

Subject card

Subject name and code	Analytical chemistry, PG_00159519						
Field of study	Chemistry						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's 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	3		ECTS credits		4.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Analytical Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Dorota Zarzeczańska				
	Teachers		dr Elżbieta Adamska dr Adrian Koterwa				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	60.0	0.0	0.0	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	acquiring the ability to independently conduct basic analyzes using qualitative and quantitative methods						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	1. Gives the composition of group reagents 2. Describes the division of anions and anions into analytical groups 3. Characterizes the methods of classical quantitative titration and gravity analysis	[SW4] test/exam - oral or written
	[CHEML3_U09] Is able to learn independently.	1. Recognizes the analytical effects of characteristic reactions performed during qualitative analysis. 2. Based on the reactions carried out, identifies and classifies ions into appropriate analytical groups in accordance with the Fresenius and Bunsen taxonomy. 3. Recognizes the end point of the titration.	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[CHEML3_W07] Understands and describes physicochemical patterns, phenomena and processes using the language of mathematics.	1. Explains the principle of operation of group and specific reagents. 2. Defines the basic issues of the theory describing the course of ionic reactions in solution. 3. Illustrates the titration process with an appropriate curve. 4. Illustrates and describes using chemical equations the reactions occurring during qualitative and quantitative determinations. 5. Lists and explains the operation of indicators used in titration determinations.	[SW4] test/exam - oral or written
	[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	Performs alkacymetric, redoximetric, precipitation and complexometric titrations and weight determination in accordance to the analytical regiments.	[SU2] presentation/project/paper/report [SU5] implementation of a problem task
	[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	Identifies and applies the laboratory glass suitable for qualitative and quantitative analysis	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[CHEML3_W08] Demonstrates knowledge of basic computational methods to solve problems in chemistry, physics, mathematics.	Selects the calculation method to determine the amount of substance in the solution.	[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.	Recognizes and predicts sources of errors in analysis and follows occupational health and safety rules in the laboratory.	[SK8] observation of student's independent or team work
	[CHEML3_W12] Characterises the basic principles of health and safety at work in a chemical laboratory; knows and describes the hazards associated with working with hazardous substances, ways to counteract these hazards and rules of conduct during an accident.	Characterizes the basic principles of health and safety procedures at the analytical laboratory	[SW1] oral statement/conversation/discussion
Subject contents	Principles of work in the analytical laboratory, qualitative analysis of cations I, IIA and III of the Fresenius analytical groups and mixtures of anions, single and double salt analysis, quantitative analysis of substances in solution (alkacymetry, redoximetry, complexometry, precipitation titration, weight analysis).		
Prerequisites and co-requisites	-completed general chemistry course-using basic laboratory glass and applying the rules of work in a chemical laboratory, writing chemical reactions taking into account the stoichiometry of reactions and determining the products, e.g. sediment, gas, etc., describing chemical equilibrium in the solution using chemical reactions, balancing the oxidation and reduction reactions; calculations based on chemical reactions, calculating molar concentrations, percentages, calculating the pH of electrolytes		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	report	0.0%	9.0%
	seven partial tests	51.0%	52.5%
	Completion of the practical part of the classes	51.0%	38.5%

Recommended reading	Basic literature	J. Minczewski i Z. Marczenko, Chemia analityczna 1 i 2, PWN Warszawa T. Lipiec, Z.S. Szmal, Chemia analityczna z elementami analizy instrumentalnej, PZWL Warszawa H. Bentkowska, Chemia analityczna jakościowa, skrypt PGA. Cygański, Chemiczne metody analizy ilościowej, WNTA. Persony, Chemia analityczna. Podstawy klasycznej analizy ilościowej, Medyk
	Supplementary literature	D. Harvey, Modern Analytical Chemistry, McGraw Hill Companies, Inc. W. Gorzelany, A. Śliwa, J. Wojciechowska, Półmikroanaliza jakościowa, PWN Warszawa
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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