

Subject card

Subject name and code	Analytical chemistry, PG_00050720						
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			3.0		
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 Dorota Zarzeczańska				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	30.0	0.0	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		5.0		40.0	75
Subject objectives	using chemical calculations to determine substances						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_W07] Understands and describes physicochemical patterns, phenomena and processes using the language of mathematics.	Performs calculations to determine the concentration of ions, taking into account the presence of several equilibria 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.	Demonstrates the ability to draw conclusions based on the work performed.	[SK1] oral statement/conversation/discussion
	[CHEML3_W08] Demonstrates knowledge of basic computational methods to solve problems in chemistry, physics, mathematics.	Selects a calculation method to determine the amount of a substance in a solution.	[SW4] test/exam - oral or written
	[CHEML3_U09] Is able to learn independently.	Based on the calculations performed, it predicts the course of the chemical reaction based on the amount and properties of the dissolved substance	[SU4] test/exam - oral or written
	[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	1. Lists the composition and justifies the use of group and specific reagents based on performed calculations 2. Based on the performed calculations, it selects a chemical indicator for a given type of titration	[SW4] test/exam - oral or written
	[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 occupational health and safety in an analytical laboratory.	[SW1] oral statement/conversation/discussion
	[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	Based on the description of the analysis, it performs calculations and formulates conclusions.	[SU4] test/exam - oral or written
	[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	Recognizes and describes the role of equipment and glass appropriate for qualitative and quantitative analysis.	[SU1] oral statement/conversation/discussion
Subject contents	Calculation of: ion activity in solution, pH of solutions of substances and mixtures, redox potentials and EMF, oxidation and reduction reaction constant, solubility of precipitates taking into account the influence of ionic strength, protolysis and complexation, ion concentrations in solutions of complexes, titration results and curves (alkalimetric, redoximetric, complexometric and precipitation), errors and losses in quantitative analysis, predicting the direction of oxidation and reduction reactions.		
Prerequisites and co-requisites	<p>-completed general chemistry course</p> <p>-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</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	arithmetic mean of two tests	51.0%	90.0%
	activity	0.0%	10.0%
Recommended reading	Basic literature	<p>Z. Galus, Ćwiczenia rachunkowe z chemii analitycznej, PWN</p> <p>A. Cygański, Chemiczne metody analizy ilościowej, WNT</p> <p>A. Persony, Chemia analityczna. Podstawy klasycznej analizy ilościowej, Medyk</p>	
	Supplementary literature	D. Harvey, Modern Analytical Chemistry, McGraw Hill Companies, Inc.	
	eResources addresses		

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

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