COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electrical Power engineering

Course

Field of study

Power Engineering

Year/Semester

2/4

Area of study (specialization)

Profile of study

practical

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)

0

Tutorials

15

Projects/seminars

0

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

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Wydział Inżynierii Środowiska i Energetyki

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Prerequisites

The student has basic knowledge of mathematics, physics and theoretical electrotechnics.

Knows the rules of programming at the general level. Has the ability to effectively self-study in a field related to the chosen field of study.

Is aware of the need to expand their competences, readiness to cooperate within a team.

Course objective

Understanding the structure and characteristic features of the power system and the physical foundations of electricity generation in various types of power plants. Understanding the basic principles of network calculations.

Course-related learning outcomes

Knowledge

1. Has general knowledge about the construction of the power system and understands the processes of generation, transmission and distribution of electricity. Knows and uses substitute diagrams of power system elements

2. Has basic knowledge in the field of energy conversion in various types of power plants, including in particular conventional and nuclear power plants. Has general knowledge of issues related to distributed and unconventional energy sources

3. Has basic knowledge regarding the analysis of steady and short-circuit states of modern power systems. Has basic knowledge regarding the analysis of transmission stability and quality of electricity supplied to consumers.

Skills

1. Potrafi oceniać technologie wytwarzania energii elektrycznej pod względem ich sprawności i oddziaływania na środowisko. Umie klasyfikować technologie wytwarzania energii elektrycznej oraz analizować efektywność przemian energetycznych zachodzących w różnych typach źródeł wytwórczych.

2. Potrafi wykonywać podstawowe obliczenia prądów i napięć w sieciach elektroenergetycznych. Potrafi wyjaśnić zasady podstawowych procesów regulacyjnych w systemie elektroenergetycznym oraz objaśnić funkcjonowanie elektroenergetycznej automatyki zabezpieczeniowej

3.Potrafi testować i diagnozować proste układy i urządzenia energetyczne

Social competences

Is able to work in a group during laboratory tests and present the effects of work done.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: exam in the next semester (semester 5)

Exercises: credit on the basis of current checking of messages and two written tests of accounting tasks

Laboratory: tests checking the knowledge necessary to implement the problems posed in a given area of laboratory tasks, assessment of knowledge and skills related to the implementation of the exercise task, evaluation of the report of the exercise, obtaining additional points for the ability to cooperate within a team that practically performs a specific task in the laboratory.

Programme content

Lecture: Characteristics of the power system. Characteristics of the electricity generation process in various types of power plants. Calculation of the efficiency of indirect energy transformations in conventional power plants. Basics of energy transformation in nuclear power plants. Replacement diagrams of elements of the power system. Principles of calculating power flow, voltage drops and power losses in simple network systems.

The content of the exercises is consistent with the topic of the lecture and includes: calculation of thermal circuits of steam power plants, calculations regarding combustion processes in the boiler as well as current flows and voltage drops in power networks.

Laboratory: Parallel compensation in MV, current distribution at one-sided power supply, photovoltaic module testing, testing the energy characteristics of the windmill model, measuring the energy characteristics of the hydroelectric power plant model.

Teaching methods

Lecture: multimedia presentation supplemented with examples given on the board

Exercises: calculating tasks at the board

Laboratories: performing tests on physical or digital models

Bibliography

Basic

1. Pawlik M., Strzelczyk F.: Elektrownie, WNT W-wa 2012, 2017

2. Kujszczyk Sz. (pod red.): Elektroenergetyczne układy przesyłowe, WNT, Warszawa, 1997

3. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa 2002

Additional

1. Chmielniak T.: Technologie energetyczne, WNT W-wa 2014

2. Marecki J.: Podstawy przemian energetycznych, WNT W-wa 2014

3. Lewandowski W. M.: Proekologiczne źródła energii odnawialnej, WNT, W-wa 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	92	3
Classes requiring direct contact with the teacher	53	2
Student's own work (literature studies, preparation for laboratory classes, preparation for tests)[1]	39	1

[1] delete or add other activities as appropriate