GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Intelligent energy and hybrid systems, PG_00057322		
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	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	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. Stanisław Czapp	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	15.0	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	6.0	14.0	50

Subject objectives

The achievement of knowledge and skills in the design and commissioning of intelligent power systems

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W01] has extended and deepened knowledge of mathematics indispensable for describing phenomena related to processes of energy conversion and transfer; uses advanced information technologies	The student knows the principle of operation and design of photovoltaic systems.	[SW1] Assessment of factual knowledge
[K7_U02] is able to use known mathematical and numerical methods to analyze and design elements, systems and power transmission networks and internal installations	The student knows how to design power installations related to the intelligent building system.	[SU3] Assessment of ability to use knowledge gained from the subject
[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 knows the principle of operation of typical electric power devices.	[SW2] Assessment of knowledge contained in presentation
[K7_U03] has the necessary preparation to work in an industrial environment, is prepared to undertake third degree studies, applies the principles of safety and hygiene	The student knows the principles of designing safe power systems. The student knows and applies the principles of health and safety at work.	[SU1] Assessment of task fulfilment

Subject contents

Types of control systems in buildings: KNX, LonWorks, VCN. European Installation Bus KNX system. The idea of the system, system elements, Sensors and actuators, graphical symbols. Topology. Devices, lines, areas. Physical address, group address. Communication in the KNX system. Data transmission, telegrams, flags, methods of the access to the bus. ETS software. Design and diagnostics. Design and performance of the KNX installation. Photovoltaic systems. Electric vehicle charging systems. Integration with the power system. Design and control. Means of protection against electric shock in low-voltage power systems.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="2">No requirements</td></tr>
<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>Seminar</td><td>100.0%</td><td>50.0%</td></tr>
<tr><td>Test</td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Petykiewicz P.: Nowoczesna instalacja elektryczna w inteligentnym budynku. COSiW, Warszawa 2001.
2. Mikulik J.: Europejska Magistrala Instalacyjna. Rozproszony system sterowania bezpieczeństwem i komfortem. COSiW, Warszawa 2008.
3. Klajn A., Bielówka M.: Instalacja elektryczna w systemie KNX/EIB. Podręcznik INPE dla elektryków, zeszyt 10, czerwiec 2006.
4. Markiewicz H.: Instalacje elektryczne. PWN, Warszawa 2018.
5. Musiał E.: Instalacje i urządzenia elektroenergetyczne. WSP, Warszawa 2008.
6. Project Engineering for EIB Installations. Basic Principles. European Installation Bus Association (EIBA), Brussels, Belgium, 1998.</td></tr>
<tr><td>Supplementary literature</td><td>1. Manual of devices of KNX system.</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">Test:

1. The maximum number of KNX elements in one network segment is:

a) 1024

b) 256

c) 64

2. In the KNX system, the physical address 12.3.0 means:

a) any element of line No.12 in area No. 3

b) area coupler connecting area No. 3 to line No. 12

c) line coupler connecting line No. 3 to the main line of area No. 12</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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