GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Measurements in Marine Energy, PG_00062648		
Field of study	Naval Architecture and Offshore Structures		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
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	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Zakład Siłowni Okrętowych -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
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	15.0	15.0	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	7.0	23.0	75

Subject objectives

To teach the theoretical foundations of metrology within the selected aspect of offshore wind farms, with particular emphasis on the technology of measuring the control parameters of the offshore wind turbine drive train unit for diagnostic purposes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K01] Understands the need for lifelong learning, critically evaluate acquired knowledge, and comprehend the significance of knowledge in addressing cognitive and practical problems	Student is able to independently conduct a source literature search in the field of offshore wind energy.	[SK2] Assessment of progress of work
[K7_U02] Presents convincing and logically justified arguments regarding outcomes through critical analysis of information in diverse technical contexts and an approach to their interpretation	Student is able to implement an experimantal test of a wind turbine unit on a smala scale and analyse the obtained results taking into account the measurement uncertainty.	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K7_W06] Capable of finding and utilizing credible sources of information crucial for analyzing issues within the field of study	Student is able to eleborate an energy balance of the power train unit of the offshore wind turbine.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	Lecture - 15 hours Uncertainties and errors in technological measurements Wind turbine capacity - Betz Limit Energy balance of the offshore wind turbine drive train system - basic and accompanying processes Basic and control parameters of an offshore wind turbine Destructive impact of the marine environment on a wind turbine States of operational failure of the main components of an offshore wind turbine Laboratory exercises - 15 hours Measurement of velocity and kinetic energy of the air stream from the wind generator Measurement of torque and rotational speed in a simple mechanical system Measurement of electrical parameters of a wind turbine power systems generator Vibration measurement in a rotating mechanical system Identification of drive shaft fatigue by thermal imaging method Project - 15 hours Work out the energy balance of the offshore wind turbine drive system for the given design form and the range of variability of the kinetic energy of the wind.
Prerequisites and co-requisites	Knowledge of machine building and electrical engineering

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	100.0%	25.0%
	100.0%	25.0%
Test	51.0%	50.0%

Recommended reading

Basic literature	1. Letcher T. M. Wind Energy Engineering. A Handbook for Onshore and Offshore Wind Turbines. Academic Press. Elsevier Inc. 2017. 2. Passon P.,Branner K., Larsen S.E., Hvenekær R.J.: Offshore Wind Turbine Foundation Design. Technical University of Denmark, Department of Wind Energy 2015. 3. Wu B., Youngqiang L., Navid Z., Samir K.: Power Conversion and Control of Wind Energy, John Wiley & Sons, INC., Publication, 2011.
Supplementary literature	Ajid Bastankhah, Fernando Porté-Age: A New Miniature Wind Turbine for Wind Tunnel Experiments. Part I: Design and Performance. Energies 10(7), March 2018.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable