COURSE DESCRIPTION CARD - SYLLABUS

Course name

Nuclear Power Engineering

Course

Field of study

Power Engineering

Year/Semester

1/2

Area of study (specialization)

-

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 of physics, chemistry, basics of power engineering and basics of thermal power plants. Student is able to solve mass and energy balance equations in simple thermal power plant's cycle. 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 new trends in nuclear energy.

Course-related learning outcomes

Knowledge

1. Student understands the essence of phenomena occurring in nuclear reactors and the technological process implemented in nuclear power plants.
2. Student has basic knowledge about the construction of nuclear reactors and knows the basic technical solutions that guarantee safe operation of a nuclear power plant.
3. Knows and understands the impact of energy transformation processes in a nuclear power plant on the natural environment.

Skills

1. Student is able to perform thermal calculations for thermal and fast reactors.
2. Is able to make economic analysis and assess the costs associated with the construction and operation of nuclear electronics.

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:

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