



Subject card

Subject name and code	Modern thermal power plants and polygeneration, PG_00055945						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies	Subject group			Optional 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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Maszyn Przepływowych -> 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	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		2.0		18.0	50
Subject objectives	Knowledge of modern, advanced power plants for electric power stations and distributed systems of energy						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U06] is able to use the basic knowledge on the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, combustion engines, compressors and rotating machines to assess the technical condition of the system		Students know the main characteristic parameters of the operation of power plants.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W06] knows classic and developmental energy technologies, rules for the selection and operation of heat and energy devices and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, methods of using renewable energy sources		Students can: - perform preliminary design calculations of large output power plants and distributed energy systems, - describe modern power plants		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K6_W13] has basic knowledge of the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, internal combustion engines, compressors and rotating machines, has basic knowledge of the regulation of energy equipment and methods of their selection depending on the needs		Students know the main principles of operation of power plants		[SW1] Assessment of factual knowledge		

Subject contents	<p>Modern steam turbine power plants with advanced supercritical parameters.</p> <p>Modern gas turbines units of high efficiency.</p> <p>Combined gas-steam power plants.</p> <p>Nuclear power plants with reactors of III+ and IV generations.</p> <p>Hydrogen power plants.</p> <p>Energy "harvesting" and "scavenging".</p> <p>Power plants for distributed energy systems.</p> <p>Energy storage systems.</p>								
Prerequisites and co-requisites									
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="451 777 794 813">Subject passing criteria</th> <th data-bbox="796 777 1139 813">Passing threshold</th> <th data-bbox="1141 777 1487 813">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 815 794 853">test</td> <td data-bbox="796 815 1139 853">60.0%</td> <td data-bbox="1141 815 1487 853">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	test	60.0%	100.0%
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Recommended reading	Basic literature	<p>1. S. Perycz, "Turbiny parowe i gazowe" (Polish) ("Steam and gas turbines), Ossolineum,</p> <p>2. K. Kosowski, "Steam and gas turbines. With examples of Alstom technology", 2007</p>							
	Supplementary literature	1. Contemporary books, journal articles and conference papers							
	eResources addresses								
Example issues/ example questions/ tasks being completed	<p>Schema and parameters of advanced supercritical steam power plants.</p> <p>Parameters and design of high efficient gas turbine units.</p> <p>Examples of hydrogen power plants</p> <p>Examples of "energy harvesting and scavenging".</p> <p>Energy storage systems.</p>								
Work placement	Not applicable								