



## Subject card

Subject name and code	NUCLEAR ENERGY, PG_00048959						
Field of study	Green Technologies						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			English		
Semester of study	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Jaskólski					
	Teachers	dr inż. Marcin Jaskólski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	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		5.0		40.0	75
Subject objectives	The aim of the course is to familiarize students with the technology of generating electricity in nuclear power plants.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U02] able to operate equipment and perform typical analyzes of studies of environmental pollution and design and oversee the environmentally friendly technologies and zero-waste technologies, can perform expert on the environmental impact of technology already working	Is able to present system solutions for environmental protection during the operation of generating sources.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_W06] has a advanced knowledge of knowledge of the principles of sustainable development as well as national and European environmental management conditions, in the protection of intellectual property and patent law	Has knowledge of the functioning of selected electricity generation technologies and their impact on the environment.			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	[K7_W03] will have a detailed knowledge of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants and the technology of cleaning and neutralization of industrial waste and wastewater management and the design and supervision of environmentally friendly technologies	Can describe the risks associated with the production of electricity and ways to minimize them.			[SW1] Assessment of factual knowledge		
Subject contents	Atom structure. Historical overview of nuclear energy. Nuclear power in the world. Fission of the uranium nucleus. Multiplication factor and reactivity. Microscopic and macroscopic cross-section. Slowing neutrons. Nuclear reactions. Classification of nuclear reactors. Construction of the basic types of nuclear units. Nuclear power plant efficiency. Nuclear fuel cycle. The future of nuclear energy.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Seminar presentation	60.0%	35.0%
	Written exam	60.0%	65.0%
Recommended reading	Basic literature	1. Krivit B. K. i in.: Nuclear Energy Encyclopedia: Science, Technology, and Applications, John Wiley and Sons 2011  2. Glasstone S., Sesoske A., Nuclear Reactor Engineering, Springer 1984	
	Supplementary literature	<a href="https://www-pub.iaea.org/MTCD/Publications/PDF/cnpp2019/pages/index.htm">https://www-pub.iaea.org/MTCD/Publications/PDF/cnpp2019/pages/index.htm</a>  <a href="https://www.intechopen.com/books/nuclear-power-plants">https://www.intechopen.com/books/nuclear-power-plants</a>  <a href="https://www.iaea.org/publications/series">https://www.iaea.org/publications/series</a>	
	eResources addresses	Adresy na platformie eNauczanie: Nuclear energy (WChem) - Moodle ID: 38381 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=38381">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=38381</a>	
Example issues/ example questions/ tasks being completed	101. Draw schematic diagrams of PWR and BWR. Describe components in each system.  102. Describe briefly the methods of reactor power control by operators?  103. What is used as a cooling agent in a primary cycle of a PWR and what are the typical parameters of this agent (pressure, temperature)?  104. Describe briefly the two most commonly applied methods of nuclear fuel enrichment.		
Work placement	Not applicable		