GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	The impact of the electric power industry on the environment, PG_00064764		
Field of study	Power Engineering, Power Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
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	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	15.0	0.0	0.0	15.0	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	6.0	14.0	50

Subject objectives

The aim of this course is to transfer the knowledge of identification of the impact of energy systems on the environment. Except for the impact of conventional energy sources, mostly coal-based, the effects of renewable energy sources, nuclear power as well as biogas- and natural gas-based technologies are within the scope of the course. In addition, selected methods and technologies of ash removal, flue gas desulphurization and carbon capture and storage (CCS) will be discussed.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U04] creatively designs or modifies, either entirely or at least in part, energy systems, machines and devices, transmission grids and internal installations, considering both technical and non-technical aspects, estimating costs and utilizing design techniques appropriate for tasks within the scope of Power Engineering	Performs a calculation task, taking into account the impact of the power sector on the environment.	[SU1] Assessment of task fulfilment
[K7_W11] interprets social, economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into engineering practice	Interprets the environmental conditions of the power sector.	[SW1] Assessment of factual knowledge
[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	Checks the correctness of own calculations based on the knowledge gained.	[SK5] Assessment of ability to solve problems that arise in practice
[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	Performs the development of the task in a way that is understandable to recipients with various needs.	[SU5] Assessment of ability to present the results of task

<table>
<tr><td>Subject contents</td><td>Course content – lecture

The impact of power plants and CHP plants on natural environment - overview. Polish energy system - fuel mix. Land protection - the area occupied by power plants and power stations. Emissions and air protection. Ash removal - electrostatic precipitator (ESP). Flue gas desulphurisation. CO2 sequestration - carbon capture and storage (CCS) systems. The impact of nuclear power plants on the environment. The use of renewable energy sources and their environmental impacts. Biogas plants. Natural-gas-based systems and extraction of gas from unconventional sources - environmental effects.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Evaluation test</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Oral presentation - Seminar</td><td>60.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. Kucowski, Laudyn, Przekwas, Energetyka a ochrona środowiska, WNT, Warszawa 1997.
2. Pawlik, Strzelczyk, Elektrownie, WNT, Warszawa 2012.
3. Marecki: Podstawy przemian energetycznych, WNT, Warszawa 2004.
4. Zieliński A. (red.): Elektrownie jądrowe w nowoczesnej gospodarce, Wydawnictwo Naukowe PWN, Warszawa 2024
5. Ewa Klugmann-Radziemska. Energetyka i ochrona środowiska: Generowanie i magazynowanie energii. Odpady energetyczne. Analiza cyklu życia. 1. wyd. Wydawnictwo Naukowe PWN, 2023. Print.</td></tr>
<tr><td>Supplementary literature</td><td>1. Strupczewski, Nie bójmy się energetyki jądrowej, SEREN, Warszawa, 2010.
2. Barre, Wszystko o energetyce jądrowej, AREVA, 2011.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Discuss the methods of flue gas desulphurisation. What method is the least-cost solution, and which one is the best in terms of the effectiveness of desulphurisation?

What is the principal rule of electrostatic precipitator?

What area is occupied by power plant per 1 MW of installed capacity?</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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