



Subject card

Subject name and code	, PG_00069688						
Field of study	Migracja zanieczyszczeń						
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	
Mode of study	Full-time studies		Mode of delivery			at the university	
Year of study	3		Language of instruction			Polish	
Semester of study	5		ECTS credits			3.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Piotr Zima				
	Teachers		dr hab. inż. Piotr Zima				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	10.0	10.0	0.0	0.0	40
	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	40		5.0		30.0	75
Subject objectives	To familiarize students with the problems related to the transport of pollutants in water and air						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_U02] solves engineering issues and problems in the area of raw materials and energy recovery through the use of appropriate analytical, numerical and experimental tools and methods.		The student solves issues and problems related to the migration of pollutants in water by using appropriate and proper analytical, numerical and experimental tools and methods.			[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu	
	[K6_W02] analyzes engineering and technological issues and problems in the area of raw materials and energy recovery using appropriate and appropriate analytical, numerical and experimental tools and methods		The student analyzes engineering and technological issues and problems in the area of contaminant migration using appropriate and proper analytical, numerical and experimental tools and methods.			[SW1] Ocena wiedzy faktograficznej	
	[K6_W04] demonstrates knowledge and understanding of research methods (information acquisition, simulations, experimental methods) in the field of technologies related to the recovery of raw materials and energy.		The student has basic knowledge of the basic processes that influence environmental pollution			[SW1] Ocena wiedzy faktograficznej	
	[K6_U04] formulates research problems and selects appropriate research methods (information acquisition, simulations, experimental methods) in the field of technologies related to the recovery of raw materials and energy in order to solve specific tasks and to report research results.		The student formulates research problems and selects appropriate research methods (information acquisition, simulations, experimental methods) in the field of contaminant migration in water in order to solve specific tasks and report research results.			[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu	

Subject contents	Course content – lecture Properties of dispersed systems (suspensions, solutions) in water and air. Migration of suspensions - the general equation of motion of a suspension particle, simplified equation, practical methods. Migration of solutes - the law of conservation of mass of a solution component, the advection-diffusion equation, source functions. Turbulent diffusion. Migration of thermal energy.		
	Course content – exercises Implementation of the lecture program in the field of blackboard exercises		
	Course content – laboratory Implementation of the lecture program in the field of laboratory exercises		
Prerequisites and co-requisites	Knowledge of mathematics, physics, computer science		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	60.0%	60.0%
	Tutorials	60.0%	20.0%
	Laboratory	60.0%	20.0%
Recommended reading	Basic literature	1. Sawicki J.M., "Przenoszenie masy i energii", Wyd. PG,Gdańsk 1993. 2. Sawicki J.M., "Migracja zanieczyszczeń", Wyd. PG, Gdańsk 2003.	
	Supplementary literature	1. Chapara S.C., "Surface Water-Quality Modeling", 1996.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	List the basic processes of transporting substances in water and air. Describe the basic source functions in the pollutant transport equation. Describe the BOD5-Dissolved Oxygen model.		
Practical activities within the subject	Not applicable		

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