COURSE DESCRIPTION CARD - SYLLABUS

Course name

Generation of electric energy

Course

Field of study

Electrical Engineering

Year/Semester

1/1

Area of study (specialization)

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

English

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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The Faculty of Environmental Engineering and Energy

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Student starting this course should have a basic knowledge of issues related to the construction of energy devices and energy conversion processes taking place in steam power plants. He should also have the ability to obtain information from the indicated sources and be ready to cooperate as part of the team.

Course objective

Getting to know the technological systems of modern steam, gas and gas-steam power plants. Understanding the structure of the manufacturing sector of the National Energy System and the role of distributed energy, including renewable energy sources, for its operation.

Course-related learning outcomes

Knowledge

1. Student has knowledge of the construction and operation of the power system.

2. Student has knowledge of increasing the energy efficiency of the process of converting primary energy into electricity.

3. Student has knowledge of conventional and unconventional electricity production technologies

Skills

1. Student is able to model the technological system of a steam, gas, gas and steam power plant and conduct its energy analysis

2. Student is able to carry out energy analyzes of selected distributed technologies

Social competences

1. Student is aware of the need to develop professional achievements and observe the rules of professional ethics, fulfill social obligations, inspire and organize activities for the benefit of the social environment

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

- evaluation of the knowledge and skills listed on the written exam,

Laboratory classes

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

Programme content

Lecture

The national energy system, taking into account the role of distributed energy, including renewable energy sources. Characteristics of local cogeneration systems. The role of distributed energy on the domestic energy market. Indicators characterizing the work of generation sources. Technological systems of steam, gas, gas-steam and nuclear power plants. Optimization of the work of the energy system, criteria and methods of implementing optimization assumptions. Working conditions of various types of generating sources in the power system.

Laboratory classes

Modeling and analysis of the power unit operation. Investigation of the influence of the parameters of the working medium on the efficiency of the electricity generation process. Energy analyzes of gas and

gas-steam power plants. Modeling of technological systems of steam, gas, gas and steam CHP plants. Energy analyzes of distributed generation sources.

Teaching methods

Lecture

- lecture with multimedia presentation supplemented with examples given on the board.

Laboratory classes

- laboratory exercises performed with the help of engineering programs

Bibliography

Basic

1. D. Laudyn, M. Pawlik, F. Strzelczyk: Elektrownie, WNT W-wa 2000

2. W. Szuman: Maszyny i urządzenia energetyczne, WSiP W-wa 1985

3. J. Paska: Wytwarzanie rozproszone energii elektrycznej i ciepła, Oficyna Wydawnicza Politechniki Warszawskiej. 2010

4. Poradnik Inżyniera Elektryka . t.3. WN-T, Warszawa 2011

5. Kowalska A., Wilczyński A., Źródła rozproszone w systemie elektroenergetycznym. Kaprint. 2007

6. Matla R., Gładyś H., Praca elektrowni w systemie elektroenergetycznym. WNT. 1999

Additional

1. Radosław Szczerbowski - Strategia zrównoważonego rozwoju a sektor wytwarzania energii w Polsce Energetyka - 2018, nr 7, s. 384-388

2. Radosław Szczerbowski - Wpływ Energiewende i polityki energetycznej krajów UE na polski sektor energii Elektro Info - 2018, nr 12, s. 86-90

3. 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

Breakdown of average student's workload

	Hours	ECTS
Total workload	98	4,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for laboratory classes, preparation for exam) [1]	38	1,5

[1] delete or add other activities as appropriate