COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electric power systems and energy management

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

Other (e.g. online)

Tutorials

0

Projects/seminars

15

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

1. Student has basic knowledge of electrical engineering, technology, energy machines and thermodynamics. Student has basic knowledge of economics.

2. Student has ability to use mathematics and computer methods to carry out simple simulation calculations. Student has ability to use economic knowledge in practice.

3. Student is aware of the need to expand their competences and the ability to work in a team.

Course objective

To acquaint students with the general principles and conditions of the energy economy in its technical,

economic and legal aspects. Ability to assess the energy situation of the world and Poland. Understand the principles of operation of the energy market; evaluation of the energy consumption of the production process. Presentation of general principles of rational energy management. Combining knowledge in the field of energy and enterprise economics.

Course-related learning outcomes

Knowledge

1. Student has a basic and structured knowledge of electricity distribution systems

2. Student has knowledge of the role and importance of energy in the country's economy, the size of energy resources and ways of using them, taking into account the production structure of the energy system. Learns the characteristics of various energy sectors: power system and heating

3. Student knows the structure of the national energy system and subsystems, knows the principles of rational energy management in the processes of energy conversion.

Skills

1. Student is able to estimate the demand for electricity

2. Student is able to balance various energy objects in accordance with the principles of rational energy use

3. Student has the ability to solve practical problems in the energy economy

Social competences

1. Student is aware of the responsibility for jointly performed tasks.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture

-assessment of knowledge and skills demonstrated in a problem-based or test written exam, continuous assessment during each class (rewarding activity and quality of perception)

Projects

- implementation of a project task - team project, evaluation for project implementation and a prepared and presented presentation

Programme content

Lecture

Rationalization of energy use. Material and energy balances. General information on the role and significance of energy in the country's economy, the size of energy resources and ways of using them, including the production structure of the national energy system. The national energy system and its subsystems: solid fuels, liquid fuels, gas, electricity, heat. Ecological threats in the processes of obtaining

and converting energy and methods of counteracting ecological threats to the energy sector. Rules for the use of waste energy. Energy market segments: fuels, electricity, heat. Legal regulations in energy trading. Institution of the regulator. Electricity exchange. Energy auditing issues.

Projects

Selected design issue from the following issues: Forecasting domestic energy demand and prices of fuels and energy carriers. Economic conditions for the construction and operation of energy sources. Investment effectiveness indicators. Energy recovery and use of waste energy. Calculation of fuel savings obtained by using solutions that increase conversion and energy efficiency. Balancing and calculation of technical, operational and economic indicators of various energy facilities: conventional and nuclear steam thermal power plants, combined heat and power plants, power plants with gas turbines, small decentralized systems, including combined ones, heating plants, as well as electricity, heat and gas transmission systems.

Teaching methods

Lecture

Lecture with multimedia presentation supplemented with examples given on the board.

Projects

Solving a design task

Bibliography

Basic

1. Mejro C., Podstawy gospodarki energetycznej, WNT, 1980

2. Niedziółka D., Rynek energii w Polsce, Difin, 2010

3. Soliński I., Ekonomika i organizacja sektorów systemu paliwowo-energetycznego. Uczelniane Wydawnictwa Naukowo Dydaktyczne, 2000

4. Soliński J. Sektor energii świata i Polski : początki, rozwój, stan obecny. Instytut Gospodarki Surowcami Mineralnymi i Energią PAN - Wydawnictwo, 2012.

5. Górzyński J., Audyting energetyczny. NAPE S.A. 2002

6. Laudyn D., Rachunek ekonomiczny w elektroenergetyce, Oficyna Wydawnicza Politechniki Warszawskiej, 1997

7. Górzyński J., Urbaniec K., Wytwarzanie i użytkowanie energii w przemyśle. Oficyna Wydawnicza PW, 2000

8. Charun H., Podstawy gospodarki energetycznej (t1-3). Wydawnictwo Uczelniane Politechniki Koszalińskiej. 2007

9. Ziębik A., Szargut J., Podstawy gospodarki energetycznej, Wyd. Politechniki Śląskiej, 1997

10. Góralczyk I. Tytko R., Racjonalna gospodarka energią, Wydawnictwo: Towarzystwo Słowaków w Polsce, 2013

Additional

1. Szargut J., Ziebik A., Podstawy energetyki cieplnej, PWN

2. Kuciński K., Energia w czasach kryzysu, DIFIN, 2006

3. Markiewicz H.: Urządzenia elektroenergetyczne, WNT, Warszawa, 2001

4. Góra S., Gospodarka elektroenergetyczna, Wydawnictwo Uczelniane politechniki Poznańskiej, 1973

5. Pawlęga A. Rachunek ekonomiczny w elektroenergetyce. Oficyna Wydawnicza Politechniki Warszawskiej, 2011

6. Janusz P., Szczerbowski R., Zaleski P, Istotne aspekty bezpieczeństwa energetycznego Polski, Warszawa, Polska : Texter, 2017

7. Szczerbowski R. Bezpieczeństwo energetyczne Polski – mix energetyczny i efektywność energetyczna. Polityka Energetyczna – Energy Policy Journal 2013;16(4):35–47

Breakdown of average student's workload

	Hours	ECTS
Total workload	52	2,0
Classes requiring direct contact with the teacher	32	1,0
Student's own work (literature studies, preparation for exam, project preparation) [1]	20	1,0

[1] delete or add other activities as appropriate