GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Operational Management and Maintenance of Wind Energy Systems , PG_00066987		
Field of study	Smart Renewable Energy Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
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	2	Language of instruction	English
Semester of study	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Marine Power Plants -> Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Zbigniew Korczewski	
	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	0.0	15.0	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	4.0	16.0	50

Subject objectives

To teach the principles of operating wind turbines, with particular emphasis on their diagnosis and maintenance.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K05] complies with legal regulations and standards related to renewable energy, including wind power, ensuring that energy installations and projects operate in accordance with current legislation	Student is able to classify the operational states of a wind farm.	[SK2] Assessment of progress of work
[K7_W06] is acquainted with global, European, and national energy policies and regulations regarding renewable energy and has basic knowledge of project management in the context of energy engineering	A student has knowledge in the range of wind farm operating strategies and costs.	[SW1] Assessment of factual knowledge
[K7_W05] understands the principles of sustainable development and safety in the context of energy systems, including the role of electrification, and can assess the environmental impact of renewable energy systems, particularly wind power installations	Student possesses knowledge in the field of operation for the practical usage and supervision of wind farm machines and energy equipment in various operating states.	[SW2] Assessment of knowledge contained in presentation
[K7_U04] possesses remote diagnostic skills and the ability to address technical issues in energy systems using remote diagnostic tools	Student is able to identify the wear process of structural elements of a wind turbine based on the results of a diagnostic test.	[SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>Lecture: Sciences about the operation of technical objects and systems - a place of technical diagnostics.

Physical ageing and wear of machines and devices of wind energy systems.

Characteristic technical states of wind power plants - the notion of failure/fault and damage, examples of operational damages to wind power plants.

Operational states of wind power plants - usage and maintenance.

Strategies and management of the wind farm operation process - analysis of operating costs.

Seminar: The role of diagnostic systems in planning the strategy of wind farm operation.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge in the field of the construction and principles of operation of energy machines and devices.</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>Seminar - report/speech</td><td>100.0%</td><td>25.0%</td></tr>
<tr><td>Lecture - colloquium</td><td>51.0%</td><td>75.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Czichos H.: Handbook of Technical Diagnostics: Fundamentals

and Application to Structures and Systems. Springer Science & Business Media. 2013.

Letcher T. M. Wind Energy Engineering. A Handbook for Onshore and Offshore Wind Turbines. Academic Press. Elsevier Inc. 2017.

Ramsey D.: The different types of industrial wear and tear. UK, 2016.

ISO 13372:2012 : Condition monitoring and diagnostics of machines Vocabulary.</td></tr>
<tr><td>Supplementary literature</td><td>Scientific articles on wind turbine operation and diagnostics.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Explain the notion of damage to a technical object.
2. Characterize the strategies for operating wind turbines in terms of costs.
3. Describe the models of wear of rolling and sliding friction nodes.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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