



## Subject card

Subject name and code	, PG_00071782						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject			2025/2026		
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Karolina Matej-Lukowicz					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	15.0	15.0	0.0	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	0.0		0.0		30
Subject objectives	The aim of the course is to familiarize students with the properties, selection, and application of filtration materials used in wastewater treatment processes. The course covers topics related to biochar, sorption mechanisms, commercial sorbent materials, and their production processes, with particular emphasis on the use of waste-derived feedstocks. Additionally, its objective is to develop skills in designing filtration materials (including planning production and modification processes) as well as conducting and interpreting laboratory studies in environmental engineering.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W02] has broadened and well-ordered knowledge of the current law on construction, water, environmental protection and planning and spatial planning.	The student has systematic knowledge of the application of filtration materials in wastewater treatment processes and their disposal, in relation to building law, water law, and other relevant regulations.			[SW3] Assessment of knowledge contained in written work and projects		
	K7_W05	The student is able to analyze the environmental impacts of investments and their implementation processes, particularly those related to wastewater treatment.			[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	[K7_U08] is able to assess risks in the implementation of engineering projects and implement appropriate safety rules	The student has gained knowledge of different types of risks and is able to identify those related to wastewater treatment processes, as well as determine methods for their prevention and mitigation.			[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		

Subject contents	Course content – exercises		
	<p>The content of the tutorial classes includes topics related to the characterization of filtration materials used in wastewater treatment, including the analysis of their basic physicochemical and structural parameters. During the classes, students evaluate the influence of individual material properties on the efficiency of filtration processes, with particular emphasis on sorption mechanisms. Additionally, they analyze research results for selected biochars and propose their potential applications in wastewater treatment systems.</p>		
	Course content – laboratory		
	<p>The content of the laboratory classes includes the analysis of the properties of filtration materials used in wastewater treatment, as well as familiarizing students with their production and modification processes. During the classes, students conduct experimental studies to evaluate the sorption and filtration parameters of selected materials. Additionally, they verify in practice the suitability of initially selected materials for specific wastewater treatment processes.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm test	50.0%	50.0%
	Assessment of ongoing work during laboratory classes	50.0%	50.0%
Recommended reading	Basic literature	<p>Sarbak Z.: <i>Adsorption and Adsorbents</i>, Adam Mickiewicz University Scientific Publishing House, 2000.</p> <p>Żubrowska-Sudoł M.: <i>Wastewater Treatment Plant as an of the Circular Bioeconomy</i>, Warsaw University of Technology Publishing House, 2022.</p> <p>Gromiec M., Kledyński Z.: <i>Water, Wastewater and Waste Management in the Circular Economy</i>, Warsaw University of Technology Publishing House, 2025.</p>	
	Supplementary literature	Available scientific publications in databases such as Scopus, Springer, and others.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• Explain the differences between physical adsorption and chemisorption.</li> <li>• What properties of biochar determine its sorption capacity?</li> <li>• How does pyrolysis temperature affect the structure of biochar?</li> <li>• Compare biochar and activated carbon as filtration materials.</li> <li>• What factors influence the effectiveness of heavy metal removal from water?</li> </ul>		
Practical activities within the subject	Not applicable		

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