



Subject card

Subject name and code	Migration of Pollution, PG_00048012						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject			2024/2025	
Education level	first-cycle studies		Subject group			Optional subject group Subject group related to scientific research in the field of study	
Mode of study	Part-time studies		Mode of delivery			at the university	
Year of study	4		Language of instruction			Polish	
Semester of study	8		ECTS credits			4.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Piotr Zima				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	10.0	0.0	0.0	0.0	25
	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	25		5.0		70.0	100
Subject objectives	Introducing students to the problems related to the transport of pollutants in water and in the air						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W12] knows the theoretical basis of the general atmosphere circulation, radiation processes, thermodynamics of the atmosphere, physical properties of atmospheric air and climate-forming processes	The student knows the theoretical foundations of the general circulation of the atmosphere, radiation processes, atmospheric thermodynamics, physical properties of atmospheric air and climate-forming processes.	[SW1] Assessment of factual knowledge
	[K6_U15] can make interpretations of measured meteorological parameters, define basic elements characterizing the weather and climate	The student is able to interpret measured meteorological parameters and determine the basic elements characterizing weather and climate.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[K6_K02] understands the need to formulate and communicate to the public information and opinions on the achievements of environmental engineering and other aspects of the sanitary industry engineer's activity; is aware of the importance and understands the non-technical aspects and effects of engineering activities; makes efforts to provide such information and opinions in a widely understandable way, presenting different points of view	The student understands the social aspect of pollution transport and is able to formulate non-technical conclusions resulting from it	[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice
	[K6_W06] has a structured and theoretically founded knowledge in the field of computer science, numerical methods and the possibilities of their applications for solving tasks, description of phenomena related to the flow of water in the environment, in open pipes and channels, filtration, migration of pollutants	The student has knowledge of mathematics and numerical methods in solving problems related to the transport of pollution	[SW1] Assessment of factual knowledge
	[K6_W05] knows the theoretical basis of hydromechanics and its practical models, necessary to solve technical problems in the field of environmental engineering (sanitary engineering, water melioration, water management and flood protection, pollution spread)	The student has knowledge of the impact of pollution on the infrastructure	[SW1] Assessment of factual knowledge
	[K6_W04] possesses elementary knowledge in the field of land mechanics, ground science, land reclamation and geotechnics; has basic knowledge about the composition of air, water and soil, environmental pollution and processes responsible for their formation and ways to reduce them, knows the principles and organization of sustainable water management	The student has basic information on the fundamental processes influencing environmental pollution	[SW1] Assessment of factual knowledge
Subject contents	WYKŁADPrzedstawienie podstawowych równań opisujących zachowanie się substancji rozproszonych w wodzie i w powietrzu. Dyfuzja, dyfuzja burzliwa, dyspersja - podstawowe mechanizmy transportu. Opis i równania funkcji źródłowych. Rozwiązania równań opisujących funkcje źródłowe. Model BZT5-tlen rozpuszczony. Rozwiązania równania transportu: równanie dyfuzji, adwekcji-dyspersji i adwekcji-dyfuzji/dyspersji-reakcji.ĆWICZENIAProjekt grupowy osadnika. Projekt grupowy emitera do atmosfery.		
Prerequisites and co-requisites	Knowledge of the subject of mathematics, physics, computer science		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Group project	60.0%	50.0%
	Substantive knowledge test	60.0%	50.0%

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	Adresy na platformie eNauczanie:
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	
Work placement	Not applicable	

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