



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Elective subject II (Ecological disasters effects elimination)

### Course

Field of study

Year/Semester

Chemical and process engineering

2/3

Area of study (specialization)

Profile of study

Bioprocesses and biomaterials engineering

general academic

Level of study

Course offered in

Second-cycle studies

Polish

Form of study

Requirements

full-time

elective

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

0

0

Tutorials

Projects/seminars

0

0

### Number of credit points

1

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr inż. Monika Zielińska

### Prerequisites

1. Has general knowledge in the field of ecology and exact sciences (core curriculum for high schools)
2. Is able to use information acquired from books, the Internet and databases
3. Has understanding of the problems of environmental protection at work and the natural environment

### Course objective

Getting to know the causes, course and effects of ecological disasters, elimination of their effects as well as issues of chemical safety and current trends posing a threat to the natural environment.

### Course-related learning outcomes

Knowledge

Student:

1. Has knowledge of environmental protection problems related to the implementation of industrial chemical processes [K\_W09]
2. Has well-established knowledge of process safety and occupational health [K\_W11]



### Skills

#### Student:

1. Can properly use natural resources in industry, guided by the principles of environmental protection and sustainable development [K\_U12]
2. Has the ability to plan a technological venture, including resource analysis, technical design, financial evaluation of the project, environmental impact analysis and marketing [K\_U16]
3. Has the ability to present the forecasted directions of development of the chemical and related industries, taking into account market, technical, formal and legal issues related to environmental protection in sectoral production processes [K\_U17]

### Social competences

#### Student:

1. Understands the need for lifelong learning; is able to inspire and organize the learning process of other people; is aware of the importance and non-technical aspects and effects of engineering activities, including its impact on the environment, and the responsibility for the decisions made [K\_K01]
2. Is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions [K\_K02]

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Forming evaluation:

based on the discussion undertaken by the lecturer during the current lecture.

#### Summary evaluation:

credit in the form of a selection test, with answers, at least one of which is correct; each question is scored on a scale of 0/1.

### Programme content

Natural ecological disasters (earthquakes, landslides, storms, floods, drought, fires). Industrial ecological disasters involving chemicals (examples). Destruction of aggressive chemicals (examples). Incineracja. Global chemical contamination according to UNEP. The state and trends of the natural environment in Europe in the EEA assessment (energy, transport, GHG, ODS, raw materials, waste, hazardous chemicals, air, precipitation, water, soil, climate, agriculture, air, tourism, health).



## Teaching methods

Lectures

## Bibliography

Basic

1. Chemical safety: international reference manual (edited by Mervyn Richardson); Weinheim; New York VCH 1994.
2. Safety assessment for chemical processes Jorg Steinbach, Weinheim; New York VCH 1999.
3. Program zapobiegania awariom i system zarządzania bezpieczeństwem Jerzy S. Michalik, Wojciech Domański

Additional

1. Tworzenie się niebezpiecznych substancji chemicznych podczas poważnych awarii przemysłowych Jerzy S. Michalik, Agnieszka Gajekch

## Breakdown of average student's workload

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 30    | 1,0  |
| Classes requiring direct contact with the teacher   | 15    |      |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup> | 15    |      |

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