GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00065746		
Field of study	Recycling and Energy Recovery		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-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	4	ECTS credits	2.0
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	prof. dr hab. inż. Michał Szydłowski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	10.0	0.0	10.0	0.0	0.0	20

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	20	0.0	0.0	20

Subject objectives

Understanding the role of water as a raw material and energy resource. Familiarizing yourself with the basic principles that govern water movement.

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.	Student calculates basic flow parameters in pipelines, channels and hydraulic devices. Investigates hydraulic phenomena in the laboratory.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task
[K6_W03] identifies problems and phenomena related to the recovery of raw materials and energy as well as applicable concepts, standards and design methods and is aware of their limitations.	The student defines concepts and explains the principles of water movement in the natural environment and technical installations. Determines the nature of water flow in closed conduits and open channels.	[SW1] Assessment of factual knowledge
[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 simplified flow models. The student learns about basic hydro-engineering devices related to water resources management.	[SW1] Assessment of factual knowledge
[K6_U03] designs processes, technologies and systems related to the recovery of raw materials and energy, using appropriate concepts, standards and design methods.	Student measures and determines water movement parameters. Draws conclusions regarding water movement.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

Course content – lecture
LECTURE Properties of fluids. Classification of flows. Elements of hydrostatics. Conservation equations for one-dimensional flows. Movement of fluids in closed conduits. Movement of fluids in open channels. Outflow of fluids through holes and weirs. Filtration of water in the ground. Measurements of velocity and flows. Water devices.

LABORATORY EXERCISES Study of flow in a pipeline. Study of flow in an open channel. Hydraulic calculations: pipelines, open channels, filtration.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">not applicable</td></tr>
<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>Knowledge test</td><td>50.0%</td><td>50.0%</td></tr><tr><td>Passing the lab</td><td>100.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Hydraulics handbooks</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Fluid mechanics handbooks</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">1. Hydraulic calculations of flow parameters in pressurized pipelines.
2. Hydraulic calculations of flow parameters in open channels.
3. Hydraulic calculations of filtration movement parameters.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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