

Subject card

Subject name and code	Offshore Wind Energy, PG_00171497						
Field of study	Economics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Specialty subject group		
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		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Jacek Zaucha				
	Teachers		mgr inż. Tomasz Laskowicz				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15		10.0		0.0	25
Subject objectives	The aim of the education is to equip the student with knowledge regarding the economic aspects of the development of offshore wind farms in Poland and around the world and acquire the skills and competences necessary to work in the offshore wind farm (OWF) sector.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[EKONMU2_W02] has an in-depth knowledge of various types of existing economic entities and organisations as well as an extended knowledge of public institutions	The student has in-depth knowledge of various types of existing entities and economic organizations investing in the OWF and extended knowledge of public institutions important from the point of view of the development of the OWF.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[EKONMU2_W03] has an in-depth knowledge of relations between economic phenomena, entities and organisations as well as public institutions functioning in the national, international and intercultural spheres	The student has in-depth knowledge of the relationships between economic phenomena, entities and organizations in the OWF sector and public institutions operating in the national, international and intercultural spheres that influence the development of the OWF.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[EKONMU2_U02] can use acquired knowledge to describe and analyse the causes and course of economic and social processes and phenomena, and can formulate his/her own opinions and critically select data and analysis methods based on the achievements of economic and social sciences	The student is able to use the acquired knowledge to describe and analyze the causes and course of economic and social processes and phenomena affecting the development of the OWF and is able to formulate his or her own opinions and critically select data and analysis methods based on the achievements of economic and social sciences.	[SU5] implementation of a problem task [SU8] observation of student's independent or team work
	[EKONMU2_K01] recognises the importance of knowledge in the field of economics in the process of identifying and solving economic problems and of consulting experts when having difficulties in solving them independently	The student recognizes the importance of knowledge in the field of economics in the process of identifying and solving the economic problems of the OWF and seeking the opinion of experts in the event of difficulties in solving them on their own.	[SK5] implementation of a problem task [SK8] observation of student's independent or team work
	[EKONMU2_K03] inspires and organises preparation of economic and social projects, following the idea of sustainable development, reconciling legal, economic, ecological, political and social requirements	The student inspires and organizes the preparation of economic and social OWF projects in accordance with the idea of sustainable development, being able to reconcile legal, economic, ecological, political and social requirements.	[SK5] implementation of a problem task [SK8] observation of student's independent or team work
	[EKONMU2_W04] knows different types of economic and social ties and regularities governing them; has an in-depth knowledge of economic and financial ties between enterprises	The student knows various types of economic and social ties in the offshore renewable energy sector and the regularities between them, and has in-depth knowledge of economic and financial ties between enterprises serving the OWF.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[EKONMU2_K02] is aware of the level of his/her knowledge in the field of economics; understands the need to extend and update this knowledge throughout his/her life	The student is aware of the level of his knowledge in the field of economics regarding the OWF, understands the need to deepen and update this knowledge throughout his life.	[SK5] implementation of a problem task [SK8] observation of student's independent or team work
	[EKONMU2_U01] can creatively interpret and explain economic and social phenomena and relations between them, using acquired knowledge of economics, finance and management sciences	The student is able to creatively interpret and explain economic and social phenomena related to the OWF development and the relationships between these phenomena, using his knowledge of economics, finance and management sciences.	[SU5] implementation of a problem task [SU8] observation of student's independent or team work
	[EKONMU2_U03] can analyse causes and course of economic and social processes and phenomena, formulate his/her own opinions on the subject, construct research hypotheses, and select and apply methods of their verification	The student is able to analyze the causes and course of economic and social processes and phenomena affecting the development of the OWF, formulate their own opinions on this subject, put forward research hypotheses and select and use methods for their verification.	[SU5] implementation of a problem task [SU8] observation of student's independent or team work

	Course outcome	Subject outcome	Method of verification
	[EKONMU2_U04] can forecast and model complex economic and social processes using quantitative and qualitative methods and tools developed by economic sciences (including statistics and econometrics)	The student is able to forecast and model complex economic and social processes of the OWF using quantitative and qualitative methods and tools created by economic sciences (including statistics and econometrics).	[SU5] implementation of a problem task [SU8] observation of student's independent or team work
Subject contents	1. Causes and effects of climate change in the world. The European Green Deal and other climate action. 2. The importance of offshore wind energy for the energy market in Poland, according to the Polish Energy Policy until 2040. 3. Development and technologies in the field of offshore wind farms. The process of building an offshore wind farm. 4. Conditions for the development of offshore wind farm projects in Poland. Energy potential of the Baltic Sea. 5. Economic aspects of building offshore wind farms. Introduction to local content in the OWF construction supply chain. 6. Spatial and social conflicts resulting from the energy transformation and the development of offshore wind farms in the Baltic Sea. 7. Development of maritime clusters and the labor market for services related to offshore wind farms in Poland. 8. Mechanisms to support the development of offshore wind farms. Capacity market in Poland. Development of offshore wind energy in the world and importance for global energy production by 2050. 9. Analysis of economic costs and benefits for the local economy resulting from the construction of an OWF in the Polish territory of the Baltic Sea. 10. Level of social acceptance for offshore wind farms. The NIMBY and BANANA effect. 11. Threats resulting from the energy transformation. 12. Participation of Polish enterprises in creating a supply chain for offshore wind energy and impact on employment and GDP. 13. The future and importance of offshore wind energy - panel discussion In order to develop the concepts discussed during the lectures, students can take advantage of consultations.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	students' engagement	51.0%	25.0%
	group project	51.0%	25.0%
	exam (written test)	51.0%	50.0%
Recommended reading	Basic literature	1. Klugmann-Radziemska E., Lewandowski W., Proekologiczne odnawialne źródła energii. Kompendium, Wydawnictwo Naukowe PWN, Warszawa 2017 2. Jastrzębska G., Energia ze źródeł odnawialnych i jej wykorzystanie, Wydawnictwa Komunikacji i Łączności, Warszawa 2017 3. Zaucha J., Gospodarowanie przestrzenią morską, Wydawnictwo Akademickie Sedno, Warszawa, 2018	

Supplementary literature	Aitken, M. (2010). Wind power and community benefits: Challenges and opportunities. <i>Energy Policy</i>, 38(10), 60666075. https://doi.org/10.1016/j.enpol.2010.05.062 Alexander, K. A., Potts, T., & Wilding, T. A. (2013). Marine renewable energy and Scottish west coast fishers: Exploring impacts, Opportunities and potential mitigation. <i>Ocean and Coastal Management</i>, 75(July 2010), 110. https://doi.org/10.1016/j.ocecoaman.2013.01.005 Allan, G., Comerford, D., Connolly, K., McGregor, P., & Ross, A. G. (2020). The economic and environmental impacts of UK offshore wind development: The importance of local content. <i>Energy</i>, 199, 117436. https://doi.org/https://doi.org/10.1016/j.energy.2020.117436 Andrea, N., & Linaje, G. A. De. (2023). <i>Assessing the wind energy technical potential of the North Sea Final Project Report</i>. Bailey, H., Brookes, K. L., & Thompson, P. M. (2014). Assessing environmental impacts of offshore wind farms: Lessons learned and recommendations for the future. <i>Aquatic Biosystems</i>, 10(1), 113. https://doi.org/10.1186/2046-9063-10-8 Boniecka, H., Brzeska, P., Czernańska, R., Faściszewski, J., Gajda, A., Gajewski, J., Gorczyca, M., Hac, B., Kalinowski, M., Kałas, M., Kapiński, J., Koba, R., Kordala, I., Kowalczyk, U., Kruk-Dowgiało, L., Kuczyński, T., Kuszewski, W., Matczak, M., Michałek, M., Woziński, R. (2016). <i>Study of Conditions of Spatial Development of Polish Sea Areas . March</i>. www.umgdy.gov.pl/?cat=96, Burgess, M. G., Clemence, M., McDermott, G. R., Costello, C., & Gaines, S. D. (2018). Five rules for pragmatic blue growth. <i>Marine Policy</i>, 87(December 2016), 331339. https://doi.org/10.1016/j.marpol.2016.12.005 Castro-Santos, L., Filgueira-Vizoso, A., Lamas-Galdo, I., & Carral-Couce, L. (2018). Methodology to calculate the installation costs of offshore wind farms located in deep waters. <i>Journal of Cleaner Production</i>, 170, 11241135. https://doi.org/10.1016/J.JCLEPRO.2017.09.219 Cisneros-Montemayor, A. M., Moreno-Báez, M., Reygondeau, G., Cheung, W. W. L., Crosman, K. M., González-Espinosa, P. C., Lam, V. W. Y., Oyinola, M. A., Singh, G. G., Swartz, W., Zheng, C. wei, & Ota, Y. (2021). Enabling conditions for an equitable and sustainable blue economy. <i>Nature</i>, 591(7850), 396401. https://doi.org/10.1038/s41586-021-03327-3 Connolly, K. (2020). The regional economic impacts of offshore wind energy developments in Scotland. <i>Renewable Energy</i>, 160, 148159. https://doi.org/10.1016/j.renene.2020.06.065 deCastro, M., Salvador, S., Gómez-Gesteira, M., Costoya, X., Carvalho, D., Sanz-Larruga, F. J., & Gimeno, L. (2019). Europe, China and the United States: Three different approaches to the development of offshore wind energy. <i>Renewable and Sustainable Energy Reviews</i>, 109(April), 5570. https://doi.org/10.1016/j.rser.2019.04.025 Dopierała, Ł., Mosionek-Schweda, M., Laskowicz, T., & Ilczuk, D. (2022). Financial performance of renewable energy producers: A panel data analysis from the Baltic Sea Region. <i>Energy Reports</i>, 8 (September), 1149211503. https://doi.org/10.1016/j.egyr.2022.09.009 EU Baltic Sea Governments. (2022). <i>The Marienburg Declaration</i>. https://www.regeringen.dk/aktuelt/publikationer-og-aftaetekster/the-marienburg-declaration/
--------------------------	--

	European Commission. (2019a). <i>STUDY ON BALTIC OFFSHORE WIND Final Report</i> (Issue June). https://doi.org/10.2833/864823 European Commission. (2019b). The European Green Deal. <i>European Commission</i>, 53(9), 24. https://doi.org/10.1017/CBO9781107415324.004 European Commission. (2020a). <i>An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future</i>. 27. European Commission. (2020b). <i>The EU Blue Economy Report</i>. 2020. Publications Office of the European Union. Luxembourg. European Commission. (2021). Fit for 55 - Delivering the EUs 2030 climate target on the way to climate neutrality. <i>European Commission</i>, 15. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0550 Fernández-Macho, J., Murillas, A., Ansuategi, A., Escapa, M., Gallastegui, C., González, P., Prellezo, R., & Virto, J. (2015). Measuring the maritime economy: Spain in the European Atlantic Arc. <i>Marine Policy</i>, 60, 4961. https://doi.org/10.1016/j.marpol.2015.05.010 Galparsoro, I., Menchaca, I., Garmendia, J. M., Borja, Á., Maldonado, A. D., Iglesias, G., & Bald, J. (2022). Reviewing the ecological impacts of offshore wind farms. <i>Npj Ocean Sustainability</i>, 1(1), 18. https://doi.org/10.1038/s44183-022-00003-5 Gdansk Maritime Institute. (2016). <i>Study of Conditions of Spatial Development of Polish Sea Areas</i>. Gorroño-Albizu, L., Sperling, K., & Djørup, S. (2019). The past, present and uncertain future of community energy in Denmark: Critically reviewing and conceptualising citizen ownership. <i>Energy Research and Social Science</i>, 57(November 2018), 101231. https://doi.org/10.1016/j.erss.2019.101231 Hooper, T., & Austen, M. (2014). The co-location of offshore windfarms and decapod fisheries in the UK: Constraints and opportunities. <i>Marine Policy</i>, 43, 295300. https://doi.org/10.1016/j.marpol.2013.06.011 International Renewable Energy Agency. (2022). <i>RENEWABLE ENERGY STATISTICS 2022 STATISTIQUES D'ÉNERGIE RENOUVELABLE 2022 ESTADÍSTICAS DE ENERGÍA RENOVABLE 2022 About IRENA</i>. www.irena.org Judge, F., McAuliffe, F. D., Sperstad, I. B., Chester, R., Flannery, B., Lynch, K., & Murphy, J. (2019). A lifecycle financial analysis model for offshore wind farms. <i>Renewable and Sustainable Energy Reviews</i>, 103 (January), 370383. https://doi.org/10.1016/j.rser.2018.12.045 Kaiser, M. J., & Snyder, B. F. (2013). Modeling offshore wind installation costs on the U.S. Outer Continental Shelf. <i>Renewable Energy</i>, 50, 676691. https://doi.org/10.1016/J.RENENE.2012.07.042 Kwiatkowski, J. M., & Zaucha, J. (2023). Measuring the blue economy in the EU: The Polish experience. <i>Frontiers in Marine Science</i>, 10 (March), 116. https://doi.org/10.3389/fmars.2023.1129075 Ladenburg, J., & Lutzeyer, S. (2012). The economics of visual disamenity reductions of offshore wind farms Review and suggestions from an emerging field. <i>Renewable and Sustainable Energy Reviews</i>, 16(9), 67936802. https://doi.org/10.1016/J.RSER.2012.08.017
--	---

	lam, R. T. & Liow, A. Q. K. (2018). Financing for renewable energy projects: A decision guide by development stages for renewable energy. <i>Renewable and Sustainable Energy Reviews</i>, 90(April 2017), 937944. https://doi.org/10.1016/j.rser.2018.03.083 Lamy, J., Bruine de Bruin, W., Azevedo, I. M. L., & Morgan, M. G. (2020). Keep wind projects close? A case study of distance, culture, and cost in offshore and onshore wind energy siting. <i>Energy Research and Social Science</i>, 63(November 2019), 101377. https://doi.org/10.1016/j.erss.2019.101377 Laskowicz, T. (2021). The perception of polish business stakeholders of the local economic impact of maritime spatial planning promoting the development of offshore wind energy. <i>Sustainability (Switzerland)</i>, 13 (12). https://doi.org/10.3390/su13126755 Ministry of Climate and Environment. (2021). <i>Polands Energy Policy until 2040</i>. 22. Monforti, F., & Gonzalez-Aparicio, I. (2017). Comparing the impact of uncertainties on technical and meteorological parameters in wind power time series modelling in the European Union. <i>Applied Energy</i>, 206, 439450. https://doi.org/10.1016/J.APENERGY.2017.08.217 Mora, E. B., Spelling, J., van der Weijde, A. H., & Pavageau, E. M. (2019). The effects of mean wind speed uncertainty on project finance debt sizing for offshore wind farms. <i>Applied Energy</i>, 252, 113419. https://doi.org/10.1016/J.APENERGY.2019.113419 Nash, K. L., Blythe, J. L., Cvitanovic, C., Fulton, E. A., Halpern, B. S., Milner-Gulland, E. J., Addison, P. F. E., Pecl, G. T., Watson, R. A., & Blanchard, J. L. (2020). To Achieve a Sustainable Blue Future, Progress Assessments Must Include Interdependencies between the Sustainable Development Goals. <i>One Earth</i>, 2(2), 161173. https://doi.org/10.1016/j.oneear.2020.01.008 North Sea Governments. (2022). THE ESBJERG DECLARATION on The North Sea as a Green Power Plant of Europe. <i>Declaration</i>. https://en.kefm.dk/Media/637884571703277400/The Esbjerg Declaration (002).pdf NSEC. (2022). <i>Joint Statement on the North Seas Energy Cooperation 12 Sept 2022</i>. 14(May), 16. <i>Regulation of the council of ministers of april 14, 2021 on the adoption of the spatial development plan of internal sea waters, territorial sea and exclusive economic zone in the scale 1:200 000</i>, 1 (2021) (testimony of Polish Council of Ministers). Polish National Grid. (2020). <i>PSE strategy for 2020-2030</i>. Polish National Grid. (2022). <i>Integrated Impact Report</i>. <i>The Act on promoting electricity generation by offshore wind farms</i>, (2020) (testimony of Polish Parliament). Polish Power Grids. (2021). <i>Report 2021</i> (Issue 1). Rubio-Domingo, G., & Linares, P. (2021). The future investment costs of offshore wind: An estimation based on auction results. <i>Renewable and Sustainable Energy Reviews</i>, 148(June 2020), 111324. https://doi.org/10.1016/j.rser.2021.111324
--	---

		Smythe, T., Bidwell, D., Moore, A., Smith, H., & McCann, J. (2020). Beyond the beach: Tradeoffs in tourism and recreation at the first offshore wind farm in the United States. <i>Energy Research and Social Science</i>, 70(July). https://doi.org/10.1016/j.erss.2020.101726 Staschus, K., Kielichowska, I., Ramaekers, L., Wouters, C., Vree, B., Villar, A., Sijtsma, L., Lindroth, S., & Yeomans, G. R. (2020). <i>Study on the offshore grid potential in the Mediterranean region</i>. https://op.europa.eu/en/publication-detail/-/publication/91d2091a-27bf-11eb-9d7e-01aa75ed71a1/language-en Stelzenmüller, V., Diekmann, R., Bastardie, F., Schulze, T., Berkenhagen, J., Kloppmann, M., Krause, G., Pogoda, B., Buck, B. H., & Kraus, G. (2016). Co-location of passive gear fisheries in offshore wind farms in the German EEZ of the North Sea: A first socio-economic scoping. <i>Journal of Environmental Management</i>, 183, 794805. https://doi.org/10.1016/j.jenvman.2016.08.027 Varela-Vázquez, P., & Sánchez-Carreira, M. del C. (2017). Estimation of the potential effects of offshore wind on the Spanish economy. <i>Renewable Energy</i>, 111, 815824. https://doi.org/10.1016/j.renene.2017.05.002 Voltaire, L., Loureiro, M. L., Knudsen, C., & Nunes, P. A. L. D. (2017). The impact of offshore wind farms on beach recreation demand: Policy intake from an economic study on the Catalan coast. <i>Marine Policy</i>, 81 (March), 116123. https://doi.org/10.1016/j.marpol.2017.03.019 WindEurope Business Intelligence. (2022). <i>Wind energy in Europe</i>. Ziemba, P. (2022). Uncertain Multi-Criteria analysis of offshore wind farms projects investments Case study of the Polish Economic Zone of the Baltic Sea. <i>Applied Energy</i>, 309(November 2021). https://doi.org/10.1016/j.apenergy.2021.118232
	eResources addresses	

Example issues/ example questions/ tasks being completed	EXERCISES Case Study 1: Analysis of a maritime spatial planning map with an analysis of potential conflicts and a mitigation attempt Title: Analysis of maritime spatial planning in the context of offshore wind energy in the Baltic Sea Description: Students receive a maritime spatial planning map for the Polish zone in the Baltic Sea. Their task is to identify potential locations for new wind farms and analyze what conflicts may arise from other users of maritime space, such as: - Shipping routes - Nature conservation areas - Fishing areas - Military zones Tasks: 1. Location identification: Indicate potential locations for wind farms. 2. Conflict analysis: Identify potential conflicts related to other users of maritime space. 3. Mitigation proposals: Propose solutions to minimize conflicts, such as changes to shipping routes, buffer zones, compensation for fishermen, etc. 4. Presentation of results: Prepare a presentation summarizing the analyzes and proposed solutions. EXERCISES Case Study 2: Analysis of the potential positive and negative effects of the development of offshore wind energy in Poland Title: The impact of the development of offshore wind energy on the Polish economy and environment Description: Students analyze the impact of the development of offshore wind energy on various economic and environmental aspects in Poland. The analysis should include both potential benefits and negative effects. Tasks: 1. Economic benefits: Analysis of the impact on job creation, development of local enterprises, increased energy security. 2. Environmental benefits: Reduction of CO2 emissions, protection of the natural environment by reducing dependence on fossil fuels. 3. Negative effects: Impact on marine ecosystems, potential threats to birds and marine mammals, conflict with the fishing industry and tourism. 4. Risk management: Proposed solutions aimed at minimizing negative effects, such as environmental monitoring technologies, compensation programs, etc. 5. Final report: Preparation of a report summarizing the analyzes and conclusions. EXERCISES Case Study 3: Ways to increase the local content index in the development of offshore wind energy in Poland Title: Strategy to increase the local content index in Polish offshore wind energy Description: Students analyze the current state of the local content indicator in Polish offshore wind energy and propose strategies to increase it. Tasks: 1. Analysis of the current state: Identifying the current local content indicator in existing offshore wind energy projects in Poland. 2. Identification of barriers: Identifying the main obstacles to increasing the local content rate, such as lack of skilled labor, technological limitations, lack of suitable suppliers. 3. Strategy proposals: Developing a strategy to increase the local content rate, such as: - Cooperation with local companies and suppliers. - Training and educational programs for local employees. - Investments in local production plants and research and development centers. 4. Case study: Analyzing one of the existing offshore wind energy projects in Poland and assessing the feasibility of implementing the proposed strategies. 5. Strategy presentation: Preparation of a detailed presentation of the proposed strategies along with a benefit-cost analysis.
Work placement	Not applicable

Document generated electronically. Does not require a seal or signature.