



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Generation of electric energy

Course

Field of study

Electrical Engineering

Area of study (specialization)

Electric Power Systems

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

15

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

Student has a basic knowledge of the basics of energy conversion and energy machine and equipment. He knows the basics of electrical engineering and power engineering. Understand the basic principles of operation of the machines and know the basic construction of conventional energy equipment. Student is aware of the need to expand their skills and readiness to work together as a team.

Course objective

Obtaining skills in the knowledge of methods of generating electricity in power plants and knowledge of the principles of the use of different types of primary energy to produce electricity.



Course-related learning outcomes

Knowledge

1. Student knows the primary form of energy available in nature and presents the possibility of their use in the energy sector. Able to classify and evaluate the types of power plants. Able to identify and assess the impact of generation sources on the environment.
2. Student has an extended knowledge of the structure and operation of various types of power plants and their role in the power system.

Skills

1. Student is able to use mathematical methods to energy analysis of technological systems of power plants.
2. Student can design a basic technological systems of power plant and CHP power plants, and evaluate them in terms of the efficiency of electricity and heat.

Social competences

1. Student understand the complexity of many aspects of electrical engineering and can present them in an understandable way

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.

Projects

- assessment of knowledge and skills related to the implementation of the project task, assessment of the completed project.

Programme content

Lecture

Characteristic of national power plants. Influence of diurnal variation on the work load power plants. Generation of electricity in thermal power plants. Methods of improve the efficiency of steam power plants. Gas and combined gas-steam power plants. Combined heat and power. Use of nuclear energy for producing electricity. Types of nuclear reactors used in nuclear power plants. The use of water power to generate electricity. Types of hydroelectric power plants and their role in the power system. Principles for the use of wind energy. Power plants and wind farms. The use of solar energy. Photovoltaics. Methods of use of geothermal energy. Electricity generation using fuel cells. Distributed generation and



its impact on power system operation. The influence of the environment and methods of its reduction. Laboratory classes

Laboratory classes

Modeling and analysis of work states of selected technologies of electric energy production.

Projects

Design task - selecting a distributed source for a recipient with a specific energy profile.

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

Projects

- independent solution of a project-related problem in the field of work and operation of various types of generation sources.

Bibliography

Basic

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9. Chmielniak, Tadeusz, Ziębk, Andrzej, Obiegi ciepłne nadkrytycznych bloków węglowych, Wydawnictwo Politechniki Śląskiej, 2010.
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15. Lewandowski W., Klugmann-Radziemska E., Proekologiczne odnawialne źródła energii : kompendium, Wydawnictwo Naukowe PWN, 2017.

Additional

1. Michałowski S., Plutecki J., Energetyka wodna. WNT. 1975
2. Legutko S.; Podstawy eksploatacji maszyn, Wyd. Politechniki Poznańskiej, Poznań 2002
3. Zdzisław Celiński, Energetyka jądrowa, PWN, Warszawa 1991
4. Szargut J., Ziębik A.: Skojarzone wytwarzanie ciepła i elektryczności - elektrociepłownie. Wydawnictwo Pracowni Komputerowej Jacka Skalmierskiego 2007.
5. Paska J., Rozproszone źródła energii, Oficyna Wydawnicza Politechniki Warszawskiej, 2017.
6. Mokrzycki E., Gawlik L., (red. nauk.) Rozproszone zasoby energii w systemie elektroenergetycznym, Wydawnictwo IGSMiE PAN, 2011.

Breakdown of average student's workload

	Hours	ECTS
Total workload	130	5,0
Classes requiring direct contact with the teacher	70	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	60	2

¹ delete or add other activities as appropriate