



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Measurements in high-voltage systems and electrical installations [N1Eltech1>C-PwUWiE]

Course

Field of study

Electrical Engineering

Year/Semester

4/8

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

elective

Number of hours

Lecture

10

Laboratory classes

20

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge of physics, electrical engineering, materials engineering, electrical power engineering, high voltage techniques and metrology. Awareness of the need to expand their knowledge, skills, competences, readiness to cooperate within a team. Ability to conduct simple measurements of electrical quantities and graphically present their results, read electrical diagrams.

Course objective

Understanding how to produce and measure high alternating, direct and surge voltages, and surge currents. Understanding the principles, requirements and conditions for measurements in electrical installations. Knowledge of modern measurement and research techniques for devices operating in the electric power system. Experiment planning, acquisition of skills in the design of test circuits. Selection of measuring instruments and implementation of the testing system as well as performance of tests and elaboration of results and their analysis.

Course-related learning outcomes

Knowledge:

Student knows the elements of theory of errors and uncertainty of measurement results and has ordered knowledge in the field of measurement methodology and properties and operation of modern high-voltage and low-voltage measuring equipment.

Skills:

Student is able to choose the right method, appropriate test device and use measuring equipment (analog and digital) to measure the basic measurable quantities characteristic of electrical installations and high-voltage engineering.

Social competences:

Student is aware of making decisions resolving dilemmas related to the exercise of the profession.

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 test consisting of open or test questions with different points. Passing threshold: 50% of points.

Current evaluation on 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 laboratory classes

Programme content

Production and measurement of high voltages and high currents.

Course topics

Lecture:

Understanding how to produce and measure high voltages. Parameters of alternating voltage and current (of technical and increased frequency), normalized and special direct and surge voltage, surge currents. Stationary and mobile (resonance) testing teams for generating AC, DC and surge voltages and currents. Rules for making measurements in electrical installations. Testing of electric shock protection measures in electrical installations up to 1 kV.

Laboratory classes:

Classes discussing the regulations of the laboratory, topics of laboratory classes and safety training related to the operation of laboratory positions. To perform 9 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-oriented presentations supported by illustrated examples presented on the board,
Presentations of selected experiments,
Initiating teamwork.

Bibliography

Basic

1. H. Markiewicz, Instalacje elektryczne, WNT, Warszawa 2012
2. F. Łasak, Wykonywanie odbiorczych i okresowych sprawdzeń instalacji elektrycznych niskiego napięcia oraz wykonywanie innych pomiarów, Medium, Warszawa, 2014
3. F. Łasak, Błędy popełniane przy badaniach i pomiarach elektrycznych: poradnik dla elektryka, Verlag

Dashofer, Warszawa, 2012

4. Wodziński J., Wysokonapięciowa technika prób i pomiarów, PWN Warszawa, 1997

Additional

1. Flisowski Z., Technika wysokich napięć, WNT Warszawa, 2023

2. Ustawa z dnia 11 maja 2001r. Prawo o miarach (Dz.U.2004.243.2441- tekst jednolity z późn. zm.)

3. Rozporządzenie Ministra Infrastruktury z dnia 12 kwietnia 2002 r. w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie

4. PN-HD 60364-6 Instalacje elektryczne niskiego napięcia

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00