



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Environmental engineering

### Course

Field of study

Chemical and process engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr hab. Małgorzata Osińska

malgorzata.osinska@put.poznan.pl

WTCh, ul. Berdychowo 4, 61-131 Poznań

Responsible for the course/lecturer:

### Prerequisites

The student should have background in analytical chemistry. The student should have background in physical chemistry and chemical kinetics. The student should know the basic chemical apparatus.

The student should know and use English. The student should be able to implement self-learning.



Student should understand the need for continuous training and improve his professional and personal competences.

### Course objective

To introduce students to current aspects of environmental protection (air, water and soil) as well as modern methods of pollution prevention and removal, as well as their recycling and disposal. To introduce students to select aspects of engineering projects in the field of waste and waste water disposal.

### Course-related learning outcomes

#### Knowledge

Student knows the principles of environmental engineering related to chemical production and waste management [K\_W08].

Student has general knowledge necessary to understand social, economic, legal and other non-technical conditions of engineering activities [K\_W16].

#### Skills

The student is able to obtain information from literature, databases and other sources related to chemical and process engineering, also in foreign language, integrate, interpret and draw conclusions and form opinions [K\_U01].

The student has the ability to self-study [K\_U05].

Student is able to use the principle of saving raw materials and energy, and through modernization of equipment and processes obtains favorable economic indicators and reduction of environmental load [K\_U14].

#### Social competences

Understands the need for continuous training and improve his professional and personal competences [K\_K01].

The student is aware of the importance and understanding of non-technical aspects and effects of engineering activities, including its impact on the environment and associated responsibility for the decision taken [K\_K02].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures and with written exam about understanding the whole material and the ability to draw conclusions from this knowledge. The exam consists of several open questions.

In the case of on-line classes, the exam will take the form of a test consisting of 10 - 30 test questions

Passing threshold: 51% of the maximum number of points.



### Programme content

The structure and functioning of the ecosystem, global aspects of anthropopressure on the environment, threat to ecological balance, environmental cleanliness, ecological standards. Water and sewage management, sewage sludge management. Equipment and engineering developmnets in theoperation of sewage treatment plants. Types, properties and strategies of waste management in the aspects of environmental nuisance and possibilities of their utilization and neutralization. International waste trading and landfills. soil contamination and remediation. Legal bases of environmental protection in Poland. Environmental pollution and human health.

### Teaching methods

Lecture: multimedia presentation.

### Bibliography

Basic

1. Ł. Karamus, Oczyszczalnie ścieków i ich eksploatacja, WNT, Wydawnictwo KaBe Krosno 2017
2. J. Krystek, Ochrona środowiska dla inżynierów, PWN W-wa 2018.
3. B. Bilitewski, G. Hardtle, K. Marek, Podręcznik gospodarki odpadami, Wydawnictwo Seidel Przywecki W-wa 2003

Additional

- J. Naumczyk, Chemia środowiska, PWN, W-wa 2017.
- A.I. Kowal, M. Świdarska-Bróż, Oczyszczanie wody, PWN W-wa 2007
- D.L. Wise, D.J. Trantolo, E.J. Cichon, H.I. Inyang, U. Stottomeister, Remediation engineering of contaminated soils, Marcel Dekker Inc., NewYork, Basel 2000

### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,2
Student's own work (literature studies, preparation for test) <sup>1</sup>	20	0,8

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