GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00059143						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject	2025/2026			
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	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						
Lesson types	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		2.0	50.0		77
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_K01] can think and act in a creative and enterprising way; can set priorities for the implementation of an individual or group task; understands the need for continuous training and professional responsibility for their activities and team	The student is able to define priorities for the implementation of an individual or group task; understands the need for continuous education and taking professional responsibility for his/her own and the team's activities	[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work
[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
[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_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_W12	The student understands the basic physical and geochemical processes occurring within the atmosphere, lithosphere, and hydrosphere, particularly water and air movement, geological processes, and heat and pollutant transport.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
WYKŁAD

Przedstawienie 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.

ĆWICZENIA:

Projekt grupowy osadnika. Projekt grupowy emitera do atmosfery.

Course content – exercises
LECTURE
Presentation of basic equations describing the behavior of substances dispersed in water and air. Diffusion, turbulent diffusion, and dispersion basic transport mechanisms. Description and equations of source functions. Solutions of equations describing source functions. BOD5-dissolved oxygen model. Solutions of the transport equation: diffusion, advection-dispersion, and advection-diffusion/dispersion-reaction equations.
EXERCISES:
Group design of a sedimentation tank. Group design of an atmospheric emitter.

Prerequisites and co-requisites

Knowledge of the subject of mathematics, physics, computer science

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Group project</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Substantive knowledge test</td><td>60.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Sawicki J.M., "Przenoszenie masy i energii", Wyd. PG,Gdańsk 1993.

2. Sawicki J.M., "Migracja zanieczyszczeń", Wyd. PG, Gdańsk 2003.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Chapara S.C., "Surface Water-Quality Modeling", 1996.</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">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</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.