COURSE DESCRIPTION CARD - SYLLABUS

Course name

Exploitation and Process Safety

Course

Field of study

Chemical Technology

Year/Semester

IV/7

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

English

Form of study

full-time

Requirements

elective

Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

Lecturers

Responsible for the course/lecturer:

Ph.D. Eng. Piotr Tomasz Mitkowski

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tel. 61 665 3334

Responsible for the course/lecturer:

Prerequisites

Student knows basics of algebra and probability theory, basic laws of heat, mass and momentum transfers, basic chemical reaction engineering. Student has basic knowledge in the field of construction and operating principles of apparatus and fittings in chemical and related industries, and industrial automation. Student is able to read and understand process flow diagrams (PFD) and simple piping and instrumentation diagrams (P&ID). The student knows the legal bases of process safety and the principles of conducting HAZOP, FTA and ETA analyzes.

Course objective

The aim of the course is to familiarize the student with qualitative and semi-qualitative methods and techniques for identifying industrial risk. In addition, the student is acquainted with the analysis of the causes and effects of selected accidents known from the petrochemical, food and related industries.

Course-related learning outcomes

Knowledge

1. Student knows the rules of conducting semi-qualitative analyzes with use of HAZOP, FTA, ETA and FMEA. [K_W018]

2. Knows the basic aspects of occupational health and safety in the chemical, petrochemical and food industries resulted from the analysis of industrial accidents and ecological disasters. [K_W015, K_W018]

Skills

1. Student is able to identify the main steps of the chemical risk assessment and determine the appropriate methods of analysis. [K_U25]

2. Is able to carry out a risk analysis of chemical industrial processes using the event and fault trees. [K_U25]

3. Can write chapters on the identification of hazards and risks required by Polish law in the safety report. [K_U25, K_U04, K_U02]

4. Is able to assess the impact of changing the scale of technological operations on the process safety. [K_U26]

Social competences

1. Student is aware of the advantages and limitations of individual and group work in solving interdisciplinary problems in industry. Is aware of the responsibility of jointly implemented tasks as part of teamwork. [K_K03]

2. The student is aware of the professionalism and compliance with the principles of professional ethics in relation to the storage and processing of chemical substances and hazardous events. The student understands the need to formulate and communicate in an understandable way information necessary to ensure safety, especially for non-engineers. [K_K05, K_K07]

3. The student knows the limits of their own knowledge and understands the need for continuous education and raising their professional competences, with particular emphasis on ongoing analysis of industrial accidents. [K_K01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Practical application of acquired skills in the form of a report on selected aspects of process safety analysis for a exemplar part of the process installation. Reports are created in a group of several people.

Programme content

As part of the course the following issues are discussed:

1. Methods supporting the identification and quantification assessment of hazards with use of HAZOP, FTA, ETA and FMEA.

2. Analyzes of selected accidents and failures in the chemical, petrochemical and food industries.

Teaching methods

Multimedia presentation, materials shared in the university's e-Learning system.

Bibliography

Basic

1. Materials delivered by the lecturer.

2. Daniel A. Crowl, Joseph F. Louvar, 2011, Chemical Process Safety: Fundamentals with Applications,Prentice Hall PTG.

Additional

1. Atherton J., Gil F., Hoboken, N.J,. Incidents that define process safety, Center for Chemical Process Safety, Wiley, 2008.

2. Markowski A.S., Bezpieczeństwo procesów przemysłowych, 2017, Wydawnictwo Politechniki Łódzkiej.

3. Guidelines for Process Safety Fundamentals in General Plant Operations, Center for Chemical Process Safety of the American Institute of Chemical Engineers, Nowy Jork, 1995 (dostęp elektroniczny przez www.library.put.poznan.pl).

4. Sanders R. E., Chemical Process Safety - Learning from Case Histories (3rd Edition), Elsevier, 2005 (dostęp elektroniczny przez www.library.put.poznan.pl).

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	25	1,0
Student's own work (literature studies, preparation for tests) [1]	25	1,0

[1] delete or add other activities as appropriate