COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric power and distribution devices

Course

Field of study

Electrical Engineering

Year/Semester

4/8

Area of study (specialization)

Insulation systems, devices and electric power installations

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

part-time

Requirements

elective

Number of hours

Lecture

20

Laboratory classes

20

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

prof. Hubert Morańda, Ph. D., Hab. Eng.

Faculty of Environmental Engineering and Energy

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tel. 61 665 2035

Responsible for the course/lecturer:

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Faculty of Environmental Engineering and Energy

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Prerequisites

Knowledge of electrotechnical materials science and basic laws regarding the theory of electrical circuits. Basic knowledge of high voltage technology, materials and insulation environments. Knowledge of surge protection of buildings and power lines. Basic knowledge of electrical devices and measuring apparatus and its use. Student can build a simple electrical system. The student is able to carry out measurements of physical quantities characteristic of insulation systems and electrical devices. Student is able to work and interact in a group. Student is aware of the impact of high voltage insulation systems on the environment.

Course objective

Understanding the basic issues related to the construction of power equipment and apparatus, such as insulators, high voltage transformers, capacitors, cables, GIS/GIL stations and high and low voltage connectors.

Course-related learning outcomes

Knowledge

Student has knowledge in the field of design, construction and operation principles of electric power devices. Student has knowledge about the construction, operating principles and operation of distribution devices, transformers, electrical machines and technical systems as well as processes occurring in their life cycle.

Skills

Student is able to correctly build, run, test and operate electrical devices in accordance with the general requirements and technical documentation.

Social competences

Understands the aspects and effects of an electrical engineer related to environmental impact, the need to initiate actions for the public interest, and is aware of the responsibility for making decisions.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- knowledge acquired as part of the lecture is verified by a written final test 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.

Programme content

Lecture:

Issues related to the design, selection of materials, construction of power devices such as insulators, power transformers, high voltage cables, capacitors, GIS stations and GIL lines. Conectors. The lectures present general information on the role of individual devices and issues related to the construction of individual active and passive elements of the above-mentioned power devices. Operating conditions of distribution devices; classification, functional classification and basic rating parameters. Contact

systems. Characteristics of operating states (opening state, switching, transit and switching off). Electric arc, arc extinguishing conditions and techniques in various extinguishing media.

Laboratory classes:

Classes discussing the regulations of the laboratory, topics of laboratory classes and OHS training related to the operation of laboratory positions. To perform 8 two-hour laboratory classes in the field of lecture.

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.

Bibliography

Basic

1. Glinka T., Maszyny Elektryczne i transformatory. Podstawy teoretyczne, eksploatacja i diagnostyka, Instytut Napędów i Maszyn Elektrycznych KOMEL, 2015.

2. Rakowska A., Linie kablowe prądu stałego: Wybrane zagadnienia, Wydawnictwo Politechniki Poznańskiej, Poznań, 2011.

3. Knothe S., Rozdzielnice wysokonapięciowe izolowane, Wydawnictwa Naukowo-Techniczne, Warszawa, 1976.

4. E. Jezierski i inni, Transformatory: budowa i projektowanie, Wydawnictwa Naukowo-Techniczne, Warszawa, 1963.

5. Bąk J. i inni, Poradnik inżyniera elektryka, T. 3, WNT Wydawnictwa Naukowo-Techniczne, 2005.

6. Markiewicz H.: Urządzenia elektroenergetyczne, WNT, Warszawa, 2001.

7. Maksymiuk J.: Aparaty elektryczne, PWN, Warszawa, 1995.

8. Flisowski Zd.: Technika wysokich napięć, WNT, Warszawa, 1999.

Additional

1. Gielniak J., Morańda H., Dynamika zawilgocenia izolacji transformatorów energetycznych w zależności od konstrukcji, Przegląd Elektrotechniczny, T. 90., W. 10/2014.

2. Periodyki: Elektroinstalator, Elektroinfo.

3. Standards.

4. Catalogs.

5. Internet publications.

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	68	3,0
Student's own work (literature studies, preparation for laboratory classes, preparation of reports, preparation for tests) [1]	22	1,0

[1] delete or add other activities as appropriate