



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Elementy chemii radiacyjnej

		Course
Field of study		Year/Semester
Technologia chemiczna (Chemical Technology)		4/8
Area of study (specialization)		Profile of study
-		general academic
Level of study		Course offered in
First-cycle studies		Polish
Form of study		Requirements
part-time		elective

		Number of hours
Lecture	Laboratory classes	Other (e.g. online)
20	0	0
Tutorials	Projects/seminars	
0	0	
<b>Number of credit points</b>		
2		

		Lecturers
Responsible for the course/lecturer:		Responsible for the course/lecturer:
dr inż. Aleksandra Grząbka-Zasadzińska		

**Prerequisites**

Knowledge of issues related to the basics of nuclear physics. Knowledge of the structure of the atom, atomic nucleus.

Ability to obtain information from literature, databases, other properly selected sources.

Understanding the need for training and improving one's professional competences and the significance of the effects of engineering activities.

### Course objective

Obtaining knowledge on modern nuclear chemistry, from the discovery of radioactivity to nuclear reactions, along with isotope methods used in chemistry, biology, medicine and industry.

### Course-related learning outcomes

Knowledge

K\_W02 has the necessary knowledge of physics to understand the theory, phenomena and physical processes

K\_W03 has the necessary knowledge of chemistry to understand chemical phenomena and processes



K\_W06 knows the necessary principles of operation of control and measurement systems and electronic control systems used in chemical technology

K\_W09 has the necessary knowledge of both natural and synthetic raw materials, products and processes used in chemical technology, as well as the directions of development of the chemical industry in the country and in the world

#### Skills

K\_U01 can obtain information from literature, databases and other sources related to closed-loop technologies, also in a foreign language, integrate them, interpret them, draw conclusions and formulate opinions

K\_U04 has the ability to self-educate, can use source information in Polish and a foreign language in accordance with the principles of ethics, reads with understanding, conducts analyzes, syntheses, summaries, critical assessments and correct conclusions

K\_U10 has the preparation and competences necessary to work in an industrial environment and knows the rules of occupational health and safety

K\_U25 assesses the risks associated with the use of chemical products and processes

#### Social competences

K\_K02 is aware of the importance and understanding of non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions

K\_K07 is aware of the social role of a technical university graduate, and especially understands the need to formulate and convey to the society, in particular through the mass media, information and opinions on the achievements of science and other aspects of engineering activities; makes efforts to provide such information and opinions in a generally comprehensible manner

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

1. Rating of written pass

#### Programme content

The interaction of ionizing radiation with matter (alpha, beta, gamma, and neutron radiation).

Natural and artificial radioactive elements. Synthesis of new super-heavy elements.

The law of radioactive disintegration. Radioactive series.

Types of natural radioactive disintegration.

Chemical effects of ionizing radiation.

Dosimetry. Gas, scintillation, and semiconductor detectors.



Fundamentals of radiological protection. The concept of ionizing radiation doses.

The influence of nuclear radiation on living organisms, problems of radiological protection.

Nuclear energy - nuclear reactors, safety problems.

Application of alpha, beta, gamma, and neutron radiation in specific fields.

### Teaching methods

Lectures

### Bibliography

Basic

1. W. Gorączko, Radiological protection, Poznań University of Technology, Poznań, 2011
2. W. Gorączko, Elements of nuclear chemistry, Poznań University of Technology, Poznań 2012
3. J. Sobkowski, M. Jelińska-Kazimierczuk: Nuclear Chemistry, publ. ADAMANTAN 2006
4. A. Czerwiński: Nuclear energy and radioactivity, ed. Krzysztof Pazdro Publishing House 1998

Additional

1. A. Hryniewicz, Man and ionizing radiation, PWN, Warsaw, 2001

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	22	1,0
Student's own work (literature studies, preparation for pass) <sup>1</sup>	28	1,0

<sup>1</sup> delete or add other activities as appropriate