



Subject card

Subject name and code	Physics of continuous media, PG_00037284						
Field of study	Technical Physics						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
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		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Division of Atomic, Molecular and Optical Physics -> Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Piotr Weber				
	Teachers		dr Piotr Weber				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	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		2.0		18.0	50
Subject objectives	Familiarizing students with the basics of continuous media physics and its applications.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W02		The student has an organized knowledge of the basic fields of physics.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	K6_U01		The student increases his knowledge. The student perform calculations and analyzes results.		[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
Subject contents	<p>The lecture presents the basics of the physics of continuous media. It is divided into several parts. In the first part, the basic concepts from hydrodynamics, aerodynamics, hydrostatics and the theory of elasticity are introduced. Also the concepts of mass forces and surface forces are introduced. The next parts of the lecture contain:</p> <ul style="list-style-type: none">• Fluid kinematics (Euler method, Lagrange method). Description of fluid particle deformation.• Fluid dynamics including the conservation equations of mass, momentum, angular momentum and energy.• Hydrostatics• concept of non-viscous fluid• vortices in non-viscous fluid• Elements of the laminar boundary layer theory• Elements of the theory of turbulent motion• Surface phenomena• Elements of the theory of elasticity						

Prerequisites and co-requisites	The student knows the basics of linear algebra, differential and integral calculus of functions of many variables, vector analysis		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	50.0%	100.0%
		0.0%	0.0%
Recommended reading	Basic literature	L. D. Landau, J.M. Lifszyc, "Fluid mechanics", Pergamon Press 1987 O. Gonzalez, A. M. Stuart, "A First Course in Continuum Mechanics", Cambridge University Press, 2008	
	Supplementary literature	C. Pozrikidis, "Fluid dynamics", Kluwer Academic Publishers, 2001	
	eResources addresses	Adresy na platformie eNauczanie: Fizyka ośrodków ciągłych 2024/2025 - Moodle ID: 39020 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=39020 Physics of continuous media 2024/2025 - Moodle ID: 42289 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42289	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none">1. Describe the forces acting on a fluid particle (volume forces and surface forces).2. Parameters of mass, energy and momentum transport in fluids (describe these concepts).3. The Cauchy-Helmholtz theorem in the description of a fluid particle4. Description of the fluid in the Lagrange method; fluid description in Euler's method;5. Derive Reynolds transport theorems.		
Work placement	Not applicable		

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