



## Subject card

Subject name and code	, PG_00058639						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024				
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	3.0				
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	15.0	0.0	0.0	0.0	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	0.0	0.0	30		
Subject objectives	The purpose of the course is to provide general information about modern energy sources.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W02] has extended and deepened knowledge of physics, chemistry, thermodynamics, fluid mechanics, material science, necessary to understand and describe basic thermal and flow phenomena occurring in and around power equipment and systems, transmission networks and internal installations	they have extended and in-depth knowledge in the field of physics and thermodynamics, necessary to understand the description of phenomena occurring in energy systems.	[SW1] Assessment of factual knowledge
	[K7_K71] is able to explain the need to apply knowledge from humanistic, social, economic or legal sciences in order to function in a social environment	They can explain the need to use knowledge in the field of economic and legal sciences in relation to energy systems.	[SK4] Assessment of communication skills, including language correctness
	[K7_U71] is able to apply knowledge from humanistic, social, economic or legal sciences in order to solve problems	They can apply knowledge in the field of humanities, social, economic or legal sciences to assess the prospects for the development of energy technologies.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task
	[K7_U01] is able to acquire information from literature, databases and other sources, has the ability of self-education in order to improve his/her professional competence (also in English), is able to prepare a simple scientific paper and its summary in English, as well as an oral presentation	They can use sources in various languages to improve knowledge in the field of modern energy technologies.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task
	[K7_K02] is able to work in a group and take on different roles	They can work in teams.	[SK1] Assessment of group work skills
[K7_W08] as knowledge about development trends in the field of known technologies and non-technical aspects to solve simple engineering tasks in the field of power systems and equipment or transmission networks and internal installations	they have knowledge of development trends in the field of learned technologies and is able to solve simple engineering tasks in the field of energy generation technology.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects	
Subject contents	General data concerning the large part and importance of new energy sources for national power system. Different kinds of the sources especially the planned energy sources in Poland. Balancing principles of energy objects on the examples of: conventional steam power plants, especially the ultra supercritical plants and also these which are equipped with the hybrid systems with coal gasification and the boilers with fluidised bed combustion chamber and also with combined gas and steam blocks. Nuclear power stations with reactors of the latest generation. Small hybrid systems with biomass-fired plants, wind plants, solar stations and installations equipped with fuel cells. Small combined heat and power systems based on Dieselenigne-sets plants or gas turbine plants. Solutions of plants based on different kinds of nonconventional energy sources (geothermal, sea and ocean water energy, stations with MHD-generators). Calculations of technical and operating coefficients of above-mentioned sources. Importance of environmental protection problems.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Knowledge test	60.0%	100.0%
Recommended reading	Basic literature	Kubowski J.: <i>Nowoczesne elektrownie jądrowe</i> . WNT, Warszawa 2010  Pawlik M., Strzelczyk F.: <i>Elektrownie</i> . WNT, Warszawa 2009  Chmielniak T.: <i>Technologie energetyczne</i> . WNT, Warszawa 2008	

	Supplementary literature	<p>Praca zbiorowa: <i>Poradnik inżyniera elektryka. Tom III.</i> WNT, Warszawa 2007</p> <p>Cieśliński J., Mikielwicz J.: <i>Niekonwencjonalne źródła energii.</i> Wydawnictwo Politechniki Gdańskiej, Gdańsk 1996</p> <p>Szargut J., Ziębik A.: <i>Podstawy energetyki cieplnej.</i> WNP, Warszawa 2000</p> <p>Lewandowski W.: <i>Proekologiczne odnawialne źródła energii.</i> WNT, Warszawa 2007.</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>What moisture content is accepted in steam turbine? What might be the effect of too low steam quality?</p> <p>Show feedwater heating on an h-s graph and a schematic diagram of turbine system.</p> <p>What is the role of mixing system in a biogas plant?</p> <p>What are the advantages and disadvantages of fuel cells?</p>	
Work placement	Not applicable	