


**KAPITAŁ LUDZKI**  
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez  
 Unię Europejską w ramach  
 Europejskiego Funduszu  
 Społecznego

**UNIA EUROPEJSKA**  
 EUROPEJSKI  
 FUNDUSZ SPOŁECZNY


<b>Course title</b>		<b>ECTS code</b>	
Analytical chemistry		7.2.0503	
<b>Name of unit administrating study</b>			
null			
<b>Studies</b>			
<b>faculty</b>	<b>field of study</b>	<b>type</b>	pierwszego stopnia
Wydział Chemii	Ochrona środowiska	<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
<b>Teaching staff</b>			
dr hab. Alicja Boryło, profesor uczelni; dr hab. Dagmara Strumińska-Parulska, profesor uczelni; dr Grzegorz Olszewski; mgr Aleksandra Moniakowska			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		5	
Auditorium classes, Laboratory classes, Lecture		classes - 60 h	
<b>The realization of activities</b>		Tutorial classes- 10 h	
classroom instruction		Student's own work- 55 h	
<b>Number of hours</b>		TOTAL: 125 h - 5 ECTS	
Laboratory classes: 30 hours, Lecture: 15 hours, Auditorium classes: 15 hours			
<b>The academic cycle</b>			
2024/2025 winter semester			
<b>Type of course</b>		<b>Language of instruction</b>	
obligatory		Polish	
<b>Teaching methods</b>		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
<ul style="list-style-type: none"> <li>- conducting experiments</li> <li>- multimedia-based lecture</li> <li>- problem solving</li> </ul>		<b>Final evaluation</b>	
		<ul style="list-style-type: none"> <li>- Graded credit</li> <li>- Examination</li> </ul>	
		<b>Assessment methods</b>	
		<ul style="list-style-type: none"> <li>- (mid-term / end-term) test</li> <li>- written exam with open questions</li> <li>- oral exam</li> </ul>	
		<b>The basic criteria for evaluation</b>	
		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	
<b>Method of verifying required learning outcomes</b>			

### Required courses and introductory requirements

#### A. Formal requirements

Formal requirements  
General and Inorganic Chemistry

#### B. Prerequisites

Prerequisites  
General and Inorganic Chemistry

### Aims of education

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

Course contents  
The subject matter of the lecture: standard and non-nominated solutions. Selected methods of analysis of inorganic compounds: the basics of qualitative and quantitative analysis, alkacymetry, permanganometry, chromianometry, 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.  
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 alkacymetry, redoximetry and complexometry.  
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

Bibliography of literature  
J. Minczewski i Z. Marczenko – Chemia analityczna, PWN, Warszawa, 2009,  
T. Lipiec, Z. Szmal – 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. Wesółowski, 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

### The learning outcomes (for the field of study and specialization)

#### Knowledge

#### Skills

#### Social competence

### Contact

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