COURSE DESCRIPTION CARD - SYLLABUS

Course name
Exploitation and diagnostics of electric power devices

Course

Field of study
Electrical Engineering

Year/Semester
5/9

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	Laboratory classes	Other (e.g. online)
20	10	
Tutorials	Projects/seminars	
	10	

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
dr hab. inż. Krzysztof Siodła, prof. PUT

e-mail: krzysztof.siodla@put.poznan.pl

tel.: 61-6652279

Faculty of Environmental Engineering and Energy

3A Piotrowo Str., 60-965 Poznań

Responsible for the course/lecturer:
dr hab. inż. Jerzy Janiszewski, prof. PUT

e-mail: jerzy.janiszewski@put.poznan.pl

tel. 61-6652279

Faculty of Environmental Engineering and Energy

3A Piotrowo Str., 60-965 Poznań

Prerequisites

Has knowledge in the field of physics, electrical engineering, electrical power engineering, high voltage techniques, construction of electrical equipment and installations. Has basic knowledge of the construction and operation of electrical equipment and installations as well as measuring apparatus and its use. Has the ability to use experimental tools. Has the ability to effective self-study in a field related to the chosen field of study. Is aware of the need to expand his knowledge, skills, competences, readiness to cooperate within a team.

Course objective

Understanding the principles of design, construction, operation and diagnostics of high and low voltage

power equipment - transmission and distribution overhead lines, cable lines, transformers, electrical machines, insulators, capacitors. Getting to know modern research techniques of devices working in the power system. Requirements of regulations and standards regarding measurements and diagnostics of selected electrical devices and installations. Acceptance and operational tests; purpose and scope of tests; organization and safety of measuring works, test periods and qualification requirements for people performing tests. Diagnostic instruments and their accuracy, acquisition and reported of test results. Diagnostic examination of selected switchgear, wires, cables and low voltage installations. Alternative measurement methods in operational tests of electric power equipment. Design and implementation of testing systems for the testing of equipment and installations.

Course-related learning outcomes

Knowledge

1. Has knowledge of the life cycle, design and operation of power equipment, installations and systems, knows and understands the principle of their operation

2. Has structured and theoretically founded knowledge of construction, principles of operation, operation and diagnostics of transformers, electrical machines, power lines and cables, electrical installations

Skills

1. Is able to use his knowledge in the selection of power and measuring equipment to perform diagnostics of power equipment

2. Is able to proper use of power equipment and installations in accordance with the general requirements and technical documentation

Social competences

1. Is aware of the need to initiate actions for the public interest, understands the various aspects and effects of electrical engineer activities, including environmental impact, and the associated responsibility for decisions

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

Assessment of knowledge and skills demonstrated at the written colloquium of problem nature

Laboratory

Checking the preparation before each class. Checking completed reports. The final conversation or colloquium

Project

Assessment of activity during project classes. Assessment of the individually prepared project of the power supply line

Programme content

Lecture

Construction, operation and diagnostics of low and high voltage power devices and power supply installations - overhead and cable lines, transformers, electric motors, capacitors, protection equipment. Requirements of regulations and standards regarding measurements and diagnostics of selected electrical devices and installations. Acceptance and operational tests; purpose and scope of research; organization and safety of measuring works, test periods and qualification requirements for people performing tests. Diagnostic instruments and their accuracy, acquisition and recording of test results. Diagnostic testing of selected switchgear, wires, cables and low voltage installations. Alternative measurement methods in operational tests of power equipment. Design and implementation of testing systems for the testing and testing of equipment and installations

Laboratory

Classes discussing the regulations of the laboratory, the subject of laboratory exercises and safety training related to the operation of laboratory positions. To carry out 6 two-hour laboratories on the subject

Project

Designing a high voltage power cable and cable line supplying an industrial or municipal consumer. Selection of high / low voltage distribution station components. Taking into account the terrain conditions of the cable line

Teaching methods

Lecture

Lecture with multimedia presentation supplemented with examples given on the blackboard. The lecture was conducted in an interactive way with the formulation of questions addressed to students

Laboratory

Checking the preparation for classes before each laboratory, preparation of exercise reports, final evaluation conversation

Project

Active participation in project classes. Individual preparation of of the project of the power supply line

Bibliography

Basic
1. Flisowski Z., Technika wysokich napięć, WNT, Warszawa, 2014

2. Mościcka-Grzesiak H., Inżynieria wysokich napięć w elektroenergetyce, tom I/II, Wydawnictwo Politechniki Poznańskiej 1996/99

3. Maksymiuk J., Pochanke Z., Obliczenia i badania diagnostyczne aparatury rozdzielczej, WNT, 2001

4. Kupras K., Wytyczne - pomiary w elektroenergetyce do 1 kV, wyd. SEP, 2007

5. Laskowski J., Poradnik elektroenergetyka przemysłowego, COSTW SEP, Warszawa,2004

Additional

1. Florkowska B., Diagnostyka wysokonapięciowych układów izolacyjnych urządzeń elektroenergetycznych, Wydawnictwa AGH, Kraków, 2016

2. Florkowska B. i inni, Mechanizmy, pomiary i analiza wyładowań niezupełnych w diagnostyce układów izolacyjnych wysokiego napięcia, Uczelniane Wydawnictwo Naukowo-Dydaktyczne AGH, Kraków, 2010

3. Poradnik inżyniera elektryka, WNT, Warszawa, 2004

4. Normy przedmiotowe (np.: PN-IEC 60364-6-61:2000 Instalacje elektryczne w obiektach budowlanych. Sprawdzanie. Sprawdzanie odbiorcze., PN-91/E-06105/02: Wyłączniki wysokonapięciowe prądu przemiennego. Badania typu.)

Breakdown of average student's workload

	Hours	ECTS
Total workload	95	4,0
Classes requiring direct contact with the teacher	68	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	27	1,0

[1] delete or add other activities as appropriate