GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00057174		
Field of study	Ocean Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	Optional 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	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	Filip Wasilczuk	
	Teachers	Filip Wasilczuk	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	30.0	0.0	75
	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	75	15.0	35.0	125

Subject objectives	Aerodynamic aspects of off-shore wind turbines, efects realted to the application of wind farms. Design of wind farms taking into account law, economics, ecologics and social aspects.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U05] can conduct an initial economic analysis of an investment in the range of ocean technology, indicate detailed rules of law and branch regulations	The student evaluates the wind farm design investment from the legal and economic side	[SU2] Assessment of ability to analyse information
[K7_U07] in compliance with a formulated specification and with the aid of appropriate tools and methods, is able to complete an advanced engineering task within the range of design, construction and operation of ocean technology objects and systems	performs engineering tasks in the field of design, manufacturing and operation of wind farms	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_U08] can manage the work of a team, coordinate the conducting of a design or research task	leading the team and coordinating the execution of the project task	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K7_W06] has an organized, widened knowledge on engineering methods and design tools allowing the conducting of advanced projects within the construction and operation of ocean technology objects and systems	knowledge on methods and tools for designing of offshore wind farms.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K7_U04] can apply mathematical methods and models and computer simulations to analyse, design, and assess the functioning of ocean technology objects and systems and their elements	uses mathematical models and computer simulations to design and evaluate the performance of wind turbines and their components	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W05] has an organized, widened knowledge on design, construction and operation of ocean technology objects and systems	broad knowledge on design and exploatation of off-shore wind farms	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K7_U06] when forming and solving design tasks can see their non-technical aspects, including environmental, economical and legal ones. Applies HSE rules and regulations	observation and analysis of environmental aspects	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents	1. Wind energy basics. 2. Wind resource assessment, obtaining wind data for simulations. 3. Obtaining Annual Energy Production (AEP) 4. Grid connection - basics. 5. Aspects to take into account while planning the wind farm a) Environmental aspects b) Law and policy aspects c) Societal aspects d) Conflicts of interest 6. Support mechanisms 7. Analysis of construction and maintnance cost, assessing Levelized Cost of Electricity (LCoE). 8. Floating wind turbines. 9. End of life repowering, decomissioning.
Prerequisites and co-requisites	basic fluid mechanics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
3) Presentation of report contents	50.0%	10.0%
1) Technical report	50.0%	50.0%
2) Technical report - py-wake calculations	50.0%	40.0%

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	Adresy na platformie eNauczanie: Projektowanie farm wiatrowych - Moodle ID: 34918 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=34918
Example issues/ example questions/ tasks being completed	nduction of wake behind off-shore wind turbine methids od wake direction control generation of blockage effect of a wind farm	
Work placement	Not applicable	