COURSE DESCRIPTION CARD - SYLLABUS

Course name
Design and diagnostic of distributive devices [N2Eltech2-UiIE>PDUR2]

Course

Field of study
Electrical Engineering

Year/Semester
2/3

Area of study (specialization)
Distribution Devices and Electrical Installations

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
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge on the construction and operation of electrical devices and installations as well as measuring apparatus and its use. Ability to obtain information from subject literature and other sources as well as critically analyze them. Ability to use analytical, simulation and experimental tools. Understanding the need for creative action.

Course objective

Understanding the principles of designing structural elements of distribution devices and methods for diagnosing the parameters of devices operating in normal and fault states.

Course-related learning outcomes

Knowledge:
Student has ordered knowledge in the field of design and diagnostics of typical structural elements of switchgear.

Skills:
Student is able to use mathematical models to design and analyze the operating status of electrical

equipment components. Student is able to carry out diagnostic measurements and verify the quality of the tested object.

Social competences:
Student can think and act in a professional manner. Student understands the need for education in various fields and understands the need for innovative testing of the condition of devices to ensure their operational safety.

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

Phenomena in high-current circuits, electrodynamic interactions and issues of high-current electric arc and its extinguishing in power switchboards. Eliminating emergency arc, limiting the effects of short circuits and arc protection of power switchboards.

Course topics

Lecture:
- Phenomena in high-current circuits,
- Electrodynamic interactions in high-current power supply circuits,
- High-current electric arc and its extinguishing,
- Emergency arc in switchboards and power switchboards,
- Eliminating emergency arc in power circuits,
- Limiting the effects of short circuits in power equipment,
- Arc protection of power switchboards.

Lab:
- Overview of the classes: topics, literature, requirements, reports, health and safety
- Determination and verification of the long-term load capacity of current circuits
- Heating of screw connections of copper busbars
- Testing the closing and opening times of switch contacts
- Operational tests and measurements of the cable line
- Determination of contact bounce times in relays and contactors
- Testing the operating systems of voltage transformers
- Summary of classes, reports and assessment

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. Maksymiuk J: Niezawodność maszyn i urządzeń elektrycznych, Oficyna Wydawnicza PW, 2003.
2. Kupras K.: Pomiary w elektroenergetyce ?wytyczne, wyd. SEP, 2007
3. Maksymiuk J., Pochanke Z.: Obliczenia i badania diagnostyczne aparatury rozdzielczej, wyd.1, WNT, 2001.
4. Au A., Maksymiuk J., Pochanke Z.: Podstawy obliczeń aparatów elektroenergetycznych, WNT, 1995.
5. Maksymiuk J.: Aparaty elektryczne, PWN, Warszawa, 1995.
6. Chmielak W., Daszyński T., Pochanke Z.: Laboratorium Aparatów elektrycznych, Oficyna wydawnicza PW, 2017.
7. Konopacki Z., Gryżewski Zd.: Prace kontrolno-pomiarowe przy urządzeniach elektroenergetycznych o napięciu znamionowym do 1 kV, COSTW SEP, Warszawa,1999.

Additional:
1. Wiśniewski S., Wiśniewski T.S.: Wymiana ciepła. WNT, Warszawa, 1997
2. Periodyki: Elektroinstalator, Elektroinfo
3. Poradnik inżyniera elektryka, WNT, 2009
4. Internet publications.
5. Standards.
6. Przepisy Budowy Urządzeń Elektroenergetycznych, Wydawnictwa Przemysłowe WEMA, Warszawa, 1997.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	20	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00