GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fluid Mechanics, PG_00049759		
Field of study	Power Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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	2	Language of instruction	English
Semester of study	4	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Krężelewski	
	Teachers	dr inż. Michał Krężelewski dr inż. Marzena Banaszek	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	15.0	0.0	0.0	75

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	75	10.0	65.0	150

Subject objectives

The student recognizes basic problems connected with flows and flows around bodies. Uses the laws and methods of Fluid Mechanics and can apply them to practical problems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] has a basic knowledge of physics (including optics, electricity and magnetism), chemistry, technical thermodynamics, fluid mechanics and general mechanics needed to understand and describe the basic phenomena occurring in devices and systems, energy plants and transmission networks and their environment	The student has the basic knowledge of fluid mechanics necessary to understand flow phenomena occurring in practice.	[SW1] Assessment of factual knowledge
[K6_K01] is aware of the need for training and self-improvement in the profession of energy and the possibility of further education; can think and act in a creative and entrepreneurial manner; can define priorities for the implementation of an individual or group task	On the basis of the knowledge acquired, the student is able to extend his/her knowledge of Fluid Mechanics and apply it to the solution of real flows occurring in the Energy Industry.	[SK5] Assessment of ability to solve problems that arise in practice

<table>
<tr><td>Subject contents</td><td>Course content – lecture

Properties of fluids. Mass and surface forces in fluids. Equations of fluid motion. The Bernoullis equation.Hydrostatic lift. Pressure distribution calculations. Flow in pipes. The similarity of flows and modeling laws.Basic field theory. Field operators: gradient, velocity flux, divergence, rotation and circulation of velocity.Mass conservation law. Basic wing theory: geometrical and dynamic characteristics of foils. Potential flows.

Course content – exercises
Solving practical problems related to the content of lectures and laboratories.
Course content – laboratory

Laboratory: flow visualization. Reynolds experiment for laminar and turbulent flow. Energy losses in pipeflow. Pressure distribution around a circular cylinder. Flow through orifices. Flow rate measurement in a pipeflow. Orifice, nozzle and Venturi flow rate meters.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Exam</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Tutorial</td><td>50.0%</td><td>25.0%</td></tr>
<tr><td>Laboratory</td><td>100.0%</td><td>25.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Cengel Y.A, Cimbala J.M. Fluid Mechanics Fundamentals and Applications, McGraw HillWhite F. M. Fluid Mechanics, McGraw-Hill
F. M. White Fluid Mechanics, Seventh Edition, McGraw-Hill 2011
Pritchard P.J., Leyegian J.C. Fox and McDonalds Introduction to Fluid Mechanics, Eighth Edition, JOHN WILEY & SONS, INC, 2011.
Potter M. C., Wiggert D. C., Shih T. I-P., Mechanics of Fluids, Cengage Learning, 2012.</td></tr>
<tr><td>Supplementary literature</td><td>Prieve D. C. A Course in Fluid Mechanics with Vector Field Theory,Carnegie Mellon University, Fall 2000</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Discuss the physical properties of fluids.Types of forces acting in a fluid.Analyze the mass conservation law for an incompressible fluid. Present the equations of fluid motion. Application of the Bernoulli integral to realflows.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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