



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Strategies to prevent and reduce emissions [S1TOZ1>SZIOE]

### Course

Field of study

Circular System Technologies

Year/Semester

3/5

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

30

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

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### Lecturers

### Prerequisites

The student knows the rules of circular economy related to chemical production. He/she can also define, explain and characterize raw materials, products and processes used in the chemical industry.

### Course objective

Learning about the algorithms and methods of estimating emissions to air, water and soil and how to reduce and eliminate them in industrial installations both theoretically and practically based on available software.

### Course-related learning outcomes

Knowledge:

1. student is familiar with the principles of environmental protection related to chemical production and management of raw materials, materials and waste in a closed circuit. [k\_w06]
2. student has knowledge of the negative impact of manufacturing and processing technologies on the environment. [k\_w08]
3. student has basic knowledge of the life cycle of products, equipment and installations used in closed-loop technologies. [k\_w12]

#### Skills:

1. student uses in discussion and correctly applies nomenclature and terminology in the field of circular economy, chemistry, chemical technology and engineering, environmental protection and related disciplines, also in a foreign language. [k\_u05]
2. student can take part in a debate, presenting and evaluating opinions on circular economy. [k\_u07]
3. student analyses, verifies existing technical solutions in the field of circular economy. [k\_u11]

#### Social competences:

1. student assesses objectively the level of his/her knowledge and skills, understands the importance of improving professional and personal competences in accordance with changing social conditions and learning progress. [k\_k05]
2. student is aware of the negative impact of human activity on the environment and actively prevents its degradation. [k\_k10]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Assessment of knowledge in the form of a test.

In the case of stationary classes you will take a test in the lecture hall, while in the case of online classes you will take a test using the platform [ekursy.put.poznan.pl](https://ekursy.put.poznan.pl).

### Programme content

Characteristics of technological processes in terms of emissions, causes of emissions, the prioritization of activities in pollution prevention/reduction strategy, chemical safety and exposure assessment based on available models

### Course topics

The lecture discusses issues related to the characteristics of technological processes in terms of emissions, including the characteristics of emissions to air, characteristics of emissions to water, characteristics of waste, heat emission, vibrations, noise, as well as the causes of emissions and factors influencing the nature and scale of emissions in industrial processes. In addition, students will become acquainted with the prioritization of activities in pollution prevention/reduction strategy, chemical safety and exposure assessment based on available models, e.g. ECETOC TRA (European Centre for Ecotoxicology and Toxicology of Chemicals Targeted Risk Assessment Tool), EUSES (European Union System for the Evaluation of Substances). At this stage, comprehensive emission reduction solutions in accordance with the BAT conclusions are considered. At the same time, the concept of potential environmental impact (PEI - Potential Environmental Impact) is discussed during the lecture, indicating the differences from the traditional mass approach with examples of using computer simulations in circular economy.

### Teaching methods

Lecture in the form of multimedia presentations together with a discussion on the issues addressed.

### Bibliography

#### Basic

1. Best Available Techniques (BAT).
2. M.R. Janka Zanieczyszczenia pyłowe i gazowe. Podstawy obliczania i sterowania poziomem emisji, PWN, 2020.

#### Additional

1. Metals in wastes, Edytorzy K. Wieszczycka, B. Tylkowski, K. Staszak, de Gruyter, 2018
2. Appropriate regulations of the Minister of Environment and EU directives.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	37	1,50