, uses knowledge of mathematics, physics, chemistry and biology in the description of basic concepts, concepts and principles in environmental protection</p> <p>K_OŚI_U03: independently plans and develops her/his own lifelong learning</p> <p>K_OŚI_U12: uses environmental protection instruments, including the concept of sustainable development, in communicating with the socio-economic environment</p>	<p><b>Knowledge</b></p> <ol style="list-style-type: none"> <li>1. knows the history of nuclear energy and understands the basic concepts of radioactivity, radiation protection and radiotoxicity,</li> <li>2. understands the concepts of neutron reactions, nuclear fission, nuclear fusion, chain reactions,</li> <li>3. knows the types of nuclear power plants and understands the reactor theory,</li> <li>4. has knowledge on the nuclear fuel cycle including nuclear reactor chemistry and nuclear waste disposal,</li> <li>5. has the basic knowledge on nuclear reactor safety and security,</li> <li>6. has the basic knowledge on nuclear weapons and nuclear propulsion.</li> </ol>
	<p><b>Skills</b></p> <ol style="list-style-type: none"> <li>1. is able to give concepts of chemistry and physics behind nuclear energy operation,</li> <li>2. recognizes the principles of nuclear reactors operation,</li> <li>3. can assess the radiological impact of nuclear energy use,</li> <li>4. is able to assess safety of nuclear energy</li> </ol>
	<p><b>Social competence</b></p> <ol style="list-style-type: none"> <li>1. understands the need for further education in the field of nuclear energy due to its constant development,</li> <li>2. demonstrates scientific competence in nuclear energy civil use</li> <li>3. can transfer knowledge in the society about the nuclear energy,</li> </ol>

K\_OŚI\_K05: identifies the level of her/his knowledge and skills, demonstrates the need to update knowledge about the environment and its protection, demonstrates the need for continuous professional training and personal development

K\_OŚI\_K06: knows and appreciates the practical application of the acquired knowledge and skills in solving problems

K\_OŚI\_K10: identifies and sees dilemmas related to pursuing future career

## Contact

grzegorz.olszewski@ug.edu.pl; tel. 5256