COURSE DESCRIPTION CARD - SYLLABUS

Course name
MODERN SOLUTIONS IN TRANSMISSION AND DISTRIBUTION OF ELECTRIC ENERGY

Course

Proposed by Discipline
Environmental Engineering, Mining and Energy
Type of studies
Doctoral School
Form of study
full-time

Year/Semester
II/4
Course offered in
English
Requirements
elective

Number of hours

Lecture
8

Tutorials

Projects/seminars

Number of credit points
2

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Knowledge:

PhD student should have basic knowledge in the field of electric power generation, transmission, distribution and consumption. She/he should also have basic information on high voltage technology.

Skills:

PhD student can individually identify, formulate and solve problems related to electric power engineering.

Social competencies:

PhD student recognises the importance of continuous learning, self-education and individual work. She/he is open to exploring new scientific issues.

Course objective

Acquaintance with modern solutions of electric power transmission and distribution cable and overhead lines. Construction of cables and devices used in overhead lines.

Course-related learning outcomes

Knowledge

A PhD student who graduated from doctoral school knows and understands:

1) Key trends in development of electric energy transmission and distribution modern solutions, [P8S_WG/SzD_W02]

2) Basic principles of knowledge transfer to the economic and social sphere, as well as commercialization of scientific research results, [P8S_WK/SzD_W07]

Skills

A PhD student who graduated from doctoral school can:

1) Use knowledge from various fields of science to identify, formulate and innovatively solve complex problems connected with generation, transmission, distribution and utilization of electric energy, [P8S_UW/SzD_U01]

2) Communicate on specialist issues on the level that allow active participation in the international scientific community, [P8S_UK/SzD_U04]

Social competencies

A PhD student who graduated from doctoral school is ready to:

1) Acknowledge the importance of knowledge in solving practical problems connected with electric energy generation and transmission system, [P8S_KK/SzD_K03]
2) Can initiate action in the public interest in the problem of electric energy generation, transmission and distribution, [P8S_KO/SzD_K05]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

PQF code	Methods for verification of learning outcomes	Assessment criteria
W02, W07	Knowledge assessment based on a colloquium or a written test	Depending on answers, the PhD student will receive the following grade: $\leq$ 50% – 2.0 (F) 51-60% – 3,0 (E) 61-70% – 3.5 (D) 71-80% – 4.0 (C) 81-90% – 4.5 (B) 91-100% – 5.0 (A)

U01, U04	Knowledge assessment based on a colloquium or a written test	Depending on answers, the PhD student will receive the following grade: ≤ 50% – 2.0 (F) 51-60% – 3,0 (E) 61-70% – 3.5 (D) 71-80% – 4.0 (C) 81-90% – 4.5 (B) 91-100% – 5.0 (A)
K03, K05	Knowledge assessment based on a colloquium or a written test	Depending on answers, the PhD student will receive the following grade: ≤ 50% – 2.0 (F) 51-60% – 3,0 (E) 61-70% – 3.5 (D) 71-80% – 4.0 (C) 81-90% – 4.5 (B) 91-100% – 5.0 (A)

Programme content

Lectures:

Quantities describing the quality of electric energy. Construction of high voltage equipment. Laboratory tests of high voltage power equipment.

Course topics

Parameters describing the working and test voltages and currents – alternating current and voltage, direct current and voltage, standard lightning voltage, standard switching voltage, current stroke. Conductive and insulating materials used in construction of high voltage power cables and overhead line accessories. Classification of distribution and transmission lines according to their voltage and role in power system. Construction of power cables and overhead lines of low, medium, high and extra-high voltage.

Teaching methods

Lecture: multimedia presentation. Interactive lecture with formulation of problems to be solved and questions asked to students.

Bibliography

Basic

1. Chudnovsky B.H., Electrical Power Transmission and Distribution, CRC Press, 2012
2. Kuffel E., Zaengl W.S., Kuffel J., High Voltage Engineering. Fundamentals, Butterworth-Heinemann, 2000
3. Holtzhausen J.P., Vosloo W.L., High Voltage Engineering. Practice and Theory, University of Stellenbosch, 2008

Additional

1. Flisowski Z., Technika wysokich napięć (in Polish), WNT Warszawa, 2023
2. Mościcka-Grzesiak H., et al., Inżynieria wysokich napięć w elektroenergetyce (in Polish), tom I/II, Wydawnictwo Politechniki Poznańskiej, Poznań, 1996/99

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	8	0
Doctoral student's own work (literature studies, preparation for tutorials, project preparation) [1]	42	2,0

[1] delete or add other activities as appropriate