


**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>	
Advanced chemistry laboratory - analytical chemistry		13.3.0445	
<b>Name of unit administrating study</b>			
Faculty of Chemistry			
<b>Studies</b>			
<b>faculty</b>	<b>field of study</b>	<b>type</b>	drugiego stopnia
Wydział Chemii	Chemia	<b>form</b>	stacjonarne
		<b>specjalty</b>	chemia biomedyczna, chemia i technologia środowiska, analityka i diagnostyka chemiczna, chemia obliczeniowa
		<b>specialization</b>	wszystkie
<b>Teaching staff</b>			
dr Paweł Niedziałkowski; dr hab. Dagmara Strumińska-Parulska, profesor uczelni; mgr Jarosław Wieczorek; mgr Amanda Kulpa-Koterwa; mgr Aleksandra Moniakowska; mgr Marcin Kaczor; dr Grzegorz Olszewski			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		2	
Laboratory classes		classes 20 h	
<b>The realization of activities</b>		Tutorial classes 5 h	
classroom instruction		Student's own work 25 h	
<b>Number of hours</b>		TOTAL: 50 h - 2 ECTS	
Laboratory classes: 20 hours			
<b>The academic cycle</b>			
2022/2023 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>	
conducting experiments		<b>Final evaluation</b>	
		Graded credit	
		<b>Assessment methods</b>	
		- assignment work – completing a specific practical assignment	
		- graded course credit based on individual grades obtained during the semester	
		<b>The basic criteria for evaluation</b>	
		performing of the experiment (30% of the final mark)	
		presentation of obtained results in the form of a report (30%)	
		report – the problem task (20%)	
		test (20%)	
<b>Method of verifying required learning outcomes</b>			
<b>Required courses and introductory requirements</b>			
<b>A. Formal requirements</b>			
Completed courses of: general chemistry, analytical chemistry and physical chemistry			
<b>B. Prerequisites</b>			
knowledge of chemical nomenclature, the ability of apply basic stoichiometry formulas, calculation of the solution concentrations, the ability to use of laboratory glass, the ability to use the basic laboratory instruments, application of the safety rules in a chemical laboratory			
<b>Aims of education</b>			
Acquaintance with modern research techniques in analytical chemistry.			

<p>Developing of the skill to choose the optimal research method for a given problem.</p> <p>Developing of the skills of independent detection and determination of various chemical substances.</p> <p>Acquiring of proficiency in the estimating the expected result and determination of the sources and scale of occurring errors during experiments.</p>	
<p><b>Course contents</b></p> <p>Acquaintance with modern methods used in analytical and instrumental chemistry. Presentation of research problems and performing discussion on the selection of an advanced analytical method. Quantitative analysis of selected compounds (e.g. determination of the content of dyes in leaves and flowers, fluorides in toothpastes, phosphates: in water, drinks and washing powders, acids in drinks, caffeine in coffee)</p>	
<p><b>Bibliography of literature</b></p> <p>Literature required to pass the course</p> <ol style="list-style-type: none"> <li>1. Chemia Analityczna Kealey D., Haines P.</li> <li>2. Chemia Analityczna. Analiza Instrumentalna Kocjan, R.</li> <li>3. Fundamentals of Analytical Chemistry Skoog D. Crouch Stanley R., Holler James F., West Donald M.</li> </ol>	
<p><b>The learning outcomes (for the field of study and specialization)</b></p>	<p><b>Knowledge</b></p> <ol style="list-style-type: none"> <li>1. Recognizes and describes the methods used in instrumental analysis in the determination of chemical compounds used in everyday life.</li> <li>2. Describes the physicochemical properties of substances occurring in the natural environment.</li> <li>3. Cites and understands the basic concepts and principles of industrial property protection and copyright.</li> <li>4. Estimates the expected analysis result.</li> <li>5. Analyzes the value of the determination error and its potential sources.</li> </ol>
	<p><b>Skills</b></p> <ol style="list-style-type: none"> <li>1. Plans and uses the appropriate methods to solve the given analytical problem.</li> <li>2. Develops the given problem in the field of the application of advanced analytical methods.</li> <li>3. Organizes the workplace in accordance with the requirements of the analysis of the chemical substance and according to BHP rules -Occupational Safety and Health Administration (OSHA) rules.</li> <li>4. Critically evaluate obtained results during the analysis.</li> <li>5. Discusses and integrate the information obtained in the group to verify the research hypothesis.</li> </ol>
	<p><b>Social competence</b></p> <ol style="list-style-type: none"> <li>1. Takes the challenge of conducting advanced chemical analyzes.</li> <li>2. Can estimate the content of components present in chemical substances used in everyday life.</li> </ol>
<p><b>Contact</b></p> <p>pawel.niedzialkowski@ug.edu.pl</p>	