COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrical Power Engineering

Course

Field of study
Electrical 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
part-time

Requirements
compulsory

Number of hours

Lecture
20

Laboratory classes
10

Other (e.g. online)

Tutorials
10

Projects/seminars

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:
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Prerequisites

Student has basic knowledge of mathematics, physics and theoretical electrical engineering. Student has the ability to effectively self-educate in a field related to the chosen field of study. Student is aware of the need to expand their competences, and is ready to cooperate as part of a team.

Course objective

Getting to know the physical basics of electricity generation in various types of power plants. Learning about issues related to the combustion of fossil fuels. Getting to know the construction and principles of operation of basic energy devices.

Course-related learning outcomes

Knowledge

1. General knowledge on the construction of the power system and understanding of electricity generation processes.

2. Basic knowledge of energy conversion in various types of power plants, including in particular conventional power plants.

Skills

1. Student is able to evaluate electricity generation technologies in terms of their efficiency and environmental impact.

2. Student is able to test and diagnose simple energy systems and devices.

Social competences

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

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

- written exam

Tutorials

- credit on the basis of the current checking of knowledge and a written test on accounting tasks

Laboratory classes

-assessment of knowledge and skills related to the implementation of the exercise task, assessment of the report on the performed exercise

Programme content

Lecture

Characteristics of the process of generating electricity in a steam power plant. Combustion of solid fuels, stoichiometric calculations. Determination of the efficiency of a power boiler with the direct and indirect method, losses in the boiler. Fundamentals of the theory of heat transfer. Calorific value and heat of combustion of fossil fuels. Energy devices. Construction and operation of heat pumps and fuel cells. Thermal cycles of steam, gas, gas-steam and nuclear power plants. Methods of improving the efficiency of thermal cycles. Technological systems of power plants and heat and power plants.

Tutorials

Energy and stoichiometric calculations of power plant technological systems.

Laboratory classes

Fossil fuel research. Determination of the characteristics of fuel cells. Heat pump research. Study of the heat transfer process.

Teaching methods

Lecture

Lecture with a multimedia presentation supplemented with examples given on the blackboard.

Tutorials

Accounting tasks counted on the blackboard.

Laboratory classes

Laboratory exercises performed on physical workstations.

Bibliography

Basic

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

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

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

4. Skorek J., Kalina J.: Gazowe układy kogeneracyjne. Wydawnictwa Naukowo-Techniczne 2005

5. Wójs K. Odzysk i zagospodarowanie niskotemperaturowego ciepła odpadowego ze spalin wylotowych PWN 2015.

Additional

1. Portacha J., Układy cieplne elektrowni i elektrociepłowni konwencjonalnych jądrowych i odnawialnych, Oficyna Wydawnicza Politechniki Warszawskiej, 2016.

2. Chmielniak, Tadeusz, Ziębik, Andrzej, Obiegi cieplne nadkrytycznych bloków węglowych, Wydawnictwo Politechniki Śląskiej, 2010

3. Anuszczyk J., Maszyny elektryczne w energetyce. WNT 2005

4.Tokarz. T.J. Kontrola procesów cieplnych w siłowniach parowych część I i część II, Wydawnictwo AGH 2015.

5. Ceran B. Wpływ pracy farm wiatrowych w systemie elektroenergetycznym na pracę konwencjonalnego bloku parowego. Przegląd Naukowo-Metodyczny, Edukacja dla Bezpieczeństwa - 2016, nr 1, s. 1161-1168

6. Szczerbowski R. Energetyka węglowa i jądrowa Wybrane aspekty. Wydawnictwo Fundacja na rzecz Czystej Energii. Rok wydania 2017

Breakdown of average student's workload

	Hours	ECTS
Total workload	127	5,0
Classes requiring direct contact with the teacher	42	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	85	3,0

[1] delete or add other activities as appropriate