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

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)

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:

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.

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 issues related to fuel combustion.

Course-related learning outcomes

Knowledge

1. Has general knowledge about the construction of the power system and understands the processes of generation of electricity.

2. Has basic knowledge in the field of energy conversion in various types of power plants, including in particular conventional power plants.

Skills

1. Student can evaluate electricity generation technologies in terms of their efficiency and environmental impact. He can classify electricity generation technologies and analyze the efficiency of energy changes taking place in various types of generation sources.

2. Student can test and diagnose simple energy systems and devices.

Social competences

Student 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: written test during the last lecture

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

Laboratories:

- assessment of knowledge and skills related to the implementation of the laboratory exercise (current message control, polling, quizzes),

- individual reports on selected laboratory exercises.

Programme content

Lectures: Characteristics of the power system. Operation of a power plant in the power system. Characteristics of the electricity generation process in various types of power plants. Combustion of solid fuels. Calculation of the efficiency of indirect energy transformations in conventional power plants. Thermal cycles of steam power plants - Rankine's cycle. Thermal systems of steam CHP plants.

Exercises: Calculation of heat cycles and operating parameters of steam power plants. Methods of improving the efficiency of the Rankine's cycle. Calculation of heat cycles and operating parameters of steam CHP plants, operating with the use of backpressure and bleed-condensing heat turbine sets. Calculations related to energy combustion of fuels.

Laboratories: Study of the photovoltaic module. Investigation of the energy characteristics of the windmill model, measurements of the energy characteristics of the hydroelectric power plant model, parameter measurements and quality control of the flow in the system of pumps cooperating with

pipelines, measurements of the parameters of fans cooperating in the ventilation system and quality control of air flow, pressure measurement and testing of manometers.

Teaching methods

Lectures: multimedia presentation

Exercises: calculating tasks at the board

Laboratories: performing tests on physical models

Bibliography

Basic

1.Pawlik M., Strzelczyk F.: Elektrownie, Wydawnictwo Naukowe PWN, Warszawa 2017.

2. Marecki J.: Podstawy przemian energetycznych, Wydawnictwo Naukowo - Techniczne, Warszawa 2014.

Additional

1. Michalak J., Szczerbowski R., Wróblewski R.: Modelowanie i badanie układów energetycznych elektrowni i elektrociepłowni z wykorzystaniem programu Cycle-Tempo®, Konferencja Naukowo-Techniczna Zastosowania Komputerów w Elektrotechnice, XIII ZKwE Poznań 2008.

2. Chmielniak T.: Technologie energetyczne, Wydawnictwo Naukowo - Techniczne, Warszawa 2014.

3. Lewandowski W. M.: Proekologiczne źródła energii odnawialnej, Wydawnictwo Naukowo - Techniczne, Warszawa 2012.

4. Janiczek R.: Eksploatacja elektrowni parowych, Wydawnictwo Naukowo - Techniczne, Warszawa 1992.

5. Spliethoff, Hartmut: Power Generation from Solid Fuels, Heidelberg: Springer-Verlag, Berlin 2010.

Breakdown of average student's workload

	Hours	ECTS
Total workload	86	3
Classes requiring direct contact with the teacher	47	2
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests) [1]	39	1

[1] delete or add other activities as appropriate