



Subject card

Subject name and code	Separation processes in refinery and petrochemical technologies, PG_00069028						
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				3.0	
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. Donata Konopacka-Łyskawa					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	15.0	45
	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	45	5.0		25.0	75	
Subject objectives	The aim of this course is to familiarize students with and consolidate their knowledge of the processes and techniques used to separate the components of single- and two-phase mixtures found in refinery technologies. The course aims to present various approaches to selecting the appropriate separation method for a given mixture and to develop practical skills in carrying out separation processes using selected methods.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U03] Uses chemical knowledge to design compounds, perform physicochemical and analytical measurements, and obtain appropriate sources of information.	The student uses chemical knowledge, especially in the field of physical chemistry, to analysis the processes of mixture separation occurring in refinery technologies.			[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
	[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 the appropriate process for separating liquid or gaseous mixtures produced in refinery technologies, taking into account the physicochemical properties of the components and technological efficiency criteria.			[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		
	[K6_W07] Has knowledge of raw materials and technologies in the chemical and polymer industries, also covering issues of corrosion and material protection.	The student has knowledge of separation processes used in refinery technologies for separating mixtures, including multi-component ones.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture		
	<p>In this lecture, students will learn the theoretical foundations of separation processes used in refinery technologies:</p> <ul style="list-style-type: none"> • Emulsion separation. Electrodehydrators. • Physicochemical equilibria for multicomponent systems. • Multicomponent distillation. Sidedrafts in a column. • Extractive distillation and solvents used in this process. • Cryogenic distillation. • Physical and chemical absorption. Desorption. • Multicomponent absorption. • Adsorption. Pressure swing adsorption. • Solvent extraction. • Membrane processes. 		
	<p>Course content – laboratory</p> <p>In the laboratory, students complete five exercises:</p> <ul style="list-style-type: none"> • Separation of a gas mixture using high-pressure absorption. • Determination of bed breakthrough time during adsorption. • Separation of a gas mixture using adsorption. • Desalination of water using reverse osmosis. • Separation of a multicomponent mixture using distillation. 		
<p>Course content – seminar</p> <p>During the seminar classes, students analyze the separation processes of typical mixtures found in refinery plants, e.g. the operation of PSA installations for hydrogen separation, the operation of ROSE installations, electrodehydrators, air components separation by cryogenic distillation, extractive distillation used to separate BTX fractions from non-aromatic compounds, and amine washing.</p>			
Prerequisites and co-requisites	knowledge of issues in the field of physical chemistry and chemical engineering		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Writing test	60.0%	40.0%
	Laboratory	100.0%	30.0%
	Presentation	100.0%	15.0%
	Problems (seminar)	60.0%	15.0%
Recommended reading	Basic literature	<p>J.-P. Wauquier, Petroleum Refining. Volume 2 : Separation Processes, Edition Technip, 2000</p> <p>A. B. de Haan, H. Bosch, Industrial Separation Processes : Fundamentals, De Gruyter, 2013</p> <p>F. M. Khoury, Multistage separation processes, Taylor & Francis, 2015</p>	
	Supplementary literature	J. S. Seader, E. J. Henley, D. K. Roper, Separation process principles, Wiley, 2019	
	eResources addresses		
	Example issues/ example questions/ tasks being completed	<p>Explain how to determine the boiling point of a multicomponent mixture for a given pressure.</p> <p>What parameters influence the amount of heat supplied to the boiler in a rectification column?</p> <p>Explain the operation of a PSA system.</p> <p>Explain the operating principle of a ROSE system.</p> <p>Propose two methods for separating randomly selected mixtures. During the method presentation: a) explain the basis for selecting the methods for separating the mixture; b) what data is needed to select a specific method; c) indicate the evaluation criteria for a given separation method.</p>	
Practical activities within the subject	Not applicable		

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