COURSE DESCRIPTION CARD - SYLLABUS

Course name
Safety of industrial processes - process risk analysis [S1TOZ1>BPParp]

Course

Field of study
Circular System Technologies

Year/Semester
4/7

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
0

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
15

Number of credit points

1,00

Coordinators

dr inż. Piotr Mitkowski
piotr.mitkowski@put.poznan.pl

Lecturers

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).

Course objective

The aim of the course is to familiarize students with the basic principles and methods of process risk analysis, with particular emphasis on the fire and explosion risks.

Course-related learning outcomes

Knowledge:
1. student knows the legal basis of process safety according to the polish and the european union laws. [k_w05]
2. student knows the basic threats that may result from the chemicals used in the industrial processes. [k_w28]

3. student knows the basic principles of process safety analysis related to the industrial processes. [k_w20, k_w24, k_w28]
4. student knows the basic aspects related to the selection and location of industrial apparatus and fittings. [k_w28]
5. student knows the basic aspects of occupational health and safety in the chemical and related industries. [k_w28]
3. student is aware of the need for professional and reliable process safety analysis associated with hazardous substances. [k_k04]

Skills:
1. student is able to effectively use the material safety data sheets of chemical substances in order to identify the process hazards. [k_u01]
2. student is able to identify the main steps of process safety analysis in the process industry. [k_u05, k_u10]
3. student is able to use the basic methods of process safety analysis, working both individually and in group. [k_u08, k_u09, k_u15]

Social competences:
1. student knows the limitations of her/his own knowledge and understands the need for continuous education and improving her/his professional competences, with particular emphasis on current analyzes of industrial accidents. [k_k01]
2. student is aware and understands of social aspects of the practical application of the acquired

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Knowledge and skills acquired during the project classes are verified through the performance of project tasks: one individual task and one task performed in a group of at least 3 people. The basic material will be available in the university"s e-Learning system.

Programme content

The course covers:
1. Basic terminology related to the process safety.
2. Principles of process safety management.
3. Legal bases related to the fire protection and the ATEX directive.
4. Identification of industrial hazards with the use of hazard analysis and operational capabilities (HAZOP).
5. Risk analysis using the fault tree (FTA), event tree (ETA) and layer of protection analysis (LOPA).

Teaching methods

Multimedia presentation, materials made available in the university e-Learning system.

Bibliography

Basic
1. Markowski Adam S., Bezpieczeństwo procesów przemysłowych, 2017, Wydawnictwo Politechniki Łódzkiej, ISBN: 978-83-7283-805-6
2. Mitkowski P.T., Analiza ryzyka w przemyśle chemicznym, 2012, Wydawnictwo Politechniki Poznańskiej, ISBN: 978 - 83 - 7775 - 202 - 9
Additional
1. Crowl D. A., Louvar J. F., Chemical Process Safety. Fundamentals with Applications, Pearson Education INC, 2011.
2. Atherton J., Gil F., Hoboken, N.J,. Incidents that define process safety, Center for Chemical Process Safety, Wiley, 2008.
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	25	1,00
Classes requiring direct contact with the teacher	16	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	9	0,50