GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basic of Chemical Technology, PG_00049398		
Field of study	Chemistry		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
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_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.	[SK2] Assessment of progress of work
[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	[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	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.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information

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 doagram 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
Exam	60.0%	50.0%
Colloquium	60.0%	25.0%
Reports	60.0%	25.0%

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., Wisialski 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, WPŚ 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, Łódz, Wydaw. Politech. Łódzkiej, 2001r. 9. Mieczysław Serwiński, 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 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: 0-8247-0957-8, 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 Library Uzupełniające Adresy na platformie eNauczanie: Chemia_Podstawy technologii chemicznej-wykład 2023/2024 - Nowy - Moodle ID: 29296 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29296 Chemia_Podstawy technologii chemicznej-seminarium 2023/2024 - Moodle ID: 30204 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30204 Chemia_Podstawy technologii chemicznej-laboratorium 2023/2024 - Moodle ID: 29295 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29295
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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