



Subject card

Subject name and code	Fluid Mechanics for Medical and Mechanical Engineering, PG_00039377						
Field of study	Medical and Mechanical Engineering, Medical and Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2022/2023	
Education level	first-cycle studies	Subject group				Optional subject group 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				3.0	
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 dr inż. Marzena Banaszek dr inż. Marta Drosińska-Komor				
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						
Mechanika płynów w IMM, W/L, sem. 5, zimowy 22/23 (M:31680W0) - Moodle ID: 25362 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=25362							
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		40.0	75
Subject objectives	The objective of the course is to provide basic information about fluid mechanics in IMM, which will be useful in the work of an engineer.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K6_U01		The student has the ability to self-study, can find the necessary information in professional literature, databases and other sources, can integrate information and formulate conclusions, and communicate using various techniques in the professional environment and outside it			[SU2] Assessment of ability to analyse information	
	K6_W08		The student has basic knowledge of thermodynamics and fluid mechanics including bioreology			[SW1] Assessment of factual knowledge	
	K6_U05		The student is able to use analytical, simulation and computer methods to formulate and solve engineering tasks in the field of mechanical and medical engineering			[SU3] Assessment of ability to use knowledge gained from the subject	

Subject contents	Lecture: <ol style="list-style-type: none"> 1. Differential operators 2. Stream lines, trajectories, acceleration 3. Deformation of the fluid element 4. conservation equations 5. Constitutive equations for Newtonian and Newtonian fluids including blood. 6. Governing equations describing fluid motion including this blood. 7. Introduction to turbulence modelling <p>LABORATORY: Flow visualization. Outflow from holes. Measurement of flow rates in open channels and in pipelines. Study of the flow in the aerodynamic tunnel. Modeling of gas flows by hydrodynamic analogy.</p>			
Prerequisites and co-requisites	Mathematics			
Assessment methods and criteria	Subject passing criteria		Passing threshold	Percentage of the final grade
	Exam		50.0%	50.0%
	Exam		50.0%	50.0%
Recommended reading	Basic literature		Tesch K., "Mechanika Płynów", Wyd. PG, 2008, 2013 Tesch K., "Wybrane Zagadnienia Modelowania Przepływów Krwi...", Wyd. PG, 2012	
	Supplementary literature		Bębenek B., "Przepływy w układzie krwionośnym" Wyd. PK, 1999 Cieśliski K., "Hydrodynamiczne uwarunkowania krążenia mózgowego", Wyd. EXIT, 2001 Puzyrewski R., Sawicki J., "Podstawy Mechaniki Płynów i Hydrauliki", PWN, 1998	
	eResources addresses			
Example issues/ example questions/ tasks being completed	-			
Work placement	Not applicable			