GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00058817		
Field of study	Environmental Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
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	2.0
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	0.0	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	5.0	20.0	55

Subject objectives	The aim of the course is to familiarize students with the basics of fluid mechanics, related to the movement of fluids (in the basic scope - liquids, in the approximate scope - gases). The lectures present basic concepts and terminology, then kinematics, the main laws of mechanics, leading to the general equations of fluid motion (Navier-Stokes) and to the equations of turbulent motion (Reynolds). The basic relations of hydrostatics and the Bernoulli equation are discussed. The aim of the laboratory is to illustrate the most important issues of the lecture program.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] can work individually and in a team; knows how to estimate the time needed to complete the task ordered; is able to develop and implement a work schedule that ensures deadlines	The student is able to work independently and in a team, according to a schedule.	[SU1] Assessment of task fulfilment
[K6_W14] knows and understands the methods of measuring basic quantities characteristic for fluid mechanics and hydraulics, hydrology; knows the calculation methods and IT tools necessary to analyze the results of laboratory and field work	The student knows the measurement methods necessary in environmental engineering.	[SW1] Assessment of factual knowledge
[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 work in a team. Understands the problem of responsibility in professional work.	[SK1] Assessment of group work skills
[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)	Is able to compare and analyze existing fluid mechanics models describing the problem under consideration and select the appropriate one.	[SW1] Assessment of factual knowledge

Subject contents

Properties of fluids. Kinematics. Buckingham's theorem. Basic conservation laws and equations. Newton's hypothesis. Navier-Stokes equations. Hydrostatics. Bernoulli's equation. Turbulence. Reynolds equations.

Prerequisites and co-requisites

Knowledge of mathematics, physics and hydraulics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	60.0%	60.0%
lab test	60.0%	40.0%

Recommended reading

Basic literature	1. Mitosek M., Mechanika płynów w inżynierii i ochronie środowiska", PWN, Warszawa 2001.2. Puzyrewski R., Sawicki J., Podstawy mechaniki płynów i hydrauliki, PWN, Warszawa 2013.3. Duckworth R.A., Mechanika Płynów", WNT, Warszawa 1983.
Supplementary literature	1. Gryboś P., Podstawy mechaniki płynów, PWN, Warszawa 1989. 2. White F. M., Fluid Mechanics" (1st-4th ed.), McGraw-Hill.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

What properties of fluids do you know?Newton's hypothesis.The law of conservation of mass for the steady motion of a compressible fluid.The Navier-Stokes equation for an incompressible and invisible fluid.Define what a streamline is.Describe the aspects of practical use of fluid mechanics and CFD.

Work placement

Not applicable

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