



Subject card

Subject name and code		Effective energy use in nuclear power technologies, PG_00065900						
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			2.0		
Learning profile		general academic profile	Assessment form			assessment		
Conducting unit		Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)		Subject supervisor		dr hab. inż. Jan Wajs				
		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	15.0	30
		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	30	5.0		15.0	50	
Subject objectives		Presentation of possible solutions for polygeneration systems based on nuclear power plants for efficient energy management.						
Learning outcomes		Course outcome	Subject outcome			Method of verification		
		[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	explains the principles of operation of polygeneration systems, verifies the applicability of different technologies in the energy system			[SW1] Assessment of factual knowledge		
		[K7_U11] communicates and justifies opinions on specialized topics in a manner understandable to diverse audiences, including the use of modern techniques, including information technology	prepares a presentation with the results of work on the selected issue, discusses these results and summarizes			[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject		
		[K7_U14] integrates information obtained from literature and other properly selected sources, including those in a foreign language, creatively interpreting and critically evaluating them, and drawing conclusions	selects a review of literature related to the seminar topic, interprets and evaluates the information obtained; formulates correct conclusions			[SU2] Assessment of ability to analyse information		
		[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study	identifies directions of development of technologies for generating electricity, heat, cooling, fuels/biofuels			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		

Subject contents	<p><i>Lecture:</i> thermodynamic cycles implemented in nuclear power plants - study of selected cases, the concept of cogeneration and polygeneration, general classification of cogeneration systems, technologies for cooperation with nuclear power plants, district heating based on nuclear energy, hydrogen production, fuel/ biofuel production</p> <p><i>Seminar:</i> review of selected polygeneration systems based on nuclear energy; individual student's work related to the collection and analysis of information about selected system (technical description, principles of operation, characteristics, economic data), which are presented and evaluated during the seminar</p>		
Prerequisites and co-requisites	thermodynamics, fluid mechanics, machine design, heat transfer		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	seminar	56.0%	35.0%
	written assessment of the lecture	56.0%	65.0%
Recommended reading	Basic literature	Amidpour M., Manesh M.H.K.: Cogeneration and polygeneration systems. Elsevier Science Publishing Co INC International Concepts, 2020	
	Supplementary literature	<p>Hani M.R.: et al.: An overview of polygeneration as a sustainable energy solution in the future. Journal of Advanced Research in Fluid Mechanics and Thermal Sciences, vol. 74 (2020), doi:10.37934/arfmts.74.2.85119</p> <p>Yan X.L., Hino R.: Nuclear hydrogen production. CRC Press, 2011, ISBN: 978-1-4398-1084-2</p>	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	The concept of polygeneration. Construction and application of combined energy systems. Nuclear heat applications.		
Work placement	Not applicable		

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