GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fluid Mechanics in Medicine, PG_00072207		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish brak
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Fluid-Flow Machinery -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Krzysztof Tesch	
	Teachers		

Lesson types

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	1.0	19.0	50

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_U06] can identify and formulate specifications for simple practical engineering tasks, and critically analyze existing technical solutions, evaluating their functionality, particularly in the context of designing mechanical and medical-mechanical devices	The student is able to identify and formulate specifications for simple, practical engineering tasks, and to carry out a critical analysis of existing technical solutions and assess how they function in the field of mechanical and medical device design	
[K6_U04] is able to utilize empirical, analytical, simulation, and computer-based methods to formulate and solve engineering tasks in the field of medical and mechanical engineering	The student is able to use empirical or analytical or simulation or computer methods to formulate and solve engineering tasks in the field of mechanical-medical engineering	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_U03] is able to use information and communication skills or research techniques to solve typical engineering tasks related to design, production and manufacturing of materials or machine components	The student is able to apply information and communication or research techniques appropriate to the performance of tasks typical of engineering work in the design, manufacture and operation of materials or machine components	
[K6_W05] has knowledge in the areas of design, manufacturing, and operation of materials, machine parts, or technical devices, with a solid understanding of design principles and technical documentation preparation	The student has knowledge of the design, manufacture and operation of materials or parts of machinery or technical equipment, and is familiar with the principles governing their design and the preparation of technical documentation	

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Lecture:

1. Differential operators
2. Strem 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

Course content – laboratory
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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Mathematics</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Exam</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Exam</td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Tesch K., "Mechanika Płynów", Wyd. PG, 2008, 2013

Tesch K., "Wybrane Zagadnienia Modelowania Przepływów Krwi...", Wyd. PG, 2012</td></tr>
<tr><td>Supplementary literature</td><td>Bębenek B., "Przepływy w układzie krwionośnym" Wyd. PK, 1999

Cieślicki K., "Hydrodynamiczne uwarunkowania krążenia mózgowego", Wyd. EXIT, 2001

Puzyrewski R., Sawicki J., "Podstawy Mechaniki Płynów i Hydrauliki", PWN, 1998</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>-</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.