



## Subject card

Subject name and code	Basic of Chemical Technology, PG_00049398						
Field of study	Chemistry						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
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 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, applying principles, techniques and equipment to the design and production of various goods and services. The goal is also for the Student to gain the ability to view technological processes as a set of technical, organizational and economic issues and to become familiar with selected processes of the chemical industry.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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	Student is able to select the chemical concept and develop a technological concept of technological process. The student understands the problems of optimization of a chemical process.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
	[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	Student knows the way of working of the basic apparatus and equipment used in laboratories and chemical industry 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 about analysis and modeling of chemical processes.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	[K6_K05] can identify the dilemmas (also ethical) associated with the practising of chemical engineer profession	Student understands technical, organizational and ethical problems related to performing profession of chemical engineering.	[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice
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 (realization of technological principles on the example of selected technological processes). Block flow diagram and process flow diagram. Material and energy balances of a technological process. Experience as a basis for process design - research program, optimization. Issues of kinetics and catalysis of the technological process. Catalytic processes in chemical technology. Selected processes in inorganic industry. Processing of oil and gas. Electrochemical processes. Energy management in chemical industry.		
Prerequisites and co-requisites	Knowledge of chemical and process engineering fundamentals, chemical equipment, 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%
	Exam	60.0%	50.0%
	Colloquium	60.0%	25.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Szarawara J., Piotrowski J., Podstawy teoretyczne technologii chemicznej, WNT Warszawa 2010.</li> <li>2. Bretsznajder S. i in., Podstawy ogólne technologii chemicznej, WNT Warszawa 1973.</li> <li>3. Synoradzki L., Wisiański J. (red.), Projektowanie procesów technologicznych. Od laboratorium do instalacji przemysłowej, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006.</li> <li>4. Dylewski, R., Projekt technologiczny. Rodzaje opracowań badawczych i badawczo projektowych, przykłady, materiały pomocnicze, WPS Gliwice 1999.</li> <li>5. W. Kordylewski: Spalanie i Paliwa, Politechnika Wrocławska, 1999.</li> <li>6. R. Dylewski, W. Gnot i M. Gonet: Elektrochemia Przemysłowa. Wybrane Procesy i Zagadnienia, Politechnika Śląska, 1999.</li> <li>7. E. Roduner, Understanding catalysis, Chem. Soc. Rev., 2014, 43, 8226-8239.</li> <li>8. Pakowski Zdzisław, Symulacja procesów inżynierii chemicznej: teoria i zadania rozwiązane programem Mathcad, Łódź, Wydaw. Politech. Łódzkiej, 2001r.</li> <li>9. Mieczysław Serwiński, Zasady inżynierii chemicznej i procesowej, WNT, W-wa, 1982r.</li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Schmidt-Szałowski K. i in., Technologia chemiczna. Przemysł nieorganiczny, PWN, 2013.</li> <li>2. H. L. White: Introduction to Industrial Chemistry, Wiley, 1987.</li> <li>3. J. N. Armor, A history of industrial catalysis, Catalysis Today, 2011, 163, 3-9.</li> <li>4. Roman Koch, Antoni Kozioł, Dyfuzyjno-ciepłoty rozdział substancji, WNT, W-wa, 1994r.</li> <li>5. Roman Zarzycki, Andrzej Złaczak, Absorpcja i absorbery, WNT, W-wa, 1995r.</li> <li>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,</li> </ol>	

	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	1) Analyze the chemical concept of a process design 2) Analyze the technological concept of a process design 3) Characterize unit operations and processes 4) Create a conceptual and technological diagram 5) Apply technological principles using selected unit operations as an example 6) Calculate the material and heat balance of a technological process. 7) apply Sabatier's rule.	
Work placement	Not applicable	