



## Subject card

Subject name and code	Wind farm design, PG_00065620						
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 lecture in English exercises and project in Polish		
Semester of study	2	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	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. Wojciech Litwin				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	30.0	0.0	60
	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	60		10.0		30.0	100
Subject objectives	Aerodynamic aspects of off-shore wind turbines, effects related to the application of wind farms						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W13] explains the main principles of individual and teamwork organization, including various forms of entrepreneurship utilizing knowledge from the field of engineering and technical sciences and disciplines relevant to the course of study	The student is able to design the layout of an offshore wind farm, taking into account the effects of interactions between turbines. They can estimate construction and operational costs, as well as the revenues generated by energy produced by the offshore wind farm.	[SW1] Assessment of factual knowledge
	[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Naval Architecture and Ocean Engineering, the construction and principles of operation of marine systems, processes and their components, as well as methods and means of their design and operation	The student can organize tasks within a project that will span the entire semester. They learn about issues related to the design and operation of offshore wind farms, enabling them to make informed career path decisions.	[SW2] Assessment of knowledge contained in presentation
	[K7_U12] develops her/his own potential and independently plans own, lifelong learning, while also being able to guide others in this regard	The student understands the principle of wind turbine operation. They are familiar with the differences between offshore and onshore wind farms. The student is aware of the key considerations required when planning an offshore wind farm.	[SU2] Assessment of ability to analyse information
	[K7_U04] creatively designs or modifies, either entirely or in part, a shipborne or offshore system or process according to a given specification, considering both technical and non-technical aspects, estimating costs and adopting design techniques representative for the field	The student is capable of working in a team during the execution of a group project that addresses basic aspects of planning offshore wind farms.	[SU3] Assessment of ability to use knowledge gained from the subject
Subject contents	applied aerodynamics, types of flows, aerodynamic characteristics of profiles, formation of wind turbine rotor blades, wind turbines wakes, methods of wakes control, control of wake interaction between rotors.		
Prerequisites and co-requisites	basic fluid mechanics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	2) handing over the finished project	50.0%	50.0%
	1) assessment test	50.0%	50.0%
Recommended reading	<p>Basic literature</p> <p>Offshore Wind: Technologies, Ecological Risks &amp; Prospects, Chester Mendoza, ISBN-13 : 978-1634823647</p> <p>Wind Energy Handbook, Nick Jenkins, Tony L Burton, Ervin Bossanyi, David Sharpe, Michael Graham; ISBN-13 : 978-1119451099</p> <p>Wind Energy Engineering: A Handbook for Onshore and Offshore Wind Turbines, Trevor M. Letcher; ISBN-13 : 978-0128094518</p> <p>Offshore Wind Power; John Twidell and Gaetano Gaudiosi; ISBN: 9780906522639</p> <p>Offshore Wind Farms; María Dolores Esteban, José-Santos López-Gutiérrez, Vicente Negro Valdecantos; ISBN 978-3-03928-563-1;</p> <p><a href="https://doi.org/10.3390/books978-3-03928-563-1">https://doi.org/10.3390/books978-3-03928-563-1</a></p> <p>Floating Offshore Wind Farms; Laura Castro-Santos, Vicente Diaz-Casas; ISBN: 978-3-319-80250-3</p>		

	Supplementary literature	<a href="https://drg.pomorskie.eu/wp-content/uploads/2021/07/WIZJA-DLA-BALTYKU.-WIZJA-DLA-POLSKI.-ROZWOJ-MORSKIEJ-ENERGETYKI-WIATROWEJ.pdf">https://drg.pomorskie.eu/wp-content/uploads/2021/07/WIZJA-DLA-BALTYKU.-WIZJA-DLA-POLSKI.-ROZWOJ-MORSKIEJ-ENERGETYKI-WIATROWEJ.pdf</a>  <a href="https://pism.pl/publikacje/Rozwoj_morskiej_energetyki_wiatrowej_na_Morzu_Baltyckim">https://pism.pl/publikacje/Rozwoj_morskiej_energetyki_wiatrowej_na_Morzu_Baltyckim</a>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>duction of wake behind off-shore wind turbine</p> <p>methids od wake direction control</p> <p>generation of blockage effect of a wind farm</p>	
Work placement	Not applicable	

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