



Subject card

Subject name and code	Conventional Power Plants, PG_00051407						
Field of study	ELEKTROWNIE KONWENCJONALNE						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group				
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		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marcin Jaskólski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	15.0	60
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=481						
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		5.0		35.0	100
Subject objectives	The aim of the course is to familiarize with the technological sequence in conventional power plants and combined heat and power plants, and to acquire the ability to perform calculations of thermodynamic cycles for these objects, as well as calculating the power and energy produced in coal, gas, nuclear and hydro power plants.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U09		Computes electrical power output of a chosen electricity generating system.		[SU1] Ocena realizacji zadania		
	K6_W10		Describes the principal of operation of chosen electricity generators.		[SW1] Ocena wiedzy faktograficznej		
	K6_K05		Performs the analysis of the impact of chosen electricity generator on environment.		[SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce		
	K6_K01		Presents the results of the analysis of a selected problem in the field of conventional power plants.		[SK4] Ocena umiejętności komunikacji, w tym poprawności językowej [SK1] Ocena umiejętności pracy w grupie		

Subject contents	Course content – lecture Lecture: Energy forms and carriers as well as energy transformations. Basic physical quantities characterizing steam and water as a working factor in thermal circuits of conventional power plants. Thermodynamic changes. Enthalpy-entropy (i-s) and temperature-entropy (T-s) plots for steam and water. Theoretical Carnot circulation - circulation efficiency. Steam thermal power plants. Rankine cycle. Theoretical and real efficiency of the Rankine cycle. Determining the operational indicators of the power plant block. Means used to improve the efficiency of the Rankine cycle. Associated thermo-electric economy. Energy balance of the combined heat and power plant block. Gas and gas-steam power plants. Brayton-Joule cycle. Theoretical and real efficiency of the Brayton-Joule cycle. Measures to improve the efficiency of the Brayton-Joule cycle. Calculation of gross and net power of gas and gas-steam power unit. Nuclear power plants. Attitudes of energy transformations in nuclear power plants. Criticality of the nuclear reactor. Calculation of gross and net nuclear power. Comparison of thermal circuits in coal and nuclear power plants. Large hydropower plants. Calculation of power and energy in hydropower plants. Tutorials - calculation of power, energy, fuel consumption in selected types of power plants, courses of variability of electrical power, thermal and flow calculations of thermal power plants with the determination of typical indicators describing the operation of the source. Seminar - a presentation on a selected topic related to conventional energy.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Seminar presentation	60.0%	15.0%
	Lecture test	60.0%	50.0%
	Tutorials test	60.0%	35.0%
Recommended reading	Basic literature	Chmielniak T.: Technologie energetyczne. WNT, Warszawa 2021 Paska J.: Wytwarzanie energii elektrycznej. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2020 Marecki J.: Podstawy przemian energetycznych. WNT, Warszawa 2022 Pawlik M., Strzelczyk F.: Elektrownie. WNT, Warszawa 2017 Zieliński A. (red.): Elektrownie jądrowe w nowoczesnej gospodarce. Wydawnictwo Naukowe PWN, Warszawa 2024. Kubowski J.: Elektrownie jądrowe. Wydawnictwo Naukowe PWN, Warszawa 2017	
	Supplementary literature	Cieśliński J., Grudziński D., Jasiński W., Pudlik W.: Termodynamika. Zadania i przykłady obliczeniowe, Wyd. Politechniki Gdańskiej, Gdańsk 2008 Góra S., Kopecki K., Marecki J., Pochyluk R.: Zbiór zadań z gospodarki energetycznej, WNT, Poznań 1976 Kijewski J., Miller A., Pawlicki K., Szolc T.: Maszynoznawstwo. Podręcznik dla Technikum, WSiP, Warszawa 2012 Marecki J.: Gospodarka skojarzona ciepłno-elektryczna, WNT, Warszawa 1980 Szuman W.: Elektrownie i sieci ciepłne, PWN, Warszawa 1963	
	eResources addresses		

Example issues/ example questions/ tasks being completed	1. Draw a simplified diagram of the steam power plant working in the Hirna cycle. Present the circuit in the T-s and i-s system. 2. Describe the specific steam consumption, specific heat consumption and specific conventional fuel consumption by mathematical relationships. 3. Show the regenerative heating of the feed water on the diagram and on the i-s chart. 4. Impact of steam parameters on the circulation efficiency.
Practical activities within the subject	Not applicable

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