

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Fluid Mechanics, PG_00055414								
Field of study	Mechatronics								
Date of commencement of studies	October 2023		Academic year of realisation of subject			2024/2025			
Education level	cation 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	3		ECTS credits			4.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Energy	/ and Industrial	Apparatus -> Faculty of Mechanical Engineering and Ship Technolog				p Technology		
Name and surname	Subject supervisor		prof. dr hab. ir	esch					
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	15.0	15.0	15.0	0.0		0.0	45	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity Participation ir classes include plan		I didactic Participation in ed in study consultation hours		Self-study SUM				
	Number of study hours	45		6.0		49.0		100	
Subject objectives	The aim of the course is to provide the student with theoretical and practical knowledge of fluid mechanics, allowing for solving engineering computational problems related to fluid mechanics.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_W04] has organized and theoretically supported, advanced knowledge in the field of general mechanics, strength of materials, theory of mechanisms and machine dynamics, fluid dynamics, hydraulics and pneumatics, machine construction and engineering graphics		The student has an ordered and theoretically founded knowledge of general mechanics, material strength, theory of mechanisms and dynamics of machines, fluid mechanics, hydraulics and pneumatics, machine construction and engineering graphics			[SW1] Assessment of factual knowledge			
	[K6_U01] is able to acquire information from literature, databases and other, properly chosen sources, integrate these information, interpret them, draw conclusions and formulate opinions [K6_U03] has self-learning skills		The student is able to obtain information from literature, databases and other properly selected sources, integrate the obtained information, interpret it, as well as draw conclusions and formulate and justify opinions The student has the ability to self-			[SU3] Assessment of ability to use knowledge gained from the subject [SU3] Assessment of ability to use knowledge gained from the			
			study			subject			

Subject contents	LECTURE Introduction and basic definitions. Properties of fluids. Fluid models. Fluid equilibrium state. Determination of hydrostatic pressure. Archimedes' law. Methods of describing fluid movement. General fluid movement. Fluid element deformation. Swirling fluid movement. Principles of conservation of mass, momentum and energy. Balance of entropy. Navier-Stokes equation. Bernoulli equation. PRACTICAL EXERCISES Kinematics of flows. Laminar and turbulent flows in a pipe - averaging flow parameters. Practical application of Bernoulli's equation. Determination of forces acting on the walls of channels and surfaces of flows. Solving simplified forms of the Navier-Stokes equation. LABORATORY Visualization of flows. Outflow from the holes. Measurement of the flow rate in open channels and pipelines. Characteristics of a water turbine. Examination of the flow around the supporting airfoils. Modeling of gas flows with the use of hydrodynamic analogy.					
Prerequisites and co-requisites	Knowledge of differential and integral calculus, differential equations and the basics of vector calculus. Basic knowledge of classical solid state mechanics					
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	Written exam	50.0%	100.0%			
Recommended reading	Basic literature	Tesch K.: Mechanika płynów, Wyd. Politechniki Gdańskiej, Gdańsk 2008				
	Supplementary literature	Puzyrewski R., Sawicki J.: Podstawy mechaniki płynów i hydrauliki, PWN Warszawa 1998				
	eResources addresses	Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed	-					
Work placement	Not applicable					