POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
History of nuclear power engineering [S2EJ1>HEJ]

Course

Field of study
Nuclear Power Engineering

Year/Semester
1/1

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

prof. dr hab. inż. Janusz Wojtkowiak
janusz.wojtkowiak@put.poznan.pl

Lecturers

Prerequisites

Knowledge of the basics of nuclear energy. Ability to use information collected in conventional and electronic sources. Ability to critically analyze and evaluate literature data..

Course objective

Acquiring knowledge about the history of nuclear energy (NPP), in particular the discoveries of nuclear physics and chemistry and key events having a significant impact on the development of nuclear energy in the world and the lack of development in Poland.

Course-related learning outcomes

Knowledge:
1. The student knows the discoveries of nuclear physics and chemistry that constitute the basis for the development of nuclear power plants.
2. The student has knowledge about the first practical applications of nuclear energy.
3. The student knows the history of the creation and development of the first nuclear power reactors.
4. The student knows the origins of subsequent generations of nuclear power plants.
5. The student has basic knowledge about ship nuclear propulsion systems.

6. The student knows and understands the similarities and differences between civilian and military applications of nuclear energy.
7. The student has knowledge about plans to build nuclear power plants in Poland and knows the reasons for their failure.

Skills:
1. The student is able to indicate and justify the importance of discoveries in basic sciences for the development of nuclear power plants.
2. The student is able to present the place and time of construction of the first NPP facilities in the world.
3. The student sees and is able to justify the relationship between subsequent generations of nuclear power plants and key accidents of nuclear power plants.
4. The student is able to indicate the connections between conventional and military applications of nuclear energy.
5. The student is able to identify and describe the reasons for the lack of development of NPP in Poland.

Social competences:
1. The student understands the need to exchange views and discuss issues related to the history of nuclear energy.
2. The student understands the need to systematically deepen and expand his knowledge and skills.
3. The student is aware of the need for social dialogue in matters related to the history of nuclear energy.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures
40-minute written assessment during the last class of the semester. The assessment is intended to test the student's knowledge and involves answering 4 questions. The list of questions is made available to students at the beginning of the semester. In doubtful cases, the assessment is extended to include an oral part. Students' activity is assessed during each lecture.
The condition for obtaining credits from lectures is to obtain at least 50% of the maximum number of points of 20. Grading scale: 0-9 points = 2.0; 10-12 points = 3.0; 13-14 points = 3.5; 15-16 points = 4.0; 17-18 points = 4.5; 19-20 points = 5.0.

Programme content

The module program covers the following topics:
1. the beginnings of the modern atomistic theory of matter,
2. design and development of nuclear power reactors,
3. types and generations of nuclear power plants (NPP),
4. propulsion nuclear reactors,
5. key events in the history of nuclear energy,
6. prospects for small modular reactors (SMRs),
7. history of NPP construction in Poland.

Course topics

The lecture program covers the following topics:
1. discovery of uranium,
2. discovery of natural radioactivity,
3. equivalence of mass and energy,
4. the first artificial nuclear reaction,
5. first nuclear reactor,
6. first demonstration nuclear power plant (NPP),
7. the first commercial NPP,
8. first power reactors (GCR, PWR, BWR, CANDU),
9. propulsion reactors (ships),
10. WASH-1400 report,

11. TMI NPP accident,
12. Chernobyl NPP accident,
13. Fukushima NPP accident,
14. current status of NPP in the world and expected changes.

Teaching methods

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

Bibliography

Basic:
1. Dobrzyński L. (Red.): Zarys nukleoniki. PWN, W-wa 2017.
2. Kubowski J. Elektrownie Jądrowe. WNT, W-wa 2019
3. PPEJ. Uchwała nr 141 Rady Ministrów z dn. 2 października 2020 r. w sprawie aktualizacji programu wieloletniego pod nazwą „Program polskiej energetyki jądrowej", Monitor Polski, Warszawa, dn. 16 października 2020 r., poz. 946. Załącznik: Rozdział 2.

Additional:
3. Murray R.L., Nuclear Energy (6th Ed.), Elsevier, Amsterdam 2009..

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	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)	15	0,50