

GDAŃSK UNIVERSITY

Subject card

Subject name and code	The impact of the electric power industry on the environment, PG_00064764									
Field of study	Power Engineering									
Date of commencement of studies	February 2025		Academic year of realisation of subject			2025/2026				
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 Electri	cal Power Engi	neering -> Fac	ulty of Electrica	al and C	Control E	Engineering			
Name and surname	Subject supervisor		dr inż. Marcin Jaskólski							
of lecturer (lecturers)	Teachers									
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM		
of instruction	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 classes includ plan	n didactic ed in study	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 out	come	Subj	ect outcome			Method of ve	rification		
	[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				

Subject contents	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.						
Prerequisites and co-requisites							
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Evaluation test	60.0%	50.0%				
	Oral presentation - Seminar	60.0%	50.0%				
Recommended reading	Basic literature	 Kucowski, Laudyn, Przekwas, Energetyka a ochrona środowiska, WNT, Warszawa 1997. Pawlik, Strzelczyk, Elektrownie, WNT, Warszawa 2012. Marecki: Podstawy przemian energetycznych, WNT, Warszawa 2004. Zieliński A. (red.): Elektrownie jądrowe w nowoczesnej gospodarce, Wydawnictwo Naukowe PWN, Warszawa 2024 Ewa Klugmann-Radziemska. <i>Energetyka i ochrona środowiska: Generowanie i magazynowanie energii. Odpady energetyczne. Analiza cyklu życia.</i> 1. wyd. Wydawnictwo Naukowe PWN, 2023. Print. 					
	Supplementary literature	 Strupczewski, Nie bójmy się energetyki jądrowej, SEREN, Warszawa, 2010. Barre, Wszystko o energetyce jądrowej, AREVA, 2011. 					
	eResources addresses	Adresy na platformie eNauczanie:					
Example issues/ example questions/ tasks being completed	Discuss the methods of flue gas desulphurisation. What method is the least-cost solution, and which one 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?						
Work placement	Not applicable						

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