GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fluid Mechanics, PG_00050289		
Field of study	Mechanical Engineering, Mechanical Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2021/2022
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	Polish -
Semester of study	4	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Krzysztof Kosowski	
	Teachers	dr inż. Marzena Banaszek dr inż. Wojciech Włodarski prof. dr hab. inż. Krzysztof Kosowski mgr inż. Anna Butterweck dr hab. inż. Tomasz Muszyński	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	15.0	0.0	0.0	60

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

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	60	6.0	59.0	125

Subject objectives

Objective of the subject is to supply the student with the theoretical and practical knowledge, enabling him to solve engineering computational and experimental problems related to fluid mechanics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U06] is able to use mathematical and physical models for analysing the processes and phenomena occurring in mechanical devices within the range of material strength, thermodynamics and fluid mechanics	The student is able to use mathematical and physical models to analyze the processes and phenomena occurring in mechanical devices in the field of material strength, thermodynamics and fluid mechanics	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning	The student has basic knowledge in the field of thermodynamics and fluid mechanics, construction and operation of thermal energy devices, process equipment, including renewable energy sources as well as refrigeration and air conditioning	[SW1] Assessment of factual knowledge

Subject contents	LECTURES Introduction and basic definitions. Properties of fluids. Models of fluids. Fluids in equilibrium. Determination of hydrostatic forces. Archimedes" law. Methods of fluid flow description. General motion of fluid. Deformation of fluid element. Vortex motion of fluid. Principles of conservation of mass, momentum and energy. Balance of entropy. Navier-Stokes equation. Bernoulli equation. Similarity of flow phenomena. Potential flows. Principles of gas dynamics - subsonic and supersonic flows. PRACTICAL EXERCISES Kinematics of flows. Laminar and turbulent flows in pipes - averaging of flow parameters.Practical applications of Bernoulli equation. Determination of forces acting on channel walls and on surfaces of bodies moving in fluids. LABORATORY EXERCISES Visualization of flows. Outflow from orifices. Measurements of flow intensity in open channels and pipes. Characteristics of water turbine. Research of flow around lifting foils. Modelling of gas flow by hydrodynamic analogy.
Prerequisites and co-requisites	Konowledge of differential and integral calculus, differential and integral equations and principles of vector calculus. Knowledge of principles of classical mechanics of solids.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Two practical exercises tests	50.0%	30.0%
Laboratory experiments reports	100.0%	30.0%
Written exam	50.0%	40.0%

Recommended reading	Basic literature: Tesch K.: Mechanika płynów, Wyd. Politechniki Gdańskiej, Gdańsk 2008 Tesch K, Banaszek M, Laboratorium mechaniki płynów, Wydawnictwo FPPOiGM, Gdańsk 2016 http://www.pg.gda.pl/~krzyte/students/laboratorium.pdf
	Supplementary literature: Puzyrewski R., Sawicki J.: Podstawy mechaniki płynów i hydrauliki, PWN Warszawa 1998
	eResources addresses:
Example issues/ example questions/ tasks being completed	-
Work placement	Not applicable