

Subject card

Subject name and code	Measurements in marine power systems, PG_00065621								
Field of study	Naval Architecture and Offshore Structures								
Date of commencement of	February 2025 Academic year of 2025/2026					/2026			
studies	1 oblidally 2020		realisation of subject			20207	2023/2026		
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	at the university		
Year of study	1		Language of instruction			English			
Semester of study	2		ECTS credits			3.0	3.0		
Learning profile	general academic profile		Assessment form			exam	exam		
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		dr inż. Mateusz Kędzierski						
			dr inż. Patrycja Puzdrowska						
			prof. dr hab. inż. Zbigniew Korczewski						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	15.0	0.0	15.0	15.0		0.0	45	
	E-learning hours inclu	ıded: 0.0						1	
Learning activity and number of study hours	Learning activity Participation in classes including plan				Self-study SUM		SUM		
	Number of study hours	45		8.0		22.0		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			
Ŭ	[K7_U13] evaluates the feasibility		Is able to balance energy			[SU1] Assessment of task fulfilment			
	and potential for utilizing new technical and technological								
	achievements in accomplishing tasks characteristic for the field of		the main components of the power transmission system of an offshore wind turbine based on the measurement of control parameters.						
	study								
	[K7_W11] interprets social,					[SW3] Assessment of knowledge contained in written work and projects			
	economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into								
	engineering practice		Has basic knowledge of			[SW3] Assessment of knowledge			
	[K7_W04] demonstrates knowledge encompassing selected issues in the field of advanced knowledge, particularly in the scope of methods, techniques, tools, and algorithms specific to Naval Architecture and Ocean Engineering		measurement systems used in offshore wind turbine drive systems and their usage for controlling and operational diagnostics.			contained in written work and projects			

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. Energie 10(7), March 2018. Korczewski, Z., & Rudnicki, J. (2024). Active Diagnostic Experimentation on Wind Turbine Blades with Vibration Measurements and Analysis. Polish Maritime Research, 126-134. https://doi.org/ 10.2478/pomr-2024-0042	Subject contents	Lecture - 15 hours						
Wind speed measurement technologies. 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 lorque and rotational speed in a simple mechanical system Measurement of lorque 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 dentification 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 from and the range of variability of the kinetic energy of the wind. Prerequisites Anowledge of machine building and electrical engineering and co-requisites Subject passing orderia Passing threshold Percentage of the final grade and criteria 10.0% 20.0% Subject passing orderia Passing threshold Percentage of the final grade of the final gra								
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Example issues/ example questions/ tasks being completed	Explain the notion of standard uncertainty type A and B.
	Characterize remote sensing methods of measuring wind speed (SODAR and LIDAR). Betz limit - simplifying assumptions.
	4. Determine the energy balance of a wind turbine - Sankey diagram.
	5. Perform the external characteristics of a wind turbine.
Work placement	Not applicable

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