GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Separation Techniques, PG_00048918		
Field of study	Chemistry in Construction Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Bożena Zabiegała	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	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	35.0	100

Subject objectives

Familiarising students with the basic techniques used to separate mixtures

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W08	The student acquires knowledge in the separation of complex, homogeneous mixtures of chemical compounds on an analytical, preparation scale. The student acquires the theoretical knowledge necessary to understand the processes and phenomena used to isolate and separate the components of complex mixtures.	
K6_W03	The student knows and understands the mechanisms used to separate mixtures of chemical compounds. The student learns the principles of the selection of analytical conditions of the separation process based on the physicochemical properties of the compounds. He learns to design simple separation processes himself and choose the right technique to solve a specific separation problem.	
K6_U06	He can design the process of separating mixtures himself. Choose the right separation technique to solve the separation problem. He can work independently and as a team, he can estimate the time it takes to complete a task	

<table>
<tr><td>Subject contents</td><td>The rules for choosing the separation technique depending on the separation problem. Adsorption of ingredients from homogeneous mixtures. Characteristics of adsorbents. Gas extraction and solvent extraction, theory and practice. The basics of extraction with liquid in a supercritical state. Modern chromatographic techniques as tools for separating complex mixtures, analytical, preparation, industrial applications. Chromatography of exclusion, determination of the distribution of molar mass.

The student acquires the theoretical knowledge necessary to understand the processes and phenomena used to isolate and separate the components of complex mixtures. He learns the principles of the selection of analytical conditions for the separation process based on the physico-chemical properties of the separated substances. He learns to design simple separation processes himself and choose the right technique to solve a specific separation problem.

The student performs all laboratory exercises himself, the number of which is determined by the attending physician. In laboratory classes, the student independently operates the test apparatus, prepares a report describing the theoretical basis of the separation technique used and presents the results obtained during the laboratory with their interpretation.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of physical, analytical and organic chemistry</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lecture - test</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>Seminar - preparing a presentation and delivering a speach. Active participation in seminar classes.</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Laboratory - completing the test, performing independent exercises and preparing a report on the exercises performed.</td><td>60.0%</td><td>30.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Z. Witkiewicz, Podstawy Chromatografii, WN-T, Warszawa 2005,
2. A. Narębska [red] Membrany i membranowe techniki rozdziału, wyd. UMK, Toruń 1997
3. P.Stepnowski, E. Synak, B. Szafranek, Z. Kaczyński Techniki, Separacyjne, Wyd Uniwersytetu Gdańskiego, UG, 2010.</td></tr>
<tr><td>Supplementary literature</td><td>1. Z. Witkiewicz, J. Heptery Chromatografia gazowa, WN-T, Warszawa 2001
2. Zygmunt Jamrógiewicz , Jacek Namieśnik Fizykochemiczne metody kontroli zanieczyszczeń środowiska - praca zbiorowa, Wydawnictwa Naukowo Techniczne</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Dialysis types, theoretical bases, properties, use in the separation of homogeneous liquid mixtures

Gas extraction theory and practice, application

Solid sorbents; classification, characteristics, physico-chemical properties, analytical and process application

Chromatographic techniques - analytical and preparation scale

Membrane processes used in the separation of liquid and gaseous mixtures</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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