

## 关。GDAŃSK UNIVERSITY 创 OF TECHNOLOGY

## Subject card

Subject name and code	, PG_00056106								
Field of study	Mechanical and Medical Engineering								
Date of commencement of studies	October 2021		Academic year of realisation of subject			2023/2024			
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 -			
Semester of study	6		ECTS credits			4.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Zakład Maszyn Przepływowych -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology							d Ship	
Name and surname	Subject supervisor		prof. dr hab. inż. Krzysztof Tesch						
of lecturer (lecturers)	Teachers		prof. dr hab. inż. Krzysztof Tesch						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	30.0	0.0	15.0	0.0		0.0	45	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	arning activity Participation in d classes included plan		didactic Participation in consultation hours		Self-study S		SUM	
	Number of study hours	45	0.0			0.0		45	
Subject objectives	The aim of the course is to familiarise students with the CFD methods applied to the modelling of thermal- fluid processes in medicine								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_W09] he/she has basic knowledge related to numerical methods and engineering software used to analyze, model and design a given mechanical system		The student has elementary knowledge of numerical methods or basic knowledge of computer programs used in the analysis and simulation of mechanical systems and in the design process.			[SW1] Assessment of factual knowledge			
	[K6_U05] he/she is able to use analytic and modelling methods to formulate and solve engineering tasks related to the mechanical- medical area		The student is able to use analytical, simulation and computer methods to formulate and solve engineering tasks in the field of mechanical-medical engineering			[SU1] Assessment of task fulfilment			
	[K6_U08] he/she is able to assess whether proposed methods and tools can be used in practice to solve simple engineering task related to machine design, manufacturing and utilization		Students will be able to assess the suitability of routine methods and tools for solving a simple engineering task of a practical nature in the design, manufacture and operation of machinery and select and apply the appropriate method and tools.			[SU3] Assessment of ability to use knowledge gained from the subject			
	[K6_U03] he/she is able to use information-communication skills to solve typical engineering tasks related to design, production and utilization		Students will be able to use information and communication technology appropriate to the performance of tasks typical of engineering activity, in the field of design, manufacture and operation of machinery.			[SU2] Assessment of ability to analyse information			

Subject contents	LECTURES Basics of CFD. Problem of properly defined boundary conditions and basics of turbulence modelling. Basic features of computational fluid dynamics solvers, mesh generators, convergence criteria and results analysis PRACTICAL EXERCISES In the computer laboratory classes, the various modelling steps will be performed using a commercial programme as an example: generation of meshes for selected geometries, correct definition of the computational model and selection of computational parameters, visualisation and interpretation of results					
Prerequisites and co-requisites	Basics of thermodynamics and fluid mechanics.					
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	Practical exercise	100.0%	100.0%			
Recommended reading	Basic literature       1. Tesch K. Mechanika płynów, Wyd. PG 2014         2. Tesch K. Numeryczna mechanika płynów, Wyd. PG 2021					
	Supplementary literature	tary literature Fletcher C.A.J. Computational Techniques for Fluid Dynamics				
	<ul> <li>Adresy na platformie eNauczanie:</li> <li>Procesy cieplno-przepływowe w medycynie, W/L, IMM, sem. 5, letni 23/24 (PG_00056106) - Moodle ID: 36703 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36703</li> </ul>					
Example issues/ example questions/ tasks being completed	<ol> <li>Conservation equations</li> <li>Boundary conditions</li> <li>Dimensionless numbers</li> <li>Turbulence</li> </ol>					
Work placement	Not applicable					