GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Forecasting the operation and planning the development of the energy sector, PG_00064758		
Field of study	Power Engineering, Power Engineering		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
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	Polish
Semester of study	2	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Paweł Bućko	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	15.0	45

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	45	7.0	48.0	100

Subject objectives

The aim of the course is to acquire the ability to make and use energy forecasts. Solving basic forecasting issues for future demand for different cycles of variation. Ability to formulate planning issues: defining purpose and constraints. Analysis of development problems in energy systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study	can plan the implementation of new technologies in forecasts and development plans for energy systems	[SW3] Assessment of knowledge contained in written work and projects
[K7_U14] integrates information obtained from literature and other properly selected sources, including those in a foreign language, creatively interpreting and critically evaluating them, and drawing conclusions	can acquire and use information from literature, databases and other sources	[SU2] Assessment of ability to analyse information
[K7_K71] is able to explain the need to apply knowledge from humanistic, social, economic or legal sciences in order to function in a social environment	can explain the need to use knowledge in the field of economic sciences to function in a professional and social environment	[SK2] Assessment of progress of work
[K7_U15] evaluates the feasibility of advanced methods and tools for solving complex engineering tasks of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose	can integrate analysis technical and economic use of different energy technologies	[SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>Course content – lecture

Stochastic nature of energy load variability. Basic factors shaping the load course over time. Division of energy forecasts according to the planning horizon. Basic applications of energy forecasts. Application of simple extrapolation of past trends in energy forecasting. Econometric models used in forecasting. Methods of forecasting daily load variability used in KDM. Methods of forecasting weekly and annual load variability used in KDM. Seasonal load variability models. Component functions of the process. Static and dynamic variability. Forecasting the variability process of power demand. Applications of multiple regression to forecasting in the energy industry. Multiple correlation coefficient (R). Analysis of the impact of independent variables on the regression equation. Applications of neural networks to forecasting. Planning the level of power reserve in the system. Statistical method used to determine electricity production plans by power plants and combined heat and power plants in individual months of the year. Planning repairs. Classification of power unit repairs. Optimization of inter-repair periods for units. Factors influencing the duration of a repair for a selected block. Problems of forecasting the development of the generating system. Consideration of the demand side in programming the development of energy. Integrated Planning of System Development.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of energy management</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>written work</td><td>60.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Armstrong J.,S.: Principles of Forecasting. Norwell, 2001.</td></tr>
<tr><td>Supplementary literature</td><td>Box P., Jenkins G.: Time Series Analisis: Forecasting and Control. Holden-day Inc,, San Francisco, 1976.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Forecasting daily variability of the load power.Setting a long-term trend in demand for power and energy.Forecast of peak load and its temporal variability.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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