GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	BASIC OF CHEMICAL TECHNOLOGY, PG_00064400						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2028/2029			
Education level	first-cycle studies		Subject group	Obligatory subject group in the field of study 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	3		Language of instruction	Polish			
Semester of study	5		ECTS credits	5.0			
Learning profile	general academic profile		Assessment form	exam			
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 hab. inż. Justyna Łuczak				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	15.0	60
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/modedit.php?update=32772&return=1						
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	60		8.0	57.0	125	
Subject objectives	To gain knowledge of the practical application of engineering science and technology, the application of principles, techniques and procedures to the design and production of various chemical products. To gain the ability to see technological processes as a set of technical, organisational and economic issues and to become familiar with selected processes of the chemical industry.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K04] is able to identify and resolve dilemmas related to the chemical engineering profession while respecting traditions and ethical principles	identifies ethical and social issues arising in technological activities and make decisions regarding the design and operation of chemical processes in accordance with the principles of professional ethics, safety, social responsibility, and environmental protection.	[SK4] Assessment of communication skills, including language correctness
[K6_U06] analyses the operation of equipment, apparatus and process lines used in laboratories and the chemical industry	is able to carry out the calculations necessary to prepare an energy and material balance for a technological process; student is able to draw up and interpret basic diagrams used in process design. The student has a basic understanding enabling them to design and analyse chemical processes.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K6_W07] integrates general knowledge in the humanities, social sciences, economics including their foundations, principles of protection of intellectual property and patent law relevant to appropriate interpretation and application in scientific and economic activities, and the concept of sustainable development	have the knowledge necessary to analyze and evaluate solutions used in chemical technology, taking into account social, economic and legal factors, including the protection of intellectual property and patent law, as well as the principles of sustainable development.	[SW1] Assessment of factual knowledge
[K6_U07] is able to undertake accurate and precise analytical measurements, to synthesise simple and large-molecular chemical compounds, to purify and analyse their composition and to determine their structure using classical and instrumental methods	The student is able to carry out selected processes and unit operations, measure selected process parameters, analyze the properties of raw materials and products, and interpret test results using analytical methods applied in chemical engineering.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task

Subject contents

Course content – lecture

Chemical technology as an applied science. Genesis of a new technological process. Chemical concept of a method. Technological concept of the method - technological principles (implementation of technological principles on the example of selected technological processes). Block diagram, piping and instrumentation diagram, material and energy balance of a technological process. Experience as a basis for process design -
research programme, optimisation. Issues of kinetics and catalysis of a technological process. Catalytic processes in chemical technology. Selected processes in the inorganic industry. Oil and gas processing. Electrochemical processes. Energy management in the chemical industry

Course content – laboratory

Process and unit operations based on the process of producing fatty acid methyl esters

Planning a factorial experiment

Course content – seminar

Material balance for a unit operation
Material balance for a unit process
Energy balance for a unit process

Prerequisites and co-requisites

Knowledge of the fundamentals of chemical and process engineering, chemical apparatus, chemical thermodynamics and kinetics, environmental protection

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture: written exam	60.0%	50.0%
Laboratory: tests and reports	60.0%	20.0%
Seminar: colloquium	60.0%	30.0%

Recommended reading

Basic literature

1. Schmidt-Szałowski K. i in., Technologia chemiczna. Przemysł nieorganiczny, PWN, 2013.
2. H. L. White: Introduction to Industrial Chemistry, Wiley, 1987.
3. J. N. Armor, A history of industrial catalysis, Catalysis Today, 2011, 163, 3-9.
4. Roman Koch, Antoni Kozioł, Dyfuzyjno-cieplny rozdział substancji, WNT, W-wa, 1994r.
5. Roman Zarzycki, Andrzej Zhacuk, Absorpcja i absorbery, WNT, Wwa, 1995r.
6. Said S. E. M. Elnashaie, Parag Garhyan , CONSERVATION EQUATIONS AND MODELING OF CHEMICAL AND BIOCHEMICAL PROCESSES,ISBN: 0-8247-095

	Supplementary literature	1. Schmidt-Szałowski K. i in., Technologia chemiczna. Przemysł nieorganiczny, PWN, 2013. 2. H. L. White: Introduction to Industrial Chemistry, Wiley, 1987. 3. J. N. Armor, A history of industrial catalysis, Catalysis Today, 2011, 163, 3-9. 4. Roman Koch, Antoni Kozioł, Dyfuzyjno-cieplny rozdział substancji, WNT, W-wa, 1994r. 5. Roman Zarzycki, Andrzej Zhacuk, Absorpcja i absorbery, WNT, Wwa, 1995r. 6. Said S. E. M. Elnashaie, Parag Garhyan , CONSERVATION EQUATIONS AND MODELING OF CHEMICAL AND BIOCHEMICAL PROCESSES,ISBN: 0-8247-095
	eResources addresses	
Example issues/ example questions/ tasks being completed	1.Describe the components of a chemical process design concept. 2.Interpreting the principle of best use of energy, describe the methods of heat recovery used in the production processes of the chemical industry. 3.State the principles of creating an block diagram. 4.Give an example of the application of technological principles on the example of a selected unit process or operation. 5.Calculate the material balance of the given unit process or operation. 6.Calculate the heat balance of the given unit process or operation. 7.Describe 2 examples of electrode processes in which the electrode material is chemically converted. 8.For what purpose is the hydrocracking process carried out in crude oil processing? What process yields hydrogen used in hydrocracking in the refining industry?	
Practical activites within the subject	Not applicable	

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