GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced fluid mechanics, PG_00065622		
Field of study	Naval Architecture and Offshore Structures		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Specialty 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	1	Language of instruction	English
Semester of study	2	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Paweł Dymarski	
	Teachers	dr hab. inż. Paweł Flaszyński	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	30.0	0.0	0.0	75

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	75	10.0	40.0	125

Subject objectives

Expand the knowledge of fluid mechanics from the bachelor degree. The class covers an expanded scope on the boundary layer, turbulent flow, flow control, aerodynamic wake as well as wind farm scale problems. Basic information on wind turbine aeroacoustics. Laboratory classes on the application of computational fluid dynamics methods.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U01] applies acquired analytical, simulation, and experimental methods, as well as mathematical models for analysis and evaluation of shipborne and offshore systems and processes	The student is capable of defining boundary conditions, generating a computational mesh, and specifying the parameters of a numerical model required for fluid dynamics analysis.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools
[K7_U02] formulates and tests hypotheses concerning problems related to shipborne and offshore systems/processes, as well as simple research problems	The student can perform analyses of flow-related problems in ocean engineering and offshore wind energy. Student is able to recognize flow phenomena specific to ocean engineering and offshore wind energy applications.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information

Subject contents

Potential flow, flow around cylinder and airfoil, turbulence, boundary layer, laminar-turbulent transition, flow control, aerodynamic wake, fundamentals of atmospheric boundary layer and aerodynamic wake on a wind farm. Basic information on wind turbine aeroacoustics.

Prerequisites and co-requisites

Fundamental knowledge on fluid mechanics (bachelor level)

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	60.0%	30.0%
	60.0%	40.0%
	60.0%	30.0%

Recommended reading

Basic literature	"Fluid mechanics", Frank White

	Supplementary literature	"Turbulence in Fluids", Marcel Lesieur "Numerical Computation of Internal & External Flows", Charles Hirsch
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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