COURSE DESCRIPTION CARD - SYLLABUS

Course name
Basics of electrical power engineering

Course

Field of study
Mathematics in technology

Year/Semester
2/4

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)

Tutorials
15

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
dr inż. Robert Wróblewski

email: robert.wróblewski@put.poznan.pl

tel. 61 665 2523

Faculty of Environmental Engineering and Energy

Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:
prof. dr hab.inż. Aleksandra Rakowska

aleksandra.rakowska@put.poznan.pl

tel. 61 665 2616

Faculty of Environmental Engineering and Energy

Piotrowo 3A, 60-965 Poznań

Prerequisites

Basic knowledge of mathematics, physics and basic electrotechnology. The ability of effective self-education in the field related to the chosen field of study. He is aware of the need to broaden his competences, readiness to start cooperation within the team.

Course objective

Getting to know the structure and characteristic features of the power system and the physical basis of electricity generation and transmission.

Course-related learning outcomes

Knowledge

1. He has knowledge of electrotechnology, thermodynamics and mechanics, especially to the extent necessary to understand basic physical phenomena occurring in elements and energy systems and their surroundings.

2. He has knowledge in the field of construction and principles of operation of electrical power equipment.

Skills

1. He can evaluate power generation technologies in terms of their efficiency and environmental impact.

2. He can measure basic electrical quantities

3. He can, on the basis of constructed mathematical models, assess the characteristics and select elements of the power system.

Social competences

1. He is aware of the need to deepen and broaden his own knowledge and understands the need for further education in order to solve mine-related problems related to optimization of power system components

2. He is aware of the importance and understands the non-technical aspects and effects of engineering activities, including their environmental impact.

3. Student is able to communicate information and opinions on the content of engineering issues in an understandable way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

assessment of knowledge and skills demonstrated during the written exam,

Laboratories:

Ongoing verification of the knowledge necessary for the realization of the set problems in a given area of laboratory tasks, evaluation of the report on the exercise performed

Tutorials:

Testing and rewarding the knowledge necessary to realize the set problems,

assessment of knowledge and skills related to the implementation of the exercise task.

Programme content

Lecture:

General characteristics of the power system; Basic values in the network calculations (current, voltage, power factor, power, indication charts, voltage drop, power losses); Substitute diagram of the line and power transformer; Calculations of current distribution and voltage drop in a multiple-loaded line; Course and characteristic values of short-circuit current according to normative recommendations; Characteristics of the power generation process in selected types of power plants. Calculation of the efficiency of intermediate energy transformations in power plants. Systems and types of MV and nN power networks. Selected elements of power stations. Current and voltage deformations in power networks

Laboratories:

Testing the characteristics of heat pump, photovoltaic and hydrogen cell, measurements of basic electrical quantities

Tutorials:

Modelling and calculation of basic parameters of power system elements.

Teaching methods

Lecture:

multimedia presentation, illustrated with examples on the board

Laboratory:

classes at laboratory positions

Tutorials:

solving tasks at the board

Bibliography

Basic

1. Laudyn D., Pawlik M., Strzelczyk F.: Elektrownie, wyd. IV. WNT Warszawa. 2000.
2. Łaski A.: Elektrownie wodne. Rozwiązania i dobór parametrów. WNT. Warszawa 1971.

Additional

3. Lewandowski M., Proekologiczne źródła energii odnawialnej, WNT W-wa 2001

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	52	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, [1]	48	2,0

[1] delete or add other activities as appropriate