



Subject card

Subject name and code	Air purification technologies, PG_00057725						
Field of study	Green Technologies						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Justyna Łuczak					
	Teachers	dr hab. inż. Justyna Łuczak					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=4099 Moodle ID: 4099 ZT_Technologie oczyszczania powietrza_wykład_2026 https://enauczanie.pg.edu.pl/2025/course/view.php?id=4099						
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	2.0	28.0	75		
Subject objectives	Acquiring knowledge about basic technologies of air protection and purification						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U02] is able to operate equipment and perform typical analyzes of studies of environmental pollution, is able to carry out an analysis of typical environmental pollution and simple devices according to specification	The student is able to identify basic methods and technologies for air purification and select the appropriate method for purifying air containing selected pollutants.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	[K6_U03] is able to use information and communication technologies relevant to the common tasks of engineering, is able to use known methods and mathematical-physical models to describe and explain phenomena and chemical processes	The student is able to use databases and e-platforms to search for information on methods and technologies for air purification.	[SU4] Assessment of ability to use methods and tools
	[K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants	The student knows air pollutants, their characteristics and sources of emissions. The student knows methods of removing pollutants from gas streams	[SW2] Assessment of knowledge contained in presentation
[K6_U05] can formulate and solve engineering tasks analytical methods, simulation as well as experimental, able to apply knowledge of basic physics and mathematics to analyze the results of experiments, is able to analyze and assess existing technical solutions	The student is able to evaluate and compare existing technical solutions for purifying air from selected pollutants.	[SU3] Assessment of ability to use knowledge gained from the subject	
Subject contents	<p>Course content – lecture The main pollutants of the atmosphere. General principles of dust control. Dust removal methods for air (dry and wet). Primary and secondary methods of reducing NO_x emissions. Air protection by desulfurization of fossil fuels. Flue gas desulfurization. Treatment of waste gases from VOCs. Control of odor emissions. Control of CO₂ emissions.</p> <p>Course content – laboratory Removal of air pollutants in absorption processes</p> <p>Removal of ammonia from air using adsorption techniques</p> <p>Removal of volatile organic compounds from air in the biofiltration process</p> <p>Selected issues in phosphorus compound technology</p> <p>Hydrogen as an element of industrial decarbonisation</p>		
Prerequisites and co-requisites	<p>Environmental chemistry Physical chemistry Basics of chemical technology Process engineering</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Participation and activity in laboratory classes	60.0%	40.0%
	Exam	60.0%	60.0%

Recommended reading	Basic literature	Lewandowski W., Techniczno-technologiczne i aparaturowe aspekty ochrony powietrza, WPG Gdańsk 2011; Krajowy bilans emisji SO ₂ , NO _x , CO, NH ₃ , NMLZO, pyłów, metali ciężkich i TZO za lata 1990-2019, Raport syntetyczny, Krajowy Ośrodek Inwentaryzacji i Raportowania Emisji, Instytut Ochrony Środowiska Państwowy Instytut Badawczy, Warszawa 2021; Krajowy Raport Inwentaryzacyjny 2021, Inwentaryzacja gazów cieplarnianych dla lat 1988-2019, Raport syntetyczny, Krajowy Ośrodek Bilansowania i Zarządzania Emisjami (KOBIZE), Instytut Ochrony Środowiska Państwowy Instytut Badawczy, Warszawa 2021. Warych J., Oczyszczanie gazów. Procesy i aparatura, WNT Warszawa 1998; Warych J., Oczyszczanie przemysłowych gazów odlotowych, WNT Warszawa 1988; Juda J., Nowicki M., Urządzenia odpylające, PWN, Warszawa 1979; Koniecznyński J., Ochrona powietrza przed szkodliwymi gazami. Metody, aparatura i instalacje, WPS, Gliwice 2004; Kośmider, J., Mazur-Chrzanowska, B., Wyszyński, B., Odory, Wyd. 1, PWN, Warszawa 2002
	Supplementary literature	Krajowy bilans emisji SO ₂ , NO _x , CO, NH ₃ , NMLZO, pyłów, metali ciężkich i TZO za lata 1990-2019, Raport syntetyczny, Krajowy Ośrodek Inwentaryzacji i Raportowania Emisji, Instytut Ochrony Środowiska Państwowy Instytut Badawczy, Warszawa 2021; Krajowy Raport Inwentaryzacyjny 2021, Inwentaryzacja gazów cieplarnianych dla lat 1988-2019, Raport syntetyczny, Krajowy Ośrodek Bilansowania i Zarządzania Emisjami (KOBIZE), Instytut Ochrony Środowiska Państwowy Instytut Badawczy, Warszawa 2021. Rozporządzenie Ministra Środowiska z dnia 26 stycznia 2010 r. w sprawie wartości odniesienia dla niektórych substancji w powietrzu, Dz.U. 2010 nr 16 poz. 87
	eResources addresses	Basic https://pg.edu.pl/biblioteka-pg/e-zasoby - literature databases
Example issues/ example questions/ tasks being completed	1. Draw a diagram and on its basis describe selective catalytic reduction of NO _x contained in flue gases, consider reactions occurring in the process and limitations of this method. 2. Discuss the most important strategies related with reducing CO ₂ emissions to the atmosphere. Draw the installation diagram and on this basis discuss the chosen process of CO ₂ separation from flue gases and CO ₂ storage.	
Practical activities within the subject	Field exercises	

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