GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Management and economics of nuclear power plants, PG_00065887		
Field of study	Nuclear Engineering		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study 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	1	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marcin Jaskólski	
	Teachers	dr inż. Marcin Jaskólski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	0.0	30

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	30	8.0	37.0	75

Subject objectives

The aim of the course for students is to acquire knowledge and skills in the field of economic evaluation of investments in a nuclear power plant.

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	Presents the main assumptions and results of the technical and economic analysis of the nuclear power plant.	[SW2] Assessment of knowledge contained in presentation
[K7_U03] identifies and formulates task specifications in the scope of energy processes and systems including non-standard problems and taking into consideration their non-technical aspects.	Calculates the average annual costs and cost of electricity from a nuclear power plant.	[SU1] Assessment of task fulfilment
[K7_K12] is ready for fullfiling social commitement and initation of actions for public interest including entrepreneurial thinking and acting	Discusses the profitability of building a selected nuclear power plant.	[SK4] Assessment of communication skills, including language correctness
[K7_U04] creatively designs or modifies, either entirely or at least in part, nulear power systems, considering both technical and non-technical aspects, estimating costs and utilizing design techniques appropriate for tasks within the scope of Nuclear Power Technologies	Performs technical and economic analysis for a nuclear power plant	[SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>Lecture:

1. Discounting time-varying cash flows

2. Calculation of capital costs (depreciation, loans)

3. Static and dynamic methods for assessing the profitability of investments in the energy sector

4. Annual energy generation costs

5. Investment outlays for the construction of a nuclear power plant and their structure

6. Calculation of the average unit cost of energy

7. Factors determining the profitability of a nuclear power plant

8. Market mechanisms of support / investment incentives

9. Non-market business models

10. Nuclear energy in models of planning the development of energy systems

Project:

1. Carrying out a technical and economic analysis for a selected case of a nuclear power plant</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project</td><td>60.0%</td><td>35.0%</td></tr>
<tr><td>Lecture test</td><td>60.0%</td><td>45.0%</td></tr>
<tr><td>Presentation</td><td>60.0%</td><td>20.0%</td></tr>
</table>
</td></tr>
<tr><td>Recommended reading</td><td>Basic literature</td><td>1. Zieliński A.S. (red.) (2024), Elektrownie jądrowe w nowoczesnej gospodarce, Wydawnictwo Naukowe PWN, Warszawa

2. Kamrat, W. (2004). Metody oceny efektywności inwestowania w elektroenergetyce.

3. Jaskólski M. (2023): Modelowanie systemów energetycznych wytwarzania energii elektrycznej i ciepła do celów planowania rozwoju - wybrane zagadnienia. Gdańsk: Politechnika Gdańska. ISBN 978-83-7348-883-0</td></tr>
</table>

	Supplementary literature	1. K. Shirvan, Overnight Capital Cost of the Next AP100, MIT-ANP-TR-193, MIT, Cambridge, MA, March 2022 2. K. Shrivan, 2024 Total cost projection of next AP1000, MIT-ANP-TR-201, July 2024 3. Ł. Sawicki, B. Horbaczewska, Role of the state in implementation of strategic investment projects: The SaHo Model for nuclear power, International Journal of Management and Economics 2021; 57(4): 343359 4. Modelling Nuclear Energy Systems with MESSAGE: A User's Guide https://www.iaea.org/publications/10861/modelling-nuclear-energy-systems-with-message-a-users-guide
	eResources addresses	Adresy na platformie eNauczanie: Zarządzanie i ekonomika elektrowni jądrowej - Moodle ID: 42722 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42722
Example issues/ example questions/ tasks being completed	1. Calculate the annual electricity production for the given values of installed capacity, degree of utilization and own needs coefficient.2. Calculate discounted investment costs for the construction of a nuclear power plant.3. Calculate the annual costs of a nuclear power plant.4. Calculate revenues from the sale of electricity. 5. Determine the annual gross and net profit.6. Determine the NPV, IRR and DPBP indicators for the selected nuclear power plant project.	
Work placement	Not applicable	

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