GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Numerical Fluid Mechanics - CFD for engineers, PG_00056270		
Field of study	Design and Construction of Yachts		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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	3.0
Learning profile	practical profile	Assessment form	assessment
Conducting unit	Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Krężelewski	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	30.0	0.0	45

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	45	5.0	25.0	75

Subject objectives

learning methods for the integration of partial differential equations and their application to the self-selected examples

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_K03	The student recognizes basic CFD problems. He uses the methods of numerical fluid mechanics and applies them in practice.	[SK5] Assessment of ability to solve problems that arise in practice
K6_U05	The student recognizes basic CFD problems. He uses the methods of numerical fluid mechanics and applies them in practice.	[SU5] Assessment of ability to present the results of task
K6_W06	The student recognizes basic CFD problems. He uses the methods of numerical fluid mechanics and applies them in practice.	[SW3] Assessment of knowledge contained in written work and projects
K6_W05	The student recognizes basic CFD problems. He uses the methods of numerical fluid mechanics and applies them in practice.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Lecture:
Overview of numerical fluid mechanics (CFD). Equations governing fluid flow and boundary conditions. Turbulence and its modeling. Methods for solving the discretized governing equations in fluid mechanics.Computational methods considering flows with free surface. Computational methods for potential flows.
Project:
Modeling of simple flows with RANSE-CFD and comparison of results with theory. Lift and drag force on the wing, flow through a venturi tube. Study of the influence of the size of the computational domain, mesh density and boundary conditions on the obtained results. .

Prerequisites and co-requisites

Yacht hydromechanics

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	60.0%	50.0%
	Project	100.0%	50.0%
Recommended reading	Basic literature	Tesch K. Numeryczna mechanika płynów, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2021. Versteeg H. K.,Malalasekera W., An introduction to Computational Fluid Dynamic, Longman 1995-98. Gryboś R.: Podstawy mechaniki płynów, t.1,2, PWN W-a 1998r.	
	Supplementary literature	Krężelewski M. Hydromechanika ogólna i okrętowa, tom II, Skrypt Politechniki Gdańskiej, Gdańsk 1982	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		