GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Machinery and equipment in nuclear power plants, PG_00065898						
Field of study	Nuclear Engineering						
Date of commencement of studies	February 2027		Academic year of realisation of subject	2027/2028			
Education level	second-cycle studies		Subject group	Specialty subject group Subject group related to scientific research in the field of study			
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	4.0			
Learning profile	general academic profile		Assessment form	exam			
Conducting unit	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Krzysztof Kosowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	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	60		10.0	30.0		100
Subject objectives	Basic knowledge on nuclear power plants: thermodynamical cycles and schema of nuclear plants, parameters of thermodynamical cycles, theory of heat turbomachinery and auxiliary equipment.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W02] demonstrates structured and theory supported knowledge encompassing key issues in the field of Nuclear Power Technologies enabling modeling and analysis of processes, systems, machines and devices of a nuclear power plant	Student can perform thermodynamical calculations of nuclear power plants, chose main design parameters, carry out design calculations of some turbomachinery elements.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U02] formulates and tests hypotheses concerning problems related to processes occurring in Nuclear Power Technologies, their efficiency, rationality, operation, safety and impact on the environment, as well as simple research problems	Student can name the main problems of thermodynamical cycles of nuclear power plants and the principles of heat turbomachinery operation and auxiliary equipment.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	Student can professionally formulate theoretical and technical problems and apply information from different sources.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Nuclear Power Technologies, the physics of processes, structure, principle of operation, operation, safety aspects, fuels and materials for reactors, systems, machines and devices of a nuclear power plant	Student knows: thermodynamical principles of nuclear power plant operation, fluid flow problems of turbomachinery and auxiliary equipment, main design elements.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture

Lectures: thermodynamical fundamentals of steam cycles of classical and nuclear power plants, thermodynamical fundamentals of gas cycles of nuclear power plants, problem of the proper values of the main design parameters of thermodynamical cycles, principles of operation of heat turbomachinery, calculations of thermodynamical cycles and design calculations of turbine stages, problems of the flow of wet steam, problems of erosion and corrosion, principles of control systems of steam nuclear plants, differences between classical and nuclear turbines, examples of modern nuclear power plants and turbines.

Prerequisites and co-requisites

Fundamentals of thermodynamics and fluid flow theory.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
laboratory	60.0%	15.0%
exercises	60.0%	15.0%
lecture	60.0%	70.0%

Recommended reading

Basic literature	Perycz, S., Steam Turbines of Electric Power Plants, part I, Gdańsk University of Technology, 1986 (in polish) Perycz, S., Steam Turbines of Electric Power Plants, part II, Gdańsk University of Technology, 1986 (in polish) Kosowski, K. ed., Steam and Gas Turbines, Alstom, France, Switzerland, United Kingdom, Poland, 2007
Supplementary literature	Perycz S., Steam and Gas Turbines, Ossolineum, Wrocław, Warszawa, Kraków, 1992 (in polish)
eResources addresses	

Example issues/ example questions/ tasks being completed	Design parameters of the thermodynamic cycles of steam nuclear power plants. Design parameters of the thermodynamic cycles of gas nuclear power plants. Problem of the rotor speed of nuclear turbines. Number of cylinders in steam nuclear turbines. Flow of wet steam in turbines. Erosion and corrosion in nuclear turbines.
Practical activites within the subject	Not applicable

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