



## Subject card

Subject name and code	Nuclear Power Plants, PG_00003345						
Field of study	Electrical Engineering						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	Subject group					
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			1.0		
Learning profile	general academic profile	Assessment form			assessment		
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						
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	0.0	15
	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	15		4.0		7.0	26
Subject objectives	The purpose of this course is to familiarize students with the basics of nuclear energy.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_U03		Students are able to analyze information from literature, including foreign literature, regarding nuclear power plants.		[SU3] Assessment of ability to use knowledge gained from the subject		
	K7_W01		Students can calculate simple tasks in the field of basic physics and nuclear energy.		[SW1] Assessment of factual knowledge		
	K7_U02		Students are able to answer a question testing knowledge of nuclear power plants.		[SU3] Assessment of ability to use knowledge gained from the subject		
	K7_W02		Students can answer questions about the chosen issues of nuclear power plant operation.		[SW1] Assessment of factual knowledge		
Subject contents	General problems and data on nuclear energy systems in the world. Classification of the existing types of nuclear power stations and these reactor technologies that are foreseen for the worldwide implementation. Elements of nuclear physics regarding especially light water reactors (LWR), thermal hydraulics of the primary circuit and of the power unit (secondary circuit) of a nuclear power station. Basic technical and operation indices of the plant and means for improving the gross efficiency of the nuclear power plant. Operating conditions and performance characteristics of station equipment in particular power units with PWR reactors. Radiation protection and shieldings problems. Nuclear fuel cycle, fuel reprocessing and the treatment of the radioactive wastes at nuclear power stations. Emergency reactor cooling systems and ventilation systems. Service water supply at a nuclear power station. Importance of overall nuclear safety approach and safety of a nuclear power plant.						
Prerequisites and co-requisites	Good knowledge of elements of physics (basic laws, physical quantities and their units and measures, mechanics, electrical engineering, thermodynamics, heat transfer). Knowledge of electrical energy generation technologies: energy conversions, efficiency of single conversion, efficiency of conversion cycle and thermodynamic cycle efficiency. Basic knowledge of mathematics: algebra, geometry, trigonometry, differential and integral calculus.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Test		60.0%		100.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Kubowski J.: Nowoczesne elektrownie jądrowe. Warszawa: WNT 2010.</li> <li>2. Celiński Z., Strupczewski A.: Podstawy energetyki jądrowej. Warszawa: WNT 1984.</li> <li>3. Kiełkiewicz M.: Jądrowe reaktory energetyczne. Warszawa: WNT 1978.</li> </ol>
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Jeziński G.: Energia jądrowa wczoraj i dzisiaj. Warszawa: WNT 2005.</li> <li>2. Żyszkowski W.: Wymiana ciepła w reaktorach jądrowych. Materiały szkoleniowe dla studiów podyplomowych. Gdańsk: Wydawnictwo Politechniki Gdańskiej 1991.</li> <li>3. NEI, Nuclear energy statistics</li> <li>4. IAEA-TECDOC-1391</li> <li>5. IAEA-TECDOC-1622</li> <li>6. IAEA-TECDOC-1487</li> <li>7. IAEA, INPRO Methodology for Sustainability Assessment of Nuclear Energy Systems: Environmental Impact of Stressors</li> </ol>
	eResources addresses	<p>Uzupełniające Adresy na platformie eNauczanie:</p>
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Classification of the world-wide existing different types of nuclear power stations and these stations which are foreseen for Poland.</li> <li>2. Calculate basic technical and operation indices of the nuclear power plant.</li> <li>3. Basic elements of primary and secondary circuit.</li> <li>4. Describe nuclear fuel cycle.</li> <li>5. Present the principle of operation of the selected passive safety system.</li> </ol>	
Work placement	Not applicable	