COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrical devices [N1Eltech1>UE1]

Course

Field of study
Electrical Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
part-time

Requirements
compulsory

Number of hours

Lecture
10

Laboratory classes
10

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Grzegorz Dombek
grzegorz.dombek@put.poznan.pl

Lecturers

Prerequisites

Basic knowledge on electrical engineering, mathematics, physics and electrical metrology. Able to perform mathematical analysis of simple electrical circuits, knows how to read electrical scheme. A sense of the need to broaden the competence and willingness to work together in a team.

Course objective

Knowledge of phenomena occurring in electrical devices and systems as well as their mathematical and physical descriptions. Purchase of skills in the application of phenomena description to design of power supply and hazard assessment that can occurs in these systems. Experiment planning, selection of measurement instrument, realization of test set-up, researches performing and results analyzing.

Course-related learning outcomes

Knowledge:
Student knows how to characterize the phenomena occurring in power equipment and systems.
Student is able to formulate a mathematical and physical description of phenomena.

Skills:

Student is able to analyze the mathematical and physical description of phenomena for various states and conditions occurring in devices. Student is able to perform calculations and assess the hazards occurring in devices and systems supplying electricity to consumers. Student is able to plan and carry out the experiment.

Social competences:
Student is aware of the impact of the correct selection of devices and analysis of phenomena to ensure the continuity of supplying electricity to various consumers. The student is aware of the impact of phenomena and devices on the environment and people working on and using power equipment and the resulting need for extensive cooperation at the design and operational stages.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
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 grading in 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 laboratoy classes.

Programme content

Lecture:
Thermal effects of operating and short-circuit currents: heat sources in devices, heating of wires and conductors under the influence of operating currents, warm operation of short-circuit currents, determination of the heating and cooling functions. Dynamic effects of short-circuit currents: analysis of some characteristic conductor systems, resistance of electrical devices and busbars to mechanical exposure. Electric switching arc: electric arc and its quenching, arc model, DC and AC arc characteristics, arc quenching conditions, arc quenching techniques.
Laboratory classes:
Classes discussing the regulations of the laboratory, topics of laboratory classes and OHS training related to the operation of laboratory positions. To perform 4 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-orientedpresentations supported by illustrated examples presented on the board,
- presentations of selected experiments,
- initiating teamwork.

Bibliography

Basic
1. Markiewicz, H. Urządzenia elektroenergetyczne, WNT, Warszawa, 2006.
2. Markiewicz, H. Bezpieczeństwo w elektroenergetyce, WNT, Warszawa, 2017.
3. Kamińska, A. Urządzenia i stacje elektroenergetyczne, Wydawnictwo Politechniki Poznańskiej, 2000.
4. Maksymiuk, J., Nowicki, J. Aparaty elektryczne i rozdzielnice wysokich i średnich napięć, Wydawnictwo Politechniki Warszawskiej, Warszawa, 2014.
5. Żmuda, K. Elektroenergetyczne układy przesyłowe i rozdzielcze. Wybrane zagadnienia z przykładami, Wydawnictwo Politechniki Śląskiej, 2014.
Additional
1. Glover, J. D., Sarma, M.S., Overbye, T.J. Power System Analysis and Design, cengage Learning, Inc,

Florence, KY, US, 2011
2. Wasiak, I. Elektroenergetyka w zakresie Przesył i rozdział energii elektrycznej, Politechnika Łódzka, 2010.
3. Królikowski, C.,Boruta, Z., Kamińska, A. Technika łączenia obwodów elektroenergetycznych. Przykłady obliczeń, PWN, Warszawa, 1992.
4. Maksymiuk, J. Aparaty elektryczne. Podstawy doboru i eksploatacji. WNT, Warszawa, 1977.
5. Au, A., Maksymiuk, J., Pochanke, Z. Podstawy obliczeń aparatów elektroenergetycznych. WNT, Warszawa, 1982.

Breakdown of average student's workload

	Hours	ECTS
Total workload	65	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	35	1,00