GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Smart Grids, PG_00064761		
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	2.0
Learning profile	general academic profile	Assessment form	assessment
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	prof. dr hab. inż. Zbigniew Lubośny	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	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	8.0	12.0	50

Subject objectives

Getting acquainted with the idea of Smart Grids (intelligent networks), with their architecture and principles of control and management. Gaining knowledge about designing such networks.

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	Has structured knowledge of the construction of power networks and stations that form SmartGrids.	[SW1] Assessment of factual knowledge
[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	Is able to analyse and interpret processes occurring in the power system.	[SU2] Assessment of ability to analyse information
[K7_W04] demonstrates knowledge encompassing selected issues in the field of advanced detailed knowledge, particularly in the scope of methods, techniques, tools, and algorithms specific to Power Engineering	Is able to use mathematical methods to solve problems covered by the course.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Course content – lecture

Smart Grid Architectural Designs, Smart Grid Communications and Measurement Technology, Performance Analysis Tools for Smart Grid Design, Stability Analysis Tools for Smart Grid, Computational Tools for Smart Grid Design, Pathway for Designing Smart Grid, Renewable Energy and Storage, Interoperability, Standards, and Cyber Security, Research, Case Studies for the Smart Grid

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Electric power systems</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Test</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Buchholz B. M., Styczynski Z. A: Smart grids - Fundamentals and technologies in electricity networks, Springer 2014, 2020Momoh J.: Smart Grid: Fundamentals of Design and Analysis, Wiley-IEEE Press, 2012Borlase S.: Smart Grids: Advanced Technologies and Solutions. 2017</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Any book related to Smart Grids</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Decribe smart grid architecture

Voltage control in smart grids

Frequency control in smart grids</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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