GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Safety in the Refining Industry, PG_00069026		
Field of study	Chemical Technology		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2028/2029
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	Polish
Semester of study	7	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Bartosz Szulczyński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	15	2.0	8.0	25

Subject objectives

The aim of the course is to familiarize students with hazards occurring in the refinery and petrochemical industries, as well as methods for their identification, assessment, and mitigation. Students acquire knowledge of chemical and physical hazards, as well as principles of safe operation, the use of personal and collective protective measures, and emergency procedures. The course also covers issues related to hazard detection, transportation of hazardous substances, and applicable legal regulations (ADR, CLP, REACH).

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U08] Is able to select elements of automatic control systems for simple technological processes and use computer programs to control and optimize chemical processes.	The student is able to select basic elements of control and process safety systems and use computer tools for the analysis and minimization of risk in technological processes.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_K04] Understands the non-technical aspects of the work of a chemical engineer, including the impact on the environment, and is aware of professionalism, professional ethics and respect for diversity.	The student understands the social and environmental aspects of engineering practice in the refinery and petrochemical industries and is aware of the importance of professional ethics, responsibility, and respect for diversity.	[SK4] Assessment of communication skills, including language correctness
[K6_W07] Has knowledge of raw materials and technologies in the chemicaland polymer industries, also covering issues of corrosion and material protection.	The student is familiar with the properties of raw materials and processes used in the refinery and petrochemical industries and understands their impact on process safety, including issues related to corrosion and material protection.	[SW1] Assessment of factual knowledge

Subject contents	Course content – lecture **Introduction to safety in the refinery and petrochemical industry** Basic concepts, hazard identification, safety culture. **Chemical hazards in refinery and petrochemical plants** Flammability and explosivity, toxicity of raw materials and products, HS, ammonia, sulfur compounds. **Hazardous and asphyxiating gases** Nitrogen as an asphyxiant, properties of oxygen, hazards related to process atmospheres. **Physical hazards in industry** High temperature, high pressure, radiation, noise. **Mechanical hazards and work in hazardous conditions** Working at height, hazards related to moving machinery and equipment. **Hazard detection systems** Gas detectors, monitoring systems, alarm systems. **Transportation of hazardous substances** Road, rail, pipeline, and marine transport hazards and safety measures. **Legal regulations and safety standards** ADR, CLP, REACH basic requirements and their role in industry. **Environmental protection in the refinery industry** Emissions, waste, prevention of environmental incidents. **Case studies** Analysis of selected industrial accidents and safety lessons learned.
Prerequisites and co-requisites	Basic knowledge of chemistry, chemical engineering, and industrial processes, as well as fundamental concepts of occupational safety and environmental protection.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	60.0%	100.0%

Recommended reading

Basic literature	Crowl D.A., Louvar J.F., *Chemical Process Safety: Fundamentals with Applications*, Prentice Hall. CCPS (Center for Chemical Process Safety), *Guidelines for Hazard Evaluation Procedures*, Wiley. Kletz T., *What Went Wrong? Case Histories of Process Plant Disasters* , Elsevier.
Supplementary literature	UNECE, *ADR European Agreement Concerning the International Carriage of Dangerous Goods by Road*. Regulation (EC) No 1907/2006 (REACH) Registration, Evaluation, Authorisation and Restriction of Chemicals. Regulation (EC) No 1272/2008 (CLP) Classification, Labelling and Packaging of substances and mixtures.
eResources addresses	

Example issues/ example questions/ tasks being completed	Characteristics of chemical hazards in the refinery and petrochemical industry (flammability, explosivity, toxicity). Identification of hazards related to the presence of HS, ammonia, and asphyxiating gases in industrial installations. Analysis of physical and mechanical hazards in technological processes (high pressure, temperature, working at height). Principles of using personal and collective protective equipment and emergency procedures. Fundamentals of hazardous materials transportation and requirements resulting from ADR, CLP, and REACH regulations.
Practical activites within the subject	Not applicable

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