



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric shock protection in power system [S2Eltech2-SiAE>OPwSE]

Course

Field of study

Electrical Engineering

Year/Semester

2/3

Area of study (specialization)

Power Networks and Electric Power Systems
Protection

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

1,00

Coordinators

dr hab. inż. Jarosław Gielniak prof. PP
jaroslaw.gielniak@put.poznan.pl

Lecturers

Prerequisites

Student has basic knowledge of safe work in the vicinity of electrical devices and is aware of the influence of electrical current on the human body. Student has basic knowledge of the design and construction of electrical devices and is able to use these devices in compliance with the principles of health and safety rules.

Course objective

The aim of the course is to familiarize students with the requirements of the power grid in the field of anti-shock safety. The course will present the current electric shock protection requirements for elements of the power system. Particular attention will be paid to the earthing system, methods of its design and typical construction solutions.

Course-related learning outcomes

Knowledge:

1. Student has knowledge of the design, construction and operation of power system devices - [K2_W08]

2. Student has knowledge of the operation of the power system, including the generation, transmission and distribution of electricity and the operation of devices that make up the power system - [K2_W19]
3. Student has basic knowledge necessary to understand social, economic, legal and other, non-technical determinants of engineering activities, knows the basic principles of health and safety rules and the possible hazards in electrical industry - [K2_W20]

Skills:

1. Student is able to apply the principles of health and safety rules - [K2_U09]
2. Student can correctly use electrical devices in accordance with general requirements and technical documentation - [K2_U14]

Social competences:

1. Student knows what the duties of an electrical engineer, understands various aspects and effects of own actions, including the impact it has on the environment, is aware of the responsibility related to the decisions made - [K2_K02]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge and skills acquired during the course will be assessed on the basis of a written exam. Activity during classes will be rewarded.

Programme content

The principles (legal issues) of protection against electric shock applicable in Poland and around the world, used to ensure the safe operation of electrical power equipment. The anti-shock protection measures used depend on the voltage level of the station, lines of electrical equipment and apparatus, and the operation of the neutral point of the power grid.

Course topics

Content of the course:

1. Legal basis for the protection against electric shock in the power system
2. Means of protection against electric shock and their classification
3. Types of earthing and their properties
4. Touch voltages expected in networks with voltage above 1 kV
5. Protection against electric shock in MV/LV stations
6. Protection against electric shock at overhead lines
7. Influence of the way of neutral point work on the protection against electric shock.

Teaching methods

Course is conducted with the use of a multimedia presentation and other visual materials (photos, videos) illustrating the issues raised within the subject matter.

Bibliography

Basic:

1. Hoppel W. Sieci średnich napięć. Automatyka elektroenergetyczna i ochrona od porażenień, PWN, Warszawa, 2017
2. Hoppel W., Marciniak R. Uziemienia w sieciach elektroenergetycznych, PWN, Warszawa 2020
3. Markiewicz H. Bezpieczeństwo w elektroenergetyce, WNT Warszawa, 2009
4. Wołkowiński K. Uziemienia urządzeń elektrycznych, WNT, Warszawa, 1972

Additional:

1. Norma PN-EN 63164 Instalacje elektryczne
2. Norma PN-EN 50522 Uziemienie instalacji elektroenergetycznych prądu przemiennego o napięciu wyższym niż 1 kV
3. Norma PN-EN 50341 Elektroenergetyczne linie napowietrzne prądu przemiennego powyżej 1 k

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50