GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Forecasting the operation and planning the development of the energy sector , PG_00057341		
Field of study	Power Engineering		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
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	2	Language of instruction	Polish
Semester of study	3	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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Paweł Bućko	
	Teachers		

Lesson types and methods of instruction	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 perform and use energy forecasts. Solving basic forecasting issues regarding future demand for energy in different cycles of variation. Ability to formulate planning issues: defining purpose and limitation functions. Analysis of development problems in energy systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U01] is able to acquire information from literature, databases and other sources, has the ability of self-education in order to improve his/her professional competence (also in English), is able to prepare a simple scientific paper and its summary in English, as well as an oral presentation	The student is able to obtain information from literature, databases and other sources.	[SU2] Assessment of ability to analyse information
[K7_W07] knows the environmental effects of energy technologies used; is familiar with the issues of effective energy management and use of renewable energy sources, has a broad and well-established knowledge of the processes of energy production and use	The student is able to identify the effects of energy technologies on the environment. He has in-depth knowledge of power generation technology. He knows the consequences of the variability of energy loads.	[SW3] Assessment of knowledge contained in written work and projects
[K7_W08] as knowledge about development trends in the field of known technologies and non-technical aspects to solve simple engineering tasks in the field of power systems and equipment or transmission networks and internal installations	The student has knowledge of development trends in the field of energy systems and equipment or transmission networks.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U05] is able to integrate technical and economic analysis of the use of various energy technologies, including technologies using renewable energy sources and conventional and nuclear energy	The student is able to integrate the technical-economic analysis of the use of various energy technologies.	[SU1] Assessment of task fulfilment

Subject contents

Stochastic character of variability of energy loads. Basic mileage-shaping factors load over time. Division of energy forecasts due to the planning horizon. essential use of energy forecasts. The use of a simple extrapolation of trends from the past century energy forecasting. Econometric models used in forecasting. methods forecasting daily load variability used in KDM. Weekly and weekly forecasting methods annual load variability used in KDM. Seasonal load variation models. Functions process components. Static and dynamic variability. Forecasting the volatility process power requirements. Applications of multiple regression for forecasting in the power industry. Factor multiple correlation (R). Analysis of the influence of independent variables on the regression equation. Network applications for prediction. Planning the power reserve level 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 of renovations. Classification of repairs of power units. Optimization of periods between overhauls for blocks. Factors shaping the duration of renovation for selected block. Problems of forecasting the development of the production system. Consideration of the demand side in the programming of energy development. Integrated System Development Planning.

Prerequisites and co-requisites

Basic knowledge of energy management.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written work	60.0%	100.0%

Recommended reading

Basic literature	1. Kit Oung: Energy Management in Business. Gower Publishing Limited, London 2013
Supplementary literature	1. Vesma V. The Future of Energy Management in the UK. Schneider Electric, 2010.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Forecasting daily load variability.Determination of a long-term trend in demand.Forecast of peak load and its seasonal variability.

Work placement

Not applicable