COURSE DESCRIPTION CARD - SYLLABUS

Course name
Major problems of the modern power industry [S2EJ1>KPWE]

Course

Field of study
Nuclear Power Engineering

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Knowledge: The student has basic information about the operation of energy systems based on fossil fuels, nuclear energy and renewable energy sources. Skills: The student is able to analyze scientific information on energy systems and formulate conclusions. Social competencies: The student understands the need to improve his knowledge.

Course objective

The purpose of the course is to acqured students with theoretical knowledge of problems related to the functioning of energy systems and methods of its practical application in solving scientific problems related to energy.

Course-related learning outcomes

Knowledge:
1. The student knows the design of energy systems based on fossil fuels, nuclear energy and renewable energy.
2. The student knows the operation of the function of energy markets.
3. The student has knowledge of the risks of use of fossil fuels, nuclear energy and renewable energy

sources in energy systems.

Skills:
1. The student is able to determine the technical parameters affecting the price of energy.
2. The student is able to conduct an analysis of the operation of the energy system powered by various energy sources and identify the risks of its operation.
3. The student is able to analyze the impact of the sources of energy in power system on society and the environment.

Social competences:
1. The student understands the need to systematically improve and expand his knowledge and skills.
2. The student is aware of the need for social dialogue on issues related to the impact of energy on the environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures
The knowledge acquired in the lecture is verified in a written exam consisting of 5 open questions scored from 0 to 2 points. Passing level: >50% of the points

Programme content

Lectures
The main assumptions of the energy policy of Poland and the European Union until 2050, Electricity market, characteristics of energy producers, renewable energy sources, integration of RES systems with conventional energetics, Methods of storage of electricity and heat, alternative fuels (hydrogen, ammonia, biomass), Nuclear power plants as energy supply stabilization systems, energy price formation mechanisms.

Course topics

1. Overview of the assumptions of Poland's Energy Policy
2. European energy and climate policy (Green Deal, Fit for 55)
3. Characteristics of the energy market (market participants, energy commodity exchange, etc.)
4. Electricity price formation
5. Polish energy mix, the role of nuclear energy
6. Alternative fuels in energy production
7. Renewable energy sources and their integration into the energy system
8. Overview of the Power to X technology chain

Teaching methods

Lecture delivered remotely using synchronous access methods.
Lectures: multimedia presentation (including drawings, photos, animations).

Bibliography

Basic:
1. T. Chmielniak: Technologie Energetyczne, WNT, 2008
2. E. Klugmann-Radziemska: Energetyka i ochrona środowiska generowanie i magazynowanie energii. Odpady energetyczne. Analiza cyklu życia, WNT, 2023
3. M. Popkiewicz: Zrozumieć transformację eneregtyczną: od depresji do wizji, 2022.

Additional:
1. P.Kwiatkiewicz, R. Szczerbowski: Energetyka-bezpieczeństwo w wyzwaniach badawczych, 2017
2. M. Popkiewicz.: Rewolucja energetycza: Ale po co?, 2015
3. Rynek energii - journal

Breakdown of average student's workload

	Hours	ECTS
Total workload	28	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	13	0,50