GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Applied Mechanical Engineering, PG_00067173		
Field of study	Smart Renewable Energy Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	second-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	1	Language of instruction	English
Semester of study	1	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Paweł Flaszyński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	15.0	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	9.0	66.0	150

Subject objectives

The aim of the course is to familiarize students with fundamentals of fluid mechanics. This is introductory course to more advanced topics on wind energy courses.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W101] is able to make an in-depth identification of key objects and phenomena related to the field of study, as well as theories that describe them and applicable analytical and design methods	The student is ready to evaluate projects and operations of wind energy systems, demonstrating competencies in designing and optimizing the operation of renewable energy systems, including wind energy systems.	[SW3] Assessment of knowledge contained in written work and projects
[K7_K01] is prepared to evaluate projects and operations in wind energy systems, demonstrating competencies in designing and optimizing renewable energy systems, including wind power	The student is able to apply analytical thinking and solve technical problems related to renewable energy systems, including wind energy, using engineering methodologies.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_U01] is able to apply analytical thinking and solve technical problems related to renewable energy systems, including wind power, using engineering methodologies	The student knows and understands theories related to wind energy generation and can explain the operating principles of wind turbines and the process of converting wind energy into electrical energy.	[SU3] Assessment of ability to use knowledge gained from the subject

<table>
<tr><td>Subject contents</td><td>Course content – lecture

1. Introduction: Problems, methods and areas of application of fluid mechanics. Properties of fluids. Element of fluid. Models of fluids. Categories of flows.
2. Kinematics: Stream lines. Paths of fluid elements. General motion of a fluid element.
3. Hydrostatics
4. Transport equations: mass, momentum and energy
5. Bernoulli equation
6. Fundamentals of boundary layer theory (laminar, turbulent, transitional)
7. Turbulent flow fundamentals, Reynolds hypothesis, Kolmogorov hypothesis
8. Basics of airfoils, airfoil theory, Kutta-Joukowsky theorem. Potential flow theory
9. Criteria of similarity. Strouhal, Froude, Euler and Reynolds numbers.
10. Fundamentals of machine and mechanism design.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Exam</td><td>60.0%</td><td>100.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Fluid Mechanics, White Frank, McGraw Hill Higher Education, 2016</td></tr>
<tr><td>Supplementary literature</td><td>Bibliography will be provided during the course</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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