



Subject card

Subject name and code	Basic of Chemical Technology, PG_00049398						
Field of study	Chemistry						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
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						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Justyna Łuczak				
	Teachers		dr inż. Natalia Łukasik dr hab. inż. Justyna Łuczak dr inż. Robert Aranowski dr hab. inż. Marek Lieder				
Lesson types and methods of instruction	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						
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		5.0		60.0	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. The aim is also for the Student 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_K05] can identify the dilemmas (also ethical) associated with the practising of chemical engineer profession	The student understands the technical, organisational and ethical problems associated with the the profession of chemical engineering	[SK4] Assessment of communication skills, including language correctness
	[K6_W05] knows and understands the chemical processes and algorithms of mathematical models which are necessary for the design of technological processes, knows chemical structure of contemporary materials and its relation to their properties, enabling the selection of the materials for sustainable development technology and material-efficient and energy-efficient methods	The student is able to select a chemical concept and develop a technological process concept. The student understands the problem of optimisation of a chemical process.	[SW1] Assessment of factual knowledge
	[K6_U06] can analyze the functioning of equipment, apparatus and technology lines used in laboratories and chemical industry, and can recognize and propose methods to solve the simple engineering tasks which he can meet as an Engineer and select and use routine methods, chemical apparatus and tools to solve practical engineering tasks, including also technological processes; can himself/herself read and make technical drawings using CAD software	The student is familiar with the operation of basic apparatus and equipment used in chemical industry laboratories and plants. The student is able to propose methods of solving simple engineering tasks. The student is able to make and read basic diagrams used in process design. The student has basic knowledge of analysis and modelling of chemical processes.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
Subject contents	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.		
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
	Reports	60.0%	25.0%
	Colloquium	60.0%	25.0%
	Exam	60.0%	50.0%
Recommended reading	Basic literature	1. Szarawara J., Piotrowski J., Podstawy teoretyczne technologii chemicznej, WNT Warszawa 2010. 2. Bretsznajder S. i in., Podstawy ogólne technologii chemicznej, WNT Warszawa 1973. 3. Synoradzki L., Wisiański J. (red.), Projektowanie procesów technologicznych. Od laboratorium do instalacji przemysłowej, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006. 4. Dylewski, R., Projekt technologiczny. Rodzaje opracowań badawczych i badawczo projektowych, przykłady, materiały pomocnicze, WPS Gliwice 1999. 5. W. Kordylewski: Spalanie i Paliwa, Politechnika Wrocławska, 1999. 6. R. Dylewski, W. Gnot i M. Gonet: Elektrochemia Przemysłowa. Wybrane Procesy i Zagadnienia, Politechnika Śląska, 1999. 7. E. Roduner, Understanding catalysis, Chem. Soc. Rev., 2014, 43, 8226-8239. 8. Pakowski Zdzisław, Symulacja procesów inżynierii chemicznej: teoria i zadania rozwiązane programem Mathcad, Łódź, Wydaw. Politech. Łódzkiej, 2001r. 9. Mieczysław Serwinski, Zasady inżynierii chemicznej i procesowej, WNT, W-wa, 1982r.	

	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 Koziół, Dyfuzyjno-ciepłoty rozdział substancji, WNT, W-wa, 1994r. 5. Roman Zarzycki, Andrzej Zhacuk, Absorpcja i absorber, WNT, W-wa, 1995r. 6. Said S. E. M. Elnashaie, Parag Garhyan, CONSERVATION EQUATIONS AND MODELING OF CHEMICAL AND BIOCHEMICAL PROCESSES, ISBN: 0-8247-0957-8, Marcel Dekker AG Hutgasse 4, Postfach 812, CH-4001 Basel
	eResources addresses	Podstawowe https://pg.edu.pl/biblioteka-pg/e-zrodla/bazy-danych - Databases provided by the PG Library Adresy na platformie eNauczenie:
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?	
Work placement	Not applicable	

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