GDAŃSK UNIVERSITY OF TECHNOLOGY

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 lows, physical quantities and their units and measures, mechanics, electrical engineering, thermodinamics, heat transfer). Knowledge of electrical energy generation technologies: energy conversions, efficiency of single conversion, efficiency of conversioncycle and thermodinamic 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	1. Kubowski J.: Nowoczesne elektrownie jądrowe. Warszawa: WNT 2010. 2. Celiński Z., Strupczewski A.: Podstawy energetyki jądrowej. Warszawa: WNT 1984. 3. Kiełkiewicz M.: Jądrowe reaktory energetyczne. Warszawa: WNT 1978.
	Supplementary literature	1. Jezierski G.: Energia jądrowa wczoraj i dzisiaj. Warszawa: WNT 2005. 2. Żyszkowski W.: Wymiana ciepła w reaktorach jądrowych. Materiały szkoleniowe dla studiów podyplomowych. Gdańsk: Wydawnictwo Politechniki Gdańskiej 1991. 3. NEI, Nuclear energy statistics 4. IAEA-TECDOC-1391 5. IAEA-TECDOC-1622 6. IAEA-TECDOC-1487 7. IAEA, INPRO Methodology for Sustainability Assessment of Nuclear Energy Systems: Environmental Impact of Stressors
	eResources addresses	Uzupełniające Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Classification of the world-wide existing different types of nuclear power stations and these stations wchich are foreseen for Poland. 2. Calculate basic technical and operation indices of the nuclear power plant. 3. Basic elements of primary and secondary circuit. 4. Describe nuclear fuel cycle. 5. Present the principle of operation of the selected passive safety system.	
Work placement	Not applicable	