



Subject card

Subject name and code	Fluid Mechanics for Medical and Mechanical Engineering, PG_00039377						
Field of study	Medical and Mechanical Engineering, Mechanical and Medical 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							
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"> <li>1. Differential operators</li> <li>2. Stream lines, trajectories, acceleration</li> <li>3. Deformation of the fluid element</li> <li>4. conservation equations</li> <li>5. Constitutive equations for Newtonian and Newtonian fluids including blood.</li> <li>6. Governing equations describing fluid motion including this blood.</li> <li>7. Introduction to turbulence modelling</li> </ol> <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	Adresy na platformie eNauczenie: Mechanika płynów w IMM, W/L, sem. 5, zimowy 22/23 (M:31680W0) - Moodle ID: 25362 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=25362">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=25362</a>		
Example issues/ example questions/ tasks being completed	-			
Work placement	Not applicable			