



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Hazards of chemical substances and mixtures

### Course

Field of study

Safety Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

Polish

Requirements

elective

### Number of hours

Lecture

10

Laboratory classes

Other (e.g. online)

Tutorials

10

Projects/seminars

8

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

Ph.D., Eng. Adam Górny,

Responsible for the course/lecturer:

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### Prerequisites

The student has a basic knowledge of chemistry, allowing to identify mixtures and chemical substances occurring in the environment of performing professional tasks. The student is aware of the necessity, role and importance of using mixtures and chemical substances in the work environment and the occurrence of related risks.

### Course objective

Achieving skills to ensure proper organization and supervision of the conditions of work in which chemicals are used.

### Course-related learning outcomes

Knowledge



- knows the requirements for the implementation of engineering issues in the field of chemistry and manufacturing technology related to the use of chemicals [P6S\_WG\_01],
- knows the issues related to hazards and their effects, risk assessment in the work environment and occupational accidents and diseases, in particular those related to the use of chemicals [P6S\_WG\_01].

#### Skills

- is able to properly select sources and information derived from them, carry out assessments and critical analyzes and synthesis of information held and, on this basis, formulate conclusions and comprehensively justify the adopted opinions [P6S\_UW\_01],
- is able to conduct a critical analysis of the functioning of any entity and assess existing technical solutions, in particular devices, objects, systems, processes and services related to the use of chemical substances [P6S\_UW\_06],
- is able to present a problem that is within the scope of safety engineering using properly selected means [P6S\_UK\_01],
- is able to identify changes in requirements, standards and regulations caused by technical progress and indicate the need to supplement his knowledge [P6S\_UU\_01].

#### Social competences

- is aware of the knowledge importance in solving problems in the field of security engineering and to ensure of continuous improvement [P6S\_KK\_02],
- is aware of the need to take into account non-technical aspects and effects of engineering activities, including its impact on the environment and the associated responsibility for decisions [P6S\_KK\_03],
- is aware of responsibility for their own work and readiness to submit to the rules of teamwork and responsibility for jointly performed tasks [P6S\_KR\_02].

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

Learning outcomes presented above are verified as follows:

##### Formative assessment:

- in the scope of tutorials: on the basis of reports on independently performed tasks,
- in the scope of project classes: on based the progress of work on the project,
- in the scope of lectures: on the basis of partial tests covering the discussed issues.

##### Summative rating:

- in the scope of tutorials: average grade of partial grades for submitted reports, colloquium to check knowledge,
- in the scope of project classes: assessment of the completed project task,
- in the scope of lecture: partial tests during lectures and a final test in which at least one answer is correct or written answers to open questions; student get a positive result of exam after obtaining at least 51% of the points available.



## Programme content

Lecture: Chemical substances and mixtures as a part of a material working environment. Characteristics of chemical substances and mixtures. Harmful dusts in the work environment. Safety Data Sheets. Classification of chemical substances and mixtures and types of related harmfulness. Criteria for assessing exposure levels. Monitoring of the working environment (including biological monitoring). Guidelines for measuring exposure to hazardous chemical substances and mixtures present in the work environment. Safety assessment and rules for carrying out work with hazardous substances and chemical mixtures. Labeling of hazardous substances and mixtures. Conditions for using hazardous chemical substances and mixtures in the work environment. Risk related to the use of hazardous chemicals and their mixtures in the work environment. The use of individual and collective protection measures in a work environment.

Tutorials: practical implementation of the issues presented during the lecture.

Project classes: project to ensure safe conditions of work inside this occurrence of chemical hazards.

## Teaching methods

Lecture classes are conducted in the form of an informational lecture supported by a multimedia presentation.

Tutorials are conducted using the case method, based on solving practical examples (tasks). During the exercises, a round table discussion takes place. Preparation for tutorials requires student's independent work, including work with a book.

Project classes are conducted on the basis of case studies with the use of scoring (graded) discussion; students work (carry out tasks) in predetermined groups. Project classes require an independent (in consultation with the teacher) solution of the problem (i.e. assessment of the technical solution used and indication of the necessary changes).

## Bibliography

### Basic

1. Górny A., Zarządzanie ryzykiem zawodowym, Wydawnictwo Politechniki Poznańskiej, Poznań, 2011.
2. Nowacka W. Ł., Zagrożenia człowieka w środowisku pracy. Zagrożenia chemiczne, biologiczne i pyłowe, Politechnika Warszawska, Warszawa, 2011.
3. Uzarczyk A., Czynniki szkodliwe i uciążliwe w środowisku pracy, Wydawnictwo ODDK, Gdańsk, 2009.
4. (praca zbiorowa), Czynniki chemiczne w środowisku pracy, Wydawnictwo CIOP - PIB, Warszawa, 2008.

### Additional

1. Bryła R., Bezpieczeństwo i higiena pracy, Wydawnictwo ELAMED, Katowice, 2011.
2. Legal regulations regarding the use and classification of chemical substances and mixtures in the work environment.
3. Legal regulations regarding the transport of hazardous substances (ADR, RID, ICAO, IMDG).



### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	28	1,0
Student's own work (literature studies, preparation for exercises and project classes, preparation of reports on independent work, preparation for tests, preparation of a project task) <sup>1</sup>	47	2,0

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