University of Gdańsk

Subject card

Subject name and code	Separation methods, PG_00081936		
Field of study	Chemistry		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	undergraduate studies	Subject group	Obligatory subject group 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	1.0
Learning profile	academic	Assessment form	
Conducting unit	Katedra Analizy Środowiska -> Faculty of Chemistry		
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	15.0	0.0	0.0	0.0	15
	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	15	2.0	8.0	25

Subject objectives

- to introduce students to the theoretical basis of chromatographic techniques, chromatographic equipment and the basic parameters of its operation
- to introduce students to the principles of selecting analytical conditions on the basis of physicochemical properties of analyzed compounds
- to introduce students to the basics of calculations necessary for the interpretation of analytical results
- acquiring the ability to design and implement processes of separation of mixtures by main separation techniques
- acquiring skills regarding the procedure in a chromatographic laboratory

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	- Knows the basics of separation techniques, - Knows and understands the theoretical basis of the chromatographic process	[SW4] test/exam - oral or written
[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	- Knows the need to follow established analytical procedures, - Is responsible for the safety of his own work and that of others: knows how to proceed in hazardous situations, is careful in handling chemical substances, exercises carefulness in handling measuring apparatus	[SK8] observation of student's independent or team work
[CHEML3_K03] Establishes priorities in the right way for the implementation of tasks specified by herself/himself and/or by others.	- Understands the need for further education, - Demonstrates responsibility for the results of teamwork, - Promotes the importance of mathematical sciences in explaining many phenomena and processes	[SK8] observation of student's independent or team work
[CHEML3_U07] Prepares documented elaboration on a specific problem in the field of selected chemical and physical issues.	- Is able to perform and interpret simple quantitative and qualitative analyses - Is able to formulate simple conclusions based on experimental data.	[SU2] presentation/project/paper/ report
[CHEML3_W10] Enumerates and describes the basic aspects of the construction, operation and use of measuring apparatus and equipment used in experimental works in the field of chemistry and related sciences.	- Knows the structure and principle of operation of the basic analytical apparatus used for chromatographic separations, - Knows the basic methods of quantitative and qualitative analysis	[SW4] test/exam - oral or written
[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	- Is able to independently operate uncomplicated research equipment, - Is able to optimize the basic operating parameters of the measuring apparatus on the basis of experimental data	[SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	- Knows basic techniques for analyzing organic compounds	[SW4] test/exam - oral or written
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	- Is able to independently operate uncomplicated research equipment, - Is able to plan and perform simple experimental investigations	[SU8] observation of student's independent or team work

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, gas samples. Gas chromatography: carrier gas, injectors, columns, detectors, selection of measurement parameters. High-performance liquid chromatography:, pumps, injector, detectors, column packing - types of stationary phases, mobile phases. Chromatography in normal and reversed phase system. Other chromatographic techniques: size exclusion chromatography and ion chromatography. Theoretical basis of electromigration techniques.

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
Two sub-tests	51.0%	100.0%

Recommended reading

Basic literature	Witkiewicz Z. Fundamentals of chromatography, WNT, Warsaw, 2005. Szczepaniak W. Instrumental methods in chemical analysis, PWN, Warsaw, 1996. Stepnowski P., Synak E., Szafranek B., Kaczyński Z. Separation techniques. UG Publishers 2010
Supplementary literature	Kocjan R. Analytical chemistry. Handbook for students. Volume 2. PZWL, Warsaw, 2000. Witkiewicz Z., Hepter J. Gas chromatography, WNT, Warsaw, 2009.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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