GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00058640						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject	2023/2024			
Education level	second-cycle studies		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	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 hab. inż. Paweł Bućko				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	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		0.0	0.0		30
Subject objectives	The aim of the subject is to acquire the ability to perform and use energy forecasts. Solving basic forecasting issues regarding future energy demand in different cycles of variation. Ability to formulate planning issues: defining the functions of purpose and limitations. Analysis of development problems in energy systems.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 the basic cycles of load variability observed in energy systems. Knows how to analyze trends of change.	[SW1] Assessment of factual knowledge
[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 perform a literature study on methods of forecasting loads in the power industry.	[SU2] Assessment of ability to analyse information
[K7_K02] is able to work in a group and take on different roles	The student is able to cooperate in a group carrying out a forecasting task.	[SK1] Assessment of group work skills
[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	The student is able to formulate and use economic criteria in solving planning tasks in the energy sector.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_W02] has extended and deepened knowledge of physics, chemistry, thermodynamics, fluid mechanics, material science, necessary to understand and describe basic thermal and flow phenomena occurring in and around power equipment and systems, transmission networks and internal installations	The student is able to select energy devices to the forecasted demand.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U71] is able to apply knowledge from humanistic, social, economic or legal sciences in order to solve problems	The student is able to formulate economic cost criteria in energy planning.	[SU1] Assessment of task fulfilment

Subject contents

Stochastic nature of the variability of energy loads. Basic factors influencing the course of the load in time. Breakdown of energy forecasts according to the planning horizon. The main applications of energy forecasting. Application of simple extrapolation of past trends in energy forecasting. Econometric models used in forecasting. Methods of forecasting the daily load variability used in KDM. Methods of forecasting weekly and annual load variability used in KDM. Models of seasonal load variability. Component functions of the process. Static and dynamic variability. Forecasting the process of variability of power demand. Applications of multiple regression to forecasting in the power industry. Multiple correlation coefficient (R). Analysis of the influence of independent variables on the regression equation. Applications of neural networks for 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 of repairs. Classification of repairs of power units. Optimization of inter-renovation periods for blocks. Factors affecting the duration of the renovation for the selected block. Problems of forecasting the development of the production system. Taking the demand side into account in programming the development of the energy sector. Integrated System Development Planning.

Prerequisites and co-requisites

Basic knowledge of energy economic.

Assessment methods and criteria

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

Recommended reading

Basic literature	Kit Oung: Energy Management in Business. Gower Publishing Limited, London 2013
Supplementary literature	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 the long-term trend in demand.Forecast of peak load and its seasonal variability.

Work placement

Not applicable