COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of electrical power engineering [S1Energ2>PE]

Course

Field of study
Power Engineering

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
15

Other (e.g. online)
0

Tutorials
15

Projects/seminars
0

Number of credit points

5,00

Coordinators

dr inż. Jerzy Andruszkiewicz
jerzy.andruszkiewicz@put.poznan.pl

Lecturers

Prerequisites

Student has knowledge of the basic phenomena occurring in the power system, is able to use mathematical analysis for calculations in the field of power engineering.

Course objective

The aim of the course is to become familiar with the basic knowledge of the power system and analysis of its operating status, construction of its basic elements - lines and transformers, as well as design, construction and calculation of power network parameters.

Course-related learning outcomes

Knowledge:
1. Student has systematized knowledge and understands the importance of energy security issues, in particular the threats and ways to increase the level of energy security.
2. Student knows and understands at an advanced level selected facts, objects and phenomena as well as methods and theories related to them explaining the complex relationships between them, constituting the basic general knowledge of the basics of power engineering and knows and understands the functioning of power systems and networks.

Skills:
1. Student is able to use properly selected methods and devices enabling measurement of basic quantities characterizing energy elements and systems.
2. Student is able to assess the energy situation and knows the principles of rational economy, is able to critically analyze the functioning of existing technical solutions in the field of energy management and evaluate these solutions.

Social competences:
1. Student is aware of the responsibility for own work and readiness to comply with the principle of teamwork and bearing the responsibility of the professional role in jointly implemented tasks.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: assessment of knowledge and skills during the written exam consisting of open and / or closed questions.
Exercises: continuous assessment in class and written test after the exercises.
Laboratory: additionally, continuous assessment with rewarding the development of skills in dealing with problems posed during the laboratory, evaluation of reports prepared by the student as a report on the completed exercise; as a basis, a test summarizing the knowledge acquired during the laboratory.

Programme content

General characteristics of power systems, modeling of basic system components, basic system regulations,
Fundamentals of the electricity market and contractual use of the electricity system.

Course topics

Construction of overhead and cable power lines, calculation of power distribution and short-circuit currents in power networks, power and energy losses, basic system regulations, reactive power compensation. Construction and operation of a power transformer, transformer insulation and cooling system, bushings, basic issues in the field of diagnostics and testing of transformers.

Teaching methods

Lecture: multimedia presentation with an open discussion on selected issues.
Exercises: tasks solved on the board by students with the support of the teacher, multimedia used where the use of catalogs is necessary.
Laboratory: exercises performed in teams on physical models under the supervision of a teacher, teaching materials made available at the stations, and some available on eCourses (e.g. videos).

Bibliography

Basic:
1. Kujszczyk Sz.: Elektroenergetyczne układy przesyłowe, WNT, Warszawa 1997.
2. Kujszczyk Sz.: Elektroenergetyczne sieci rozdzielcze. Tom I i II. WNT, Warszawa, 2004.
3. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych, WNT, Warszawa, 2013.
4. Laudyn D., Pawlik M., Strzelczyk F.: Elektrownie, wyd. IV, WNT, Warszawa, 2005.
5. Flisowski Z.: Technika wysokich napięć, WNT, Warszawa, 2005.
6. Szczepański Z., Czajewski J.: Układy izolacyjne urządzeń elektroenergetycznych, WNT, Warszawa, 1978.
7. Jezierski E., Gogolewski Z., Kopczyński Z., Szmit J.: Transformatory. Budowa i projektowania, WNT, Warszawa, 1963.

Additional:
1. Adamska J., Niewiedział R.: Podstawy elektroenergetyki. Sieci i urządzenia elektroenergetyczne. Wyd. PP, Poznań, 1989.
2. Kowalski Z.: Jakość energii elektrycznej, Wyd. PŁ, Łódź, 2007.
3. Żmuda K.: Elektroenergetyczne układy przesyłowe i rozdzielcze. Wybrane zagadnienia z przykładami.

Wyd. PŚ, Gliwice, 2014.
4. Harlow J.: Electric power transformet engineering, CRC Press, 2012.

Breakdown of average student's workload

	Hours	ECTS
Total workload	132	5,00
Classes requiring direct contact with the teacher	62	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	70	2,50