COURSE DESCRIPTION CARD - SYLLABUS

Course name

Nuclear power plants

Course

Field of study

Electrical Engineering

Year/Semester

2/3

Area of study (specialization)

Electric Power Systems

Profile of study

general academic

Level of study

Second-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Środowiska i Energetyki

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

The student has basic knowledge in the field of physics, nuclear chemistry, basics of thermal energy and operation of power plants. Is able to solve mass and energy equations in power plant thermal cycles. Is aware of the need to expand their competences, readiness to cooperate within a team.

Course objective

Understanding the basic types of nuclear reactors. Familiarization with their construction, concept and thermal systems. Addressing issues related to the security of nuclear power plants. Understanding development trends in nuclear energy.

Course-related learning outcomes

Knowledge

1. The student understands the essence of phenomena occurring in nuclear reactors and the technological process implemented in nuclear power plants, understands the impact of energy transformation processes occurring in nuclear power plants on the natural environment.
2. The student has the knowledge to analyze the technological systems of nuclear power plants and assess the importance of nuclear power safety.

Skills

1. The student is able to integrate knowledge in the field of electrical engineering, electronics, computer science, automation and other disciplines to assess the role, tasks and other non-technical aspects (including economic and legal) of nuclear power plants in the power system.

Social competences

1. Understands the need to formulate and provide the public with reliable information and opinions on nuclear energy, presenting different points of view.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:Assessment of knowledge and skills takes place at the written colloquium on the 13th lecture. The colloquium consists of 10 open questions, with various points. The minimum passing threshold is 51%.

Programme content

The state of development of nuclear energy in the world. Classification of nuclear reactors. Generations of energy nuclear reactors. Basic types of nuclear reactors and their safety features. Construction, concept and technological systems of basic nuclear reactors, construction of fuel elements and core. Operation parameters of reactors. Auxiliary devices and systems. Problems of nuclear power security - the importance of nuclear power plant safety and the security of all nuclear power. Development trends in nuclear energy.

Teaching methods

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

Bibliography

Basic

1. Celiński Z., Strupczewski A., Podstawy energetyki jądrowej, WNT, Warszawa 1984
2. Kiełkiewicz M., Jądrowe reaktory energetyczne, WNT, Warszawa 1978
3. Kubowski J., Nowoczesne elektrownie jądrowe, WNT, Warszawa 2010
4. Celiński Z., Energetyka jądrowa, PWN, Warszawa 1991
5. Kubowski J., Elektrownie jądrowe, WNT, 2014

Additional

1. Ackermann G., Eksploatacja elektrowni jądrowych, WNT, Warszawa 1987
2. Glasstone S., Podstawy techniki reaktorów jądrowych, WNT, Warszawa 1958
3. Kiełkiewicz M., Teoria reaktorów jądrowych, WNT, Warszawa 1987
4. Kiełkiewicz M., Podstawy fizyki reaktorów jądrowych. Cz. 1, Wydawnictwa Politechniki Warszawskiej, Warszawa 1977
5. Kiełkiewicz M., Podstawy fizyki reaktorów jądrowych. Cz. 2, Wydawnictwa Politechniki Warszawskiej, Warszawa 1980
6. Młynarski T., Energetyka jądrowa wobec globalnych wyzwań bezpieczeństwa energetycznego i reżimu nieproliferacji w erze zmian klimatu, Wydawnictwo Uniwersytetu Jagiellońskiego, Kraków 2016
7. Jezierski G., Energia jądrowa wczoraj i dziś, WNT, Warszawa 2005
8. Hrynkiewicz A., Energia wyzwanie XXI wieku, Wydawnictwo Uniwersytetu Jagiellońskiego, Kraków 2002

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1
Classes requiring direct contact with the teacher	20	1
Student's own work (literature studies, preparation for tests) [1]	10	1

[1] delete or add other activities as appropriate