University of Gdańsk

Subject card

Subject name and code	Basics of chromatographic techniques, PG_00171074						
Field of study	Environmental Protection						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
Education level	Bachelor's studies		Subject group	Optional subject group			
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	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Department of Environmental Analysis -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Monika Paszkiewicz					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	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	30		10.0	20.0	60	
Subject objectives	To introduce knowledge of of chromatographic techniques and their application in the analytical control of technological processes, including: an introduction to the basics of chromatographic techniques, the construction of the equipment and the parameters of its work, an introduction to the basics of interpreting analytical results and to the principles of selecting operating conditions for the equipment, acquiring skills in designing and implementing processes for separating mixtures and for extraction of chemical compounds, acquiring skills in operating in a chromatographic laboratory.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OŚL3_U01] Performs tasks under supervision and independently in the field of analysis of the natural environment and the functioning of natural and man-made natural systems.	- Can apply basic chromatographic techniques to identify environmental pollutants - Can operate uncomplicated testing equipment independently - Can analyse and interpret experimental data	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[OŚL3_U07] Uses basic laboratory techniques, conducts field research and performs qualitative and quantitative analyses and draws conclusions on this basis for practical purposes.	- Can operate uncomplicated testing equipment independently - Can plan and carry out simple experimental tests. - Can formulate simple conclusions based on experimental data.	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[OŚL3_U02] Plans, selects appropriate research and measuring equipment and devices, performs physicochemical measurements and experiments; analyses the results and draws conclusions based on them.	Can perform and interpret simple quantitative and qualitative analyses - Can optimize the basic operating parameters of measuring equipment based on experimental data - Can formulate simple conclusions based on experimental data	[SU2] presentation/project/paper/ report
[OŚL3_K02] Works individually demonstrating initiative and independence in actions, and effectively cooperates in a team, performing various roles in it.	- Knows the necessity of following established analytical procedures - Is responsible for the safety of their own work and that of others: knows how to react in dangerous situations, is careful when handling chemicals, is careful when handling measuring equipment - Shows responsibility for the results of the team's work	[SK8] observation of student's independent or team work
[OŚL3_W11] Discusses measurement systems and analysis techniques used in monitoring the state of the natural environment.	- Knows the basics of separation techniques - Knows and understands the theoretical basics of the chromatographic process - Knows the basic techniques of organic compound analysis	[SW2] presentation/project/paper/ report

Subject contents

Classification of separation methods. Theoretical basis of the chromatographic process. Preparation of samples for analysis, classification of extraction techniques, extraction of solid, liquid, gaseous samples. Gas chromatography: carrier gas, injectors, columns, detectors, selection of measurement parameters. High-performance liquid chromatography:, pumps, injectors, detectors, column packing - types of stationary phase, mobile phases. Normal and reversed phase chromatography. Other chromatographic techniques: size exclusion chromatography and ion chromatography.

Prerequisites and co-requisites

General chemistry, organic chemistry, inorganic chemistry, analytical chemistry

Knowledge of basic general chemistry, organic chemistry, inorganic chemistry and analytical chemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Report on laboratory exercises	51.0%	100.0%

Recommended reading

Basic literature	J. Kałużna-Czaplińska, Z. Witkiewicz. Basics of chromatography and electromigration techniques. PWN, 2021 Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Separation techniques. Wydawnictwo UG 2010 Szczepaniak W. Instrumental methods in chemical analysis, PWN, Warszawa, 1996.
Supplementary literature	Z. Witkiewicz, W. Wardencki, I. Malinowska. Liquid chromatography. Theory and practice. PWN, 2019 Z. Witkiewicz, W. Wardencki, I. Gas chromatography. PWN, 2018
eResources addresses	

Example issues/ example questions/ tasks being completed

Work placement

Not applicable

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