



## 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 2025		Academic year of realisation of subject		2025/2026		
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						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Krzysztof Kosowski				
	Teachers						
Lesson types and methods of instruction	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	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	Adresy na platformie eNauczanie:	
	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.	
Work placement	Not applicable		

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