COURSE DESCRIPTION CARD - SYLLABUS

Course name

Nuclear Power

Course

Field of study

Technical Physics

Year/Semester

3/5

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

elective

Number of hours

Lecture

20

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Materiałowej i Fizyki

Technicznej

Instytut Badań Materiałowych i Inżynierii

Kwantowej

Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

Knowledge of physics, chemistry and mathematics (program basis for high schools, standard level).

Skills in solving problems in physics based on the knowledge possessed, ability to extract information from the recommended sources.

Understanding of the necessity of extending one’s competences, readiness to cooperate within a team.

Course objective

1. Transfer of fundamental knowledge in nuclear physics, within the range defined by the program relevant for the field of study.

2. Development of skills in solving elementary problems and performing simple experiments, as well as the analysis of results obtained, based on the knowledge possessed.

3. Development of skills in self-study and team work.

Course-related learning outcomes

Knowledge

1. Student has knowledge in the field of physics, including mechanics, thermodynamics, atomic and nuclear physics and solid state physics, including knowledge necessary to understand the basic physical phenomena occurring in the field of nuclear energy.

2. Student has basic knowledge in the field of nuclear energy including construction of nuclear reactors, mechanisms of nuclear reaction, nuclear power plant failure, calculation methods of reactor physics.

Skills

1. Student can acquire information from literature, databases and other sources; can integrate the obtained information, make their interpretation, as well as apply and formulate and justify opinions.

2. Student can prepare and present a brief presentation of the results of the engineering task.

3. Student has the ability to self-education, among others to improve professional skills.

Social competences

1. Student can get actively involved in solving problems stated, develop and extend his (her) competences unaided.

2. Student can cooperate within a team, fulfill the duties resulting from division of team work, show responsibility for his (her) own work and joint responsibility for the results of team work.

3. Student is aware of the importance and understands the non-technical aspects and effects of the engineer-energy industry, including its impact on the environment, and the related responsibility for decisions.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge:

Lecture: written exam from selected issues in nuclear physics.

Evaluation criteria:

less than 50% - 2.0

50.1%-60.0% - 3.0

60.1%-70.0% - 3.5

70.1%-80.0% - 4.0

80.1%-90.0% - 4.5

from 90.1% - 5.0

Programme content

1. Structure and properties of the atomic nucleus.

2. Nuclear models.

3. Radioactivity - Alpha, Beta, and Gamma Decay.

4. Nuclear reactions.

5. Nuclear fission.

6. Principles of operation of a nuclear reactor.

7. Overview of reactor types.

8. Nuclear reactor failures.

9. Fundamentals of nuclear fusion

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given in the presentation.

Bibliography

Basic

1. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki, tom 5,Wydawnictwo Naukowe PWN, Warszawa 2006

2. T.Mayer-Kuckuk, Fizyka jądrowa, Wydawnictwo Naukowe PWN, Warszawa 1987

3. E.Skrzypczak, Z.Szefliński, Wstęp do fizyki jądra atomowego i cząstek elementarnych, Wydawnictwo Naukowe PWN, Warszawa 2002

4. P.Tipler, R.Llewellyn, Fizyka współczesna, Wydawnictwo Naukowe PWN, Warszawa 2011

Additional

1. R.Eisberg, R.Resnick, Fizyka kwantowa, Wydawnictwo Naukowe PWN, Warszawa 1983

2. M.Kiełkiewicz, Podstawy fizyki reaktorów jądrowych, WPW

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	3,0
Classes requiring direct contact with the teacher	30	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate