COURSE DESCRIPTION CARD - SYLLABUS

Course name
Design of electric network and electric power system protection [N2Eltech2-SiAE>PSiU]

Course

Field of study
Electrical Engineering

Year/Semester
1/2

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
part-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
20

Number of credit points

2,00

Coordinators

dr inż. Bartosz Olejnik
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Lecturers

Prerequisites

Student has knowledge of the basics of electrical engineering, power engineering and protection devices. Student can calculate maximum power demand, short-circuit currents, can adjust a power transformer/CT/VT, knows the principles of confuration protection settings. Student is aware group work.

Course objective

The objective is to acquire the skills to create a project of a segment of the distribution grid (LV, MV, HV level) including power system protection.

Course-related learning outcomes

Knowledge:
1. Has in-depth knowledge of the construction and operation of the power system and issues related to the generation, distribution and processing of electricity.
2. Has expanded knowledge in the field of computer-aided design in electrical engineering with particular emphasis on electrical power protection automation.

Skills:
1. Is able to use known methods and mathematical models of power system components - if necessary, modifying them accordingly - to analyze and design electrical processes, devices and systems.
2. Is able to design elements and complex electrical devices and systems, taking into account given non-technical (utility and economic) criteria, if necessary adapting existing or developing new methods, techniques and computer tools to support design

Social competences:
1. Is aware of the need for continuous development of professional achievements and compliance with the principles of professional ethics, fulfilling social obligations, inspiring and organizing activities for the social environment

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- defining cooperation skills within a team practically performing a specific task,
- rewarding with sources of knowledge necessary to implement the problems posed in a given task area,
- assessment of the report on the completed project with individual conversation with the student.

Programme content

Equivalent models of power system components. Power flow and short-circuit calculations. Calculations of power protection settings for passive and active networks. Protection in the depth of the network.

Course topics

Determination of the predicted power required of a selected group of recipients. Determination of normal and short-circuit operating conditions states of designed system. Selection of overhead wires or cables. Selection of fuses for LV networks. Selection of transformers and relays for MV and HV networks. Assessment of the impact of the proposed MV line on the earth fault protection installed in other line fields the station. Power system protecion settings (in MV station and in the depths of the network).

Teaching methods

Multimedia presentation introducing the subject of the project, analysis of various methods (including non-standard ones), solving the problems posed, team work.

Bibliography

Basic:
1. Kacejko P., Machowski J.: Zwarcia w sieciach elektroenergetycznych. Podstawy obliczeń. WNT Warszawa 1993.
2. Żydanowicz J. : Elektroenergetyczna automatyka zabezpieczeniowa
- Tom I : Podstawy zabezpieczeń elektroenergetycznych. WNT Warszawa 1979.
- Tom II : Automatyka eliminacyjna. WNT Warszawa 1985,
3. Hoppel W.: Sieci średnich napięć. Automatyka zabezpieczeniowa i ochrona od porażeń. WNT, Warszawa 2017,
4. Dołęga W., Kobusiński M.: Projektowanie instalacji elektrycznych w obiektach przemysłowych. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2009.

Additional:
1. Standard N SEP-E-002
2. Kujszczyk Sz. (red.) Elektroenergetyczne sieci rozdzielcze. Tom II, PWN Warszawa 1994.
3. Winkler W., Wiszniewski A. : Automatyka zabezpieczeniowa w systemach elektroenergetycznych. WNT Warszawa 1999

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