

Course title Chemia analityczna/Analytical chemistry		ECTS code 7.2.0503	
Name of unit administrating study			
Faculty of Chemistry			
Studies			
Field of study	Type	Form	
Environmental Protection	Bachelor	Full-time studies	
Teaching staff Dr hab. Alicja Boryło, prof. UG			
Forms of classes, the realization and number of hours		ECTS credits	
A. Forms of classes, in accordance with the UG Rector's regulations lecture, audytorium classes, laboratory classes		classes - 60 h Tutorial classes- 10 h Student's own work- 55 h TOTAL: 125 h - 5 ECTS	
B. The realization of activities In-class			
C. Number of hours lecture 15 h, audytorium classes 15 h, laboratory classes 30 h			
The academic cycle Second year, winter semester			
Type of course obligatory		Language of instruction Polish	
Teaching methods Lectures including multimodal presentations Laboratory experiments Case studies		Form and method of assessment and basic criteria for evaluation or examination requirements	
		A. Final evaluation, in accordance with the UG study regulations Course completion (with a grade), exam	
		B. Assessment methods Written exam with open questions Oral exam Test	
		The basic criteria for evaluation 1. positive grade of the written exam consisting of 30-40 open questions covering the issues listed in the lecture syllabus content and selected types of tasks of the auditorium training, 2. oral exam - supplement to the written exam, but only for those students who obtained 30-50% of points available in the written exam 3. auditorium training - demonstrating the ability to solve chemical tasks – test (1) in the field of stoichiometry, solution concentrations, ionic equilibrium solutions (pH, buffer solutions, solubility product, complex connections) and (2) interpretation and analysis of analytical titration results, 4. laboratory training - positive assessment of the entrance tests covering the subject of six experiments performed as part of the laboratory practice, the implementation of the experimental part covered by the classes syllabus and the	

development of results obtained during the exercises

Required courses and introductory requirements

A. Formal requirements

General and Inorganic Chemistry

B. Prerequisites

General and Inorganic Chemistry

Aims of education

- familiarizing students with all issues listed in the lecture syllabus content,
- introducing students to the basics of chemical calculations in the field of analytical chemistry,
- developing the skills of independent experimentation and problem solving during conducting a chemical experiment (qualitative and quantitative analysis).

Course contents

- A. The subject matter of the lecture: standard and non-nominate solutions. Selected methods of analysis of inorganic compounds: the basics of qualitative and quantitative analysis, alkalimetry, permanganometry, chromimetry, iodometry, complexometric titration and weight analysis. Analyte concentration and mineralization of environmental samples. Statistical processing of analytical results: precision, accuracy, blank sample, linear regression, errors and their transfer, detection of thick errors.
- B. Problems of auditorium training: basic types of calculation tasks related to concentrations and chemical reactions with particular emphasis on equilibria in solutions, oxidation-reduction reactions, methods of balancing chemical reaction equations, the basics of chemical calculations in the field of alkalimetry, redoximetry and complexometry.
- C. The subject matter of laboratory exercises: the basics of laboratory work, conducting six exercises / experiments thematically related to the above-mentioned lecture program.

Bibliography of literature

- A. J. Minczewski i Z. Marczenko – Chemia analityczna, PWN, Warszawa, 2009,
T. Lipiec, Z. Szmaj – Chemia analityczna z uwzględnieniem półmikroanalizy jakościowej, PZWL, Warszawa
L.F. Hamilton, S.G. Simpson, D.W. Ellis – Obliczenia w chemii analitycznej, WNT, Warszawa 1973,
Ćwiczenia rachunkowe z chemii analitycznej pod redakcją Z. Galusa, PWN, Warszawa 2009,
M. Wesołowski, K. Szefer, D. Zimna – Zbiór zadań z chemii analitycznej, Warszawa 2002.
A. Cygański, B. Ptaszyński, J. Krystek – Obliczenia w chemii analitycznej, WN-T, Warszawa 2000
- B. **Extracurricular readings**