



Subject card

Subject name and code	Nuclear Power Plants, PG_00069139						
Field of study	Electrical Engineering, Automation, Robotics and Control Systems						
Date of commencement of studies	February 2026	Academic year of realisation of subject			2026/2027		
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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marcin Jaskólski					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	15.0	45
	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	45		5.0		25.0	75
Subject objectives	The aim of the course is for students to acquire knowledge related to key issues related to the construction, operation and importance of nuclear energy in the global energy economy.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U02] is able to prepare and deliver a short oral presentation on a selected technical topic	Prepares a presentation of the task results and presents them orally.			[SU5] Assessment of ability to present the results of task		
	[K7_W101] is able to make an in-depth identification of key objects and phenomena related to the field of study, as well as theories that describe them and applicable analytical and design methods	Knows the key technologies of generation III and IV nuclear reactors along with the phenomena describing them as well as methods for calculating their characteristic quantities.			[SW1] Assessment of factual knowledge		
	[K7_U03] is able to obtain information from literature, databases and other sources, also in English, draw conclusions, formulate and fully justify opinions. substantiate opinions; is able to identify directions for further learning and implement the process of self-education	Develops a solution to the task based on literature sources in Polish and English.			[SU1] Assessment of task fulfilment		

Subject contents	<p>Course content – lecture General problems and data of nuclear energy systems in the world. Classification of the world-wide existing different types of nuclear power stations and these stations which are foreseen for Poland. Elements of nuclear physics regarding especially light water reactors (LWR), thermal hydraulics of the primary circuit and of the power unit (secondary circuit) of 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 bloc units with PWR reactors. Nuclear radiation shielding and radiation protection issues. Nuclear fuel cycle and the processing and handling of the radioactive wastes at nuclear power stations. EPR and AP1000 reactors - structure, technical data, safety systems. High-temperature reactors - technical solutions. Fast reactors - schematic diagrams and technical characteristics. Small modular reactors (SMR) - pros and cons. Selected SMR solutions. Modern nuclear fuel cycle. Nuclear fusion and fusion reactors.</p> <p>Seminar: an extension of the topics covered during the lecture (example subjects include: the history of nuclear energy, comparison between nuclear and coal-fired power plants, the INES scale, an overview of small modular reactors (SMRs), the impact of nuclear radiation on living organisms, and the Windscale accident).</p>											
Prerequisites and co-requisites	<p>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.</p>											
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Seminar presentation</td> <td>60.0%</td> <td>33.0%</td> </tr> <tr> <td>Lecture tests</td> <td>60.0%</td> <td>67.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Seminar presentation	60.0%	33.0%	Lecture tests	60.0%	67.0%
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Recommended reading	<p>Basic literature</p> <p>Zieliński A. (red.): Elektrownie jądrowe w nowoczesnej gospodarce. Wydawnictwo Naukowe PWN, Warszawa 2024.</p> <p>Król K.: Bezpieczeństwo radiologiczne. Wydawnictwo Naukowe PWN, Warszawa 2024.</p> <p>Kubowski J.: Elektrownie jądrowe. Wydawnictwo Naukowe PWN, Warszawa 2017.</p>											
	<p>Supplementary literature</p> <p>1. Jeziński G.: Energia jądrowa wczoraj i dzisiaj. Warszawa: WNT 2005.</p>											
	<p>eResources addresses</p>											
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • role and importance of nuclear energy in the global energy economy, • classification of nuclear power plants, • elements of nuclear physics regarding especially light water reactors (LWR), thermal hydraulics of the primary circuit and of the power unit (secondary circuit) of nuclear power plants, • describe fuel cycle in nuclear reactors and management of radioactive waste. 											
Practical activities within the subject	<p>Not applicable</p>											

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