COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrical installation systems in buildings [N2Elenerg1>SIEwB]

Course

Field of study
Electrical Power Engineering

Year/Semester
2/3

Area of study (specialization)
Smart Grids

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
10

Other
0

Tutorials
0

Projects/seminars
20

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of electrical devices and installations. Knowledge of the principles of safe use of electrical equipment. Knowledge of the operation and use of installation protections.

Course objective

Gaining knowledge and skills in the construction, design and testing of electrical installation systems. Understanding how to distribute power, create comprehensive surge protection and build lightning protection systems, computer and telecommunications networks.

Course-related learning outcomes

Knowledge:
student knows the rules for the selection of electrical and information and communications ict equipment used in electrical installation projects. student considers phenomena accompanying interference processes at the design stage of electrical installation systems.

Skills:
student is able to design building electrical installations for various purposes. student can choose the

equipment of electrical and teletechnical installations. student is able to interact with designers of other installation systems and users of buildings.

Social competences:
student is aware of the principles of professional ethics when designing surveillance systems in buildings. student responsibly plans tasks respecting the rights of other designers and users of buildings.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture:
- knowledge acquired as part of the lecture is verified by a written final exam consisting of open or test questions with different points. Passing threshold: 50% of points,
- current grading in each lecture (rewarding activities).

Laboratory classes:
- current check and rewarding knowledge necessary for the accomplishment of the problems in the area of laboratory tasks,
- evaluation of reports performed on laboratory classes,
- rewarding activities related to the implementation of laboratoy classes.

Projects:
- the preparation of materials for the project is evaluated,
- substantive preparation for the implementation of the assigned project is evaluationed,
- project and its defense are evaluated.

Programme content

Lecture:
Electrical installation systems in buildings. Lightning, surge, anti-shock and fire protection. Access control. Computer and telecommunications networks.

Laboratories:
Laboratory exercises related to the subject matter to be completed.

Projects:
The assigned project in the field of electrical installation systems is to be completed.

Course topics

Lecture:
- technical conditions that should be met by electrical installation systems in buildings,
- lightning, surge, anti-shock and fire protection systems,
- structured cabling,
- access control, burglary and signaling systems
- computer and telecommunications networks,
- cable management systems.

Laboratories:
- Overview of the classes: topics, literature, requirements, reports, health and safety
- Induction motor control and starting systems
- Selectivity of residual current circuit breakers
- Selection of protection devices in electrical installations for selective operation
- Testing the basic characteristics of fuses
- Use of a frequency converter to control the rotational speed of the induction motor
- Installation of modular low-voltage equipment in a surface-mounted electrical switchboard
- Summary of classes, reports and assessment

Projects:
- introductory classes
- design of lightning protection installation,

- designing a lightning protection system - risk assessment
- design of earth electrodes based on (PN-HD 60364-5-54, PN - EN 50522)
- design of lighting and socket installation in a single-family building, part 1
- design of lighting and socket installation in a single-family building, part 2
- intelligent installation design based on Deimic and Fibaro,
- basics of designing PV installations, part 1
- basics of designing PV installations, part 2
- heat pumps – basics
- summary of classes

Teaching methods

Lecture:
- multimedia or object-oriented presentations supported by illustrated examples presented on the board,
- interactive lecture with questions and initiating discussions.
Laboratory classes:
- object-orientedpresentations supported by illustrated examples presented on the board,
- presentations of selected experiments,
- initiating teamwork.
Projects:
- use of dedicated or developed computer applications, graphic programs and catalogs of producers of electrical equimpments, teletechnical, building automation and alarm systems.

Bibliography

Basic
1. Markiewicz H., Instalacje elektryczne, WNT, Warszawa, 2018.
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3. Waliszewski, W. Instalacje elektryczne w praktyce, Wiedza i Praktyka, 2014.
4. Skibko, Z. Budowa oraz eksploatacja instalacji i urządzeń elektrycznych, Oficyna Wydawnicza Politechniki Białostockiej, Białystok, 2019.
5. Lejdy, B.; Sułkowski, M. Instalacje elektryczne w obiektach budowlanych, PWN, Warszawa, 2019.
6. Niestępski, S.; Parol, M.; Pasternakiewicz, J.; Wiśniewski, T. Instalacje elektryczne: budowa, projektowanie i eksploatacja, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2019.
7. Wincencik, K. Ochrona odgromowa wedug nowych Polskich norm, Wydawnictwo Wiedza i Praktyka, Warszawa, 2018.
Additional
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2. Skibko, Z. Low-voltage electrical installations, Oficyna Wydawnicza Politechniki Białostockiej, Białystok, 2019.
3. Parol, M.; Rokicki, Ł. Instalacje i systemy w inteligentnych budynkach: laboratorium, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2017.
4. Dombek, G.; Nowak, K.; Książkiewicz, A.; Bochenek, B.; Nowaczyk, P.; Pluta, P. Zastosowanie przekaźników PLC do realizacji algorytmów sterowania ogrzewaniem. Poznan University of Technology Academic Journals. Electrical Enginnering, 2017, Issue 92, pp.415-425.
5. Dombek, G.; Książkiewicz, A.; Janiszewski, J. Electrodynamic contact bounce induced by fault current in low-voltage relays. Energies, 2018, vol. 12, no. 20, pp. 3926-1-3926-13.
6. Normy przedmiotowe.
7. Publikacje internetowe.

Breakdown of average student's workload

	Hours	ECTS
Total workload	105	4,00
Classes requiring direct contact with the teacher	40	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50