



Subject card

Subject name and code	Fluid Mechanics , PG_00040058						
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	Part-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 Tesch				
	Teachers		prof. dr hab. inż. Krzysztof Tesch				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	8.0	0.0	0.0	0.0	23
	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	23		7.0		95.0	125
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_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		
	[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		
Subject contents	<p>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.</p> <p>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 flowing bodies. Solving simplified forms of the Navier-Stokes equation.</p>						
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	
Example issues/ example questions/ tasks being completed	-	
Work placement	Not applicable	