

**Subject card**

<b>Subject name and code</b>	Offshore Wind Energy, PG_00119519						
<b>Field of study</b>	Economics						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2024/2025		
<b>Education level</b>	Master's studies	<b>Subject group</b>			Obligatory subject group in the field of study Specialty subject group		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	1	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	2	<b>ECTS credits</b>			1.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>							
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		prof. dr hab. Jacek Zaucha				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		0.0		0.0	15
<b>Subject objectives</b>	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_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
	[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_K02] is aware of the level of their knowledge in the area of solving complex problems in economic.; 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_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_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_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_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_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

	<table border="1"> <thead> <tr> <th>Course outcome</th> <th>Subject outcome</th> <th>Method of verification</th> </tr> </thead> <tbody> <tr> <td>[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)</td> <td>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).</td> <td>[SU5] implementation of a problem task [SU8] observation of student's independent or team work</td> </tr> </tbody> </table>	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						
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Subject contents	<ol style="list-style-type: none"> <li>1. Causes and effects of climate change in the world. The European Green Deal and other climate action.</li> <li>2. The importance of offshore wind energy for the energy market in Poland, according to the Polish Energy Policy until 2040.</li> <li>3. Development and technologies in the field of offshore wind farms. The process of building an offshore wind farm.</li> <li>4. Conditions for the development of offshore wind farm projects in Poland. Energy potential of the Baltic Sea.</li> <li>5. Economic aspects of building offshore wind farms. Introduction to local content in the OWF construction supply chain.</li> <li>6. Spatial and social conflicts resulting from the energy transformation and the development of offshore wind farms in the Baltic Sea.</li> <li>7. Development of maritime clusters and the labor market for services related to offshore wind farms in Poland.</li> <li>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.</li> <li>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.</li> <li>10. Level of social acceptance for offshore wind farms. The NIMBY and BANANA effect.</li> <li>11. Threats resulting from the energy transformation.</li> <li>12. Participation of Polish enterprises in creating a supply chain for offshore wind energy and impact on employment and GDP.</li> <li>13. The future and importance of offshore wind energy - panel discussion</li> </ol>												
Prerequisites and co-requisites													
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	<p>Leung, P. L. &amp; Law, A. Q. K. (2018). Financing for renewable energy projects: A decision guide by development stages. <i>Renewable and Sustainable Energy Reviews</i>, 90(April 2017), 937944. <a href="https://doi.org/10.1016/j.rser.2018.03.083">https://doi.org/10.1016/j.rser.2018.03.083</a></p> <p>Lamy, J., Bruine de Bruin, W., Azevedo, I. M. L., &amp; 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. <a href="https://doi.org/10.1016/j.erss.2019.101377">https://doi.org/10.1016/j.erss.2019.101377</a></p> <p>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). <a href="https://doi.org/10.3390/su13126755">https://doi.org/10.3390/su13126755</a></p> <p>Ministry of Climate and Environment. (2021). <i>Polands Energy Policy until 2040</i>. 22.</p> <p>Monforti, F., &amp; 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. <a href="https://doi.org/10.1016/J.APENERGY.2017.08.217">https://doi.org/10.1016/J.APENERGY.2017.08.217</a></p> <p>Mora, E. B., Spelling, J., van der Weijde, A. H., &amp; 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. <a href="https://doi.org/10.1016/J.APENERGY.2019.113419">https://doi.org/10.1016/J.APENERGY.2019.113419</a></p> <p>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., &amp; 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. <a href="https://doi.org/10.1016/j.oneear.2020.01.008">https://doi.org/10.1016/j.oneear.2020.01.008</a></p> <p>North Sea Governments. (2022). THE ESBJERG DECLARATION on The North Sea as a Green Power Plant of Europe. <i>Declaration</i>. <a href="https://en.kefm.dk/Media/637884571703277400/The%20Esbjerg%20Declaration%20(002).pdf">https://en.kefm.dk/Media/637884571703277400/The Esbjerg Declaration (002).pdf</a></p> <p>NSEC. (2022). <i>Joint Statement on the North Seas Energy Cooperation 12 Sept 2022</i>. 14(May), 16.</p> <p><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).</p> <p>Polish National Grid. (2020). <i>PSE strategy for 2020-2030</i>.</p> <p>Polish National Grid. (2022). <i>Integrated Impact Report</i>.</p> <p><i>The Act on promoting electricity generation by offshore wind farms</i>, (2020) (testimony of Polish Parliament).</p> <p>Polish Power Grids. (2021). <i>Report 2021</i> (Issue 1).</p> <p>Rubio-Domingo, G., &amp; 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. <a href="https://doi.org/10.1016/j.rser.2021.111324">https://doi.org/10.1016/j.rser.2021.111324</a></p>
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<p>Example issues/ example questions/ tasks being completed</p>	<p>EXERCISES Case Study 1: Analysis of a maritime spatial planning map with an analysis of potential conflicts and a mitigation attempt</p> <p>Title: Analysis of maritime spatial planning in the context of offshore wind energy in the Baltic Sea</p> <p>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:</p> <ul style="list-style-type: none"> <li>- Shipping routes</li> <li>- Nature conservation areas</li> <li>- Fishing areas</li> <li>- Military zones</li> </ul> <p>Tasks:</p> <ol style="list-style-type: none"> <li>1. Location identification: Indicate potential locations for wind farms.</li> <li>2. Conflict analysis: Identify potential conflicts related to other users of maritime space.</li> <li>3. Mitigation proposals: Propose solutions to minimize conflicts, such as changes to shipping routes, buffer zones, compensation for fishermen, etc.</li> <li>4. Presentation of results: Prepare a presentation summarizing the analyzes and proposed solutions.</li> </ol> <p>EXERCISES Case Study 2: Analysis of the potential positive and negative effects of the development of offshore wind energy in Poland</p> <p>Title: The impact of the development of offshore wind energy on the Polish economy and environment</p> <p>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.</p> <p>Tasks:</p> <ol style="list-style-type: none"> <li>1. Economic benefits: Analysis of the impact on job creation, development of local enterprises, increased energy security.</li> <li>2. Environmental benefits: Reduction of CO2 emissions, protection of the natural environment by reducing dependence on fossil fuels.</li> <li>3. Negative effects: Impact on marine ecosystems, potential threats to birds and marine mammals, conflict with the fishing industry and tourism.</li> <li>4. Risk management: Proposed solutions aimed at minimizing negative effects, such as environmental monitoring technologies, compensation programs, etc.</li> <li>5. Final report: Preparation of a report summarizing the analyzes and conclusions.</li> </ol> <p>EXERCISES Case Study 3: Ways to increase the local content index in the development of offshore wind energy in Poland</p> <p>Title: Strategy to increase the local content index in Polish offshore wind energy</p> <p>Description: Students analyze the current state of the local content indicator in Polish offshore wind energy and propose strategies to increase it.</p> <p>Tasks:</p> <ol style="list-style-type: none"> <li>1. Analysis of the current state: Identifying the current local content indicator in existing offshore wind energy projects in Poland.</li> <li>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.</li> <li>3. Strategy proposals: Developing a strategy to increase the local content rate, such as: <ul style="list-style-type: none"> <li>- Cooperation with local companies and suppliers.</li> <li>- Training and educational programs for local employees.</li> <li>- Investments in local production plants and research and development centers.</li> </ul> </li> <li>4. Case study: Analyzing one of the existing offshore wind energy projects in Poland and assessing the feasibility of implementing the proposed strategies.</li> <li>5. Strategy presentation: Preparation of a detailed presentation of the proposed strategies along with a benefit-cost analysis.</li> </ol>
<p>Work placement</p>	<p>Not applicable</p>

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