GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Power Plants and Combined Heat and Power Plants, PG_00055959		
Field of study	Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
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	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Tomasz Minkiewicz	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	15.0	0.0	45

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	45	6.0	49.0	100

Subject objectives

The purpose of this course is to familiarize students with general characteristics of the Polish Power System energy sources with particular emphasis on the role of CHP plants. Students become familiar with basic equipment and technological systems on example of CHP plant "Elektrocieplownia Gdanska".

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W12] has basic knowledge of the life cycle and repairs of energy equipment in the field of thermal power stations, thermal and energy systems and heating systems, internal combustion engines and compressors as well as rotating machines	The student is familiar with the issues related to the operation of selected devices in a power plant / combined heat and power plant.	[SW1] Assessment of factual knowledge
[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	Student knows the principles of design and balancing various heat and fluid flow elements of thermal cycles in power plant nad CHP plant.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W08] has basic knowledge in the field of intellectual property protection and patent law, knows and understands the basic processes of energy production and use, knows and understands the principles of modern heating and power systems	The student knows and is able to discuss the construction, operating principle and functions of power plants and combined heat and power plants.	[SW1] Assessment of factual knowledge

Subject contents

Lecture: current operation data of the Polish Power System; electricity and heat generation processes; equipment of power units; impact of the power plant on the environment.

Laboratory: characteristics of the consumption of fuels and energy carriers, characteristics of electricity and heat production in Poland, Thermal calculations of power units and calculations of heat networks using computer tools.

Project: a preliminary design of a power source in district heating as a combined heat and power plant.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Good knowledge of elements of physics (basic lows, physical quantities and their units and measures, mechanics, electrical engineering, thermodinamics, heat transfer). Knowledge of electrical energy generation technologies: energy conversions, efficiency of single conversion, efficiency of conversioncycle and thermodinamic cycle efficiency. Basic knowledge of mathematics: algebra, geometry, trigonometry, differential and integral calculus.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project work</td><td>60.0%</td><td>35.0%</td></tr>
<tr><td>Exam</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Laboratory reports</td><td>60.0%</td><td>15.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Marecki J., Podstawy przemian energetycznych, WNT, Warszawa 2022
2. Pawlik M., Strzelczyk F., Elektrownie, WNT, Warszawa 2023
3. Chmielniak T., Technologie energetyczne, WNT, Warszawa 2021</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Andrzejewski S., Podstawy projektowania siłowni cieplnych, WNT, Warszawa 1974
2. Pawlik M., Skierski J., Układy i urządzenia potrzeb własnych elektrowni, WNT, Warszawa 1986
3. Praca zbiorowa: Poradnik inżyniera elektryka Tom III, WNT, Warszawa 2007
4. Szargut J., Ziębik A., Podstawy energetyki cieplnej, Wydawnictwo Naukowe PWN, Warszawa 2000</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">• what is the role and significance of power engineering in country's economy,
• discuss national energy resources size and methods of their use,
• describe the principles of design and balancing various heat and fluid flow elements/ thermal cycles in CHP plant,
• function and principle of operation of the steam drum.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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