University of Gdańsk

Subject card

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| Subject name and code | Nuclear Energetics and Reactor Processes, PG_00204573 | | | | | | |
| Field of study | Nuclear safety and radiological protection | | | | | | |
| Date of commencement of studies | October 2026 | | Academic year of realisation of subject | 2028/2029 | | | |
| Education level | Bachelor's studies | | Subject group | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study | | | |
| Mode of study | full-time studies | | Mode of delivery | at the university | | | |
| Year of study | 3 | | Language of instruction | Polish | | | |
| Semester of study | 5 | | ECTS credits | 2.0 | | | |
| Learning profile | academic | | Assessment form | exam | | | |
| Conducting unit | Laboratory of Environmental Analytics and Radiochemistry -> Department of Environmental Chemistry and Radiochemistry -> Faculty of Chemistry -> Rector | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | prof. dr hab. Bogdan Skwarzec | | | | |
| | Teachers | | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | Self-study | SUM | |
| | Number of study hours | 30 | | 0.0 | 30.0 | 60 | |
| Subject objectives | familiarizing students with all issues mentioned in the lecture program content | | | | | | |

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [BJORL3_W06] Knows advanced computational methods used to solve typical problems in radiological protection and nuclear safety. | knows the basic computational methods used to solve typical problems in the field of radiological protection and nuclear safety | [SW4] test/exam - oral or written<br>[SW1] oral statement/ conversation/discussion |
| [BJORL3_W07] Has advanced knowledge of the construction and principles of operation of scientific apparatus used in radiological protection and nuclear safety. | knows the structure and basic principles of operation of scientific equipment used in radiological protection and aimed at ensuring nuclear safety | [SW4] test/exam - oral or written<br>[SW1] oral statement/ conversation/discussion |
| [BJORL3_U04] Can use mathematical and computer apparatus to analyze and solve problems in radiological protection and nuclear safety. | can use mathematical apparatus to analyze and solve problems in the field of radiological protection and nuclear safety | [SU1] oral statement/conversation/ discussion<br>[SU4] test/exam - oral or written |
| [BJORL3_U07] Knows how to present in an accessible way the latest developments in radiological protection and nuclear safety and can analyze their legal aspects. | can present the latest achievements in the field of radiological protection and nuclear safety | [SU1] oral statement/conversation/ discussion<br>[SU4] test/exam - oral or written |
| [BJORL3_K05] Is ready to initiate activities for the public interest and to popularise radiological protection and nuclear safety. | understands the need to popularize knowledge of radiological protection and nuclear safety | [SK1] oral statement/conversation/ discussion<br>[SK4] test/exam - oral or written |
| [BJORL3_K06] Is ready to perform the professional role in a competent and responsible manner and to adhere to the principles of professional ethics. | is aware of compliance with the principles of professional ethics | [SK1] oral statement/conversation/ discussion<br>[SK4] test/exam - oral or written |
| [BJORL3_W05] Has advanced knowledge of the elementary components of matter and the types of fundamental interactions between them, the manifestations of these interactions in phenomena occurring at scales ranging from subatomic to subatomic, knows the time and energy scales associated with these phenomena. | has knowledge of the elementary components of matter, knows the basics of biology and ecology in terms of understanding the biological and ecological aspects of nuclear safety and radiological protection | [SW4] test/exam - oral or written<br>[SW1] oral statement/ conversation/discussion |
| [BJORL3_W01] Has a detailed knowledge of the basic concepts and principles of nuclear physics and chemistry, understands their historical development and their importance not only for nuclear safety and radiation protection, but also for understanding the modern world. | has general knowledge of nuclear physics and chemistry and understands the importance of nuclear safety and radiological protection, has basic knowledge of biology and ecology | [SW4] test/exam - oral or written<br>[SW1] oral statement/ conversation/discussion |
| [BJORL3_W09] Has general knowledge of the legal and ethical considerations associated with professional activities. | has basic legal knowledge related to professional activity | [SW4] test/exam - oral or written<br>[SW1] oral statement/ conversation/discussion |
| [BJORL3_K01] Is prepared to critically evaluate own actions, recognizes the limitations of own knowledge, and understands the need for further education. | understands the need for further education | [SK1] oral statement/conversation/ discussion<br>[SK4] test/exam - oral or written |
| [BJORL3_U03] Is able to use the formalism of physics and chemistry to describe phenomena in the microworld. | can use the laws of physics and chemistry to describe phenomena in the microworld | [SU1] oral statement/conversation/ discussion<br>[SU4] test/exam - oral or written |

**Subject contents**

nuclear energy in the world, nuclear reactors, their structure and types, reactor processes in nuclear reactors, reactor accidents and the safety of nuclear power plants, radioactive waste from nuclear power plants, thermonuclear fusion, nuclear energy compared to other methods of obtaining energy, prospects for the development of nuclear energy.

**Prerequisites and co-requisites**

passed subjects in environmental radiochemistry and radiological protection as well as nuclear chemistry

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| written exam | 51.0% | 100.0% |

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| Recommended reading | Basic literature | Z.Celiński, Nuclear energy, PWN, Warsaw (1991), Nuclear energy and society, PWN, Warsaw (1992)<br>W. Szymański, Nuclear chemistry, PWN, Warsaw 1996.<br>Sobkowski and M. Jelińska-Kaźmierczuk, Nuclear chemistry, Adamantan Publishing House, Warsaw 2006<br>B. Skwarzec, Environmental radiochemistry, University of Gdańsk Publishing House, 2021, ISBN 978-83-8206-111-6 |
| | Supplementary literature | not applicable |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | What is a fission reaction?<br>Describe the structure of a nuclear reactor<br>Describe the processes of nuclear fuel enrichment | |
| Work placement | Not applicable | |

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