GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Numerical Methods in Fluid-Flow Systems Designing, PG_00042170		
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power 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	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
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	

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	3.0	17.0	50

Subject objectives

The aim of the course is to acquaint students with the problems and methods of CFD in the design of flow systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U07	The student is able to use basic knowledge in the field of fluid flow machines and methods related to their design in an analytical and numerical approach to the preliminary design of an energy installation	
K6_U08	The student is able to design the basic parameters of the selected technology related to energy conversion and select auxiliary devices and evaluate the project in terms of technical and economic	
K6_W12	The student has basic knowledge of the life cycle and repairs of energy equipment in the field of thermal power plants, thermal and energy systems and heating systems, internal combustion engines, compressors and rotating machines	

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 Students run the simulations for two 3D cases by means of available CFD code. Students generate the mesh for selected geometry, select model and solver settings, analyse the convergence and visualize 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. Gryboś R. Podstawy mechaniki płynów, PWN Warszawa 1998 2. Puzyrewski R. Sawicki J. Podstawy mechaniki płynów i hydrauliki, PWN Warszawa 1998 3. Tesch K. Mechanika Płynów, Wyd. PG 2014	
	Supplementary literature	Fletcher C.A.J. Computational Techniques for Fluid Dynamics	
	eResources addresses	Adresy na platformie eNauczanie: Metody numeryczne w projektowaniu układów przepływowych, W/L, E, sem. 6, letni 22/23 (PG_00042170) - Moodle ID: 29219 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29219	
Example issues/ example questions/ tasks being completed	1. Conservation equations 2. Boundary conditions 3. Dimensionless numbers 4. Turbulence		
Work placement	Not applicable		