GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Wind Farm Design, PG_00070371						
Field of study	Naval Architecture and Offshore Structures						
Date of commencement of studies	February 2026		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	1		Language of instruction	English			
Semester of study	2		ECTS credits	3.0			
Learning profile	general academic profile		Assessment form	exam			
Conducting unit	Institute of Naval Architecture -> 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. Wojciech Litwin				
	Teachers		dr inż. Filip Wasilczuk				
Lesson types	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		5.0	10.0		75
Subject objectives	Aerodynamic aspects of off-shore wind turbines, efects realted to the application of wind farms						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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_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 Naval Architecture and Offshore Structures	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_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
[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

Subject contents

Course content – lecture

Wind turbine and wind farm aerodynamics
Selection of wind farm support structures
Wind turbine and wind farm control
Environmental analysis of wind farms
Legal framework and support mechanisms for wind farms
Wind farm financing
Risk management

Course content – project

Wind turbine and wind farm aerodynamics
Selection of wind farm support structures
Wind turbine and wind farm control
Environmental analysis of wind farms
Legal framework and support mechanisms for wind farms
Wind farm financing
Risk management

Prerequisites and co-requisites

basic fluid mechanics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
3) Computational part of the project; detailed information presented during classes and available on the e-learning platform	50.0%	50.0%
1) handing over the finished project	50.0%	40.0%
2) presenting the project	50.0%	10.0%

Recommended reading	Basic literature	Offshore Wind: Technologies, Ecological Risks & Prospects, Chester Mendoza, ISBN-13 : 978-1634823647 Wind Energy Handbook, Nick Jenkins, Tony L Burton, Ervin Bossanyi, David Sharpe, Michael Graham; ISBN-13 : 978-1119451099 Wind Energy Engineering: A Handbook for Onshore and Offshore Wind Turbines, Trevor M. Letcher; ISBN-13 : 978-0128094518 Offshore Wind Power; John Twidell and Gaetano Gaudiosi; ISBN: 9780906522639 Offshore Wind Farms; María Dolores Esteban, José-Santos López-Gutiérrez, Vicente Negro Valdecantos; ISBN 978-3-03928-563-1; https://doi.org/10.3390/books978-3-03928-563-1 Floating Offshore Wind Farms; Laura Castro-Santos, Vicente Diaz-Casas; ISBN: 978-3-319-80250-3
	Supplementary literature	https://drg.pomorskie.eu/wp-content/uploads/2021/07/WIZJA-DLA-BALTYKU.-WIZJA-DLA-POLSKI.-ROZWOJ-MORSKIEJ-ENERGETYKI-WIATROWEJ.pdf https://pism.pl/publikacje/Rozwoj_morskiej_energetyki_wiatrowej_na_Morzu_Baltyckim
	eResources addresses	
Example issues/ example questions/ tasks being completed	Wake formation behind an offshore wind turbine Wind turbine wake steering methods Formation of the wind farm blockage effect Aspects to consider when preparing an environmental analysis of an offshore wind farm Aspects to consider when planning an offshore wind farm	
Practical activites within the subject	Not applicable	

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