GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | Smart Grids, PG_00064761 | | |
| Field of study | Power Engineering | | |
| Date of commencement of studies | February 2025 | Academic year of realisation of subject | 2025/2026 |
| Education level | second-cycle studies | Subject group | Specialty subject group<br>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 | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | prof. dr hab. inż. Zbigniew Lubośny | |
| | Teachers | | |

**Lesson types and methods of instruction**

| 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**

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

**Prerequisites and co-requisites**

Electric power systems

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><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>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>Any book related to Smart Grids</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Decribe smart grid architecture<br><br>Voltage control in smart grids<br><br>Frequency control in smart grids</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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