



**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>	
Chemical analysis of biologically active compounds		13.3.0452	
<b>Name of unit administrating study</b>			
null			
<b>Studies</b>			
<b>faculty</b>	<b>field of study</b>	<b>type</b>	wszystkie
Wydział Biologii	Przyroda	<b>form</b>	wszystkie
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
Wydział Chemii	Chemia	<b>type</b>	pierwszego stopnia
		<b>form</b>	stacjonarne
		<b>specjalty</b>	chemia biomedyczna, chemia kosmetyków
		<b>specialization</b>	wszystkie
<b>Teaching staff</b>			
dr hab. Anna Łęgowska, profesor uczelni; dr Agata Gitlin-Domagalska; dr hab. Piotr Mucha, profesor uczelni; dr hab. Jarosław Ruczyński; prof. UG, dr hab. Dawid Dębowski			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		4	
Laboratory classes, Lecture		classes 60 h	
<b>The realization of activities</b>		tutorial classes 5 h	
classroom instruction		student's own work 35 h	
<b>Number of hours</b>		TOTAL: 100 h - 4 ECTS	
Lecture: 15 hours, Laboratory classes: 45 hours			
<b>The academic cycle</b>			
2023/2024 summer 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> </ul>		<b>Final evaluation</b>	
		Graded credit	
		<b>Assessment methods</b>	
		Lecture: <ul style="list-style-type: none"> <li>• written exam with open questions</li> </ul> Laboratory classes: <ul style="list-style-type: none"> <li>• continuous assessment of student participation and involvement in laboratory classes, quality of work and written presentation of obtained results (reports);</li> <li>• preliminary tests;</li> <li>• final grade would be determined as average of partial grades received during the semester;</li> </ul>	
		<b>The basic criteria for evaluation</b>	

	<p>Assessment criteria in accordance with the UG Studies Regulations</p> <p>Lecture:</p> <ul style="list-style-type: none"> <li>• Continuous assessment of preparation and activity in the classroom</li> <li>• positive evaluation of the written exam consisting of 6-12 open questions covering issues mentioned in the subject curriculum contents; answers to the questions will require solving tasks related to the assumed effects of education; the grading scale will be adjusted to the rating range of the assessed written work.</li> <li>• the condition to take the exam is to get credit for laboratory exercises</li> </ul> <p>Laboratory classes:</p> <p>positive grade received in 7 preliminary testes, that check knowledge required to perform experiments during the classes; accomplishment of all planned experimental work (quality of laboratory work, ability to team work and mode of work would be graded); analysis of obtained results performed as written report;</p> <ul style="list-style-type: none"> <li>• to complete the laboratory course each negative grade must be improved.</li> </ul>
<p><b>Method of verifying required learning outcomes</b></p>	
<p><b>Required courses and introductory requirements</b></p>	
<p><b>A. Formal requirements</b> organic chemistry for the first degree students</p> <p><b>B. Prerequisites</b> basic knowledge of organic chemistry, ability to work in a chemical laboratory, knowledge of basic laboratory glass, assimilation of working principles in a chemical laboratory</p>	
<p><b>Aims of education</b></p>	
<ul style="list-style-type: none"> <li>• familiarize students with all the issues mentioned in the lecture's program content,</li> <li>• acquainting students with the basics of UV/Vis spectroscopy and spectrofluorimetry and their use in the analysis of biologically active compounds</li> <li>• acquainting students with chromatographic and electrophoretic methods of analysis of peptides, proteins and nucleic acids</li> <li>• teaching students to perform chemical experiments independently (using descriptions included in the instructions)</li> <li>• to develop the skills of critical evaluation and interpretation of the obtained experimental results and analysis of source texts</li> </ul>	
<p><b>Course contents</b></p>	
<p>A. Issues of the lecture Characteristics of electromagnetic radiation. The laws of absorption. Application of UV and VIS spectroscopy. Basics and application of fluorescent methods. Basics of chromatography theory. Characteristics and application of basic chromatographic techniques in the separation of biomolecules. Types of detectors used in chromatography. Basics of gel electrophoresis. Characteristics of basic electrophoretic techniques. Electrophoresis of proteins and nucleic acids. Capillary electrophoresis.</p> <p>B. Laboratory classes : completion of seven experiments related to the isolation and chemical analysis of natural compounds, such as saccharides, lipids, alkaloids, vegetable dyes, vitamins, proteins and nucleic acids, using spectroscopic, chromatographic and electrophoretic techniques</p>	
<p><b>Bibliography of literature</b></p>	
<p>Literature required to pass the course Cygański W, Metody spektroskopowe w chemii analitycznej Witkiewicz Z, Podstawy chromatografii Stryer L, Biochemia Kłysejko-Stefanowicz L, Ćwiczenia z biochemii</p>	
<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. Defines and presents the chemical structure of basic groups of biomolecules, explains their importance for the functioning of living organisms</li> <li>2. defines the laws of absorption, knows their importance in the spectrometric analysis of biomolecules</li> <li>3. characterizes the basic spectroscopic techniques used in the identification and quantitative analysis of biologically active compounds</li> <li>4. defines the basic concepts from the theory of chromatography and electrophoresis</li> <li>5. classifies specific chromatographic and electrophoretic techniques and its ability for analysis of biomolecules with specific physicochemical properties</li> <li>6. recognizes and is able to use basic laboratory equipment</li> </ol> <p><b>Skills</b></p> <ol style="list-style-type: none"> <li>1. Uses chemical terminology to the extent necessary to present (in written and oral</li> </ol>

- form) the content of the subject
- 2. anticipates the course of reactions of metabolic pathways and products of these transformations
- 3. predicts physicochemical and biological properties of organic compounds based on their chemical formulas
- 4. uses the basic analytical techniques used in the analysis of endogenous organic compounds
- 5. designs and performs simple biochemical experiments, selecting laboratory equipment in accordance with its intended use
- 6. analyzes the results of experiments conducted, draws conclusions about the correctness of their course

### Social competence

#### Student

- 1. Understands the need for continuous education,
- 2. takes care of the laboratory equipment entrusted
- 3. is prudent in using laboratory equipment and working with chemical reagents
- 4. appreciates the need to work in a team in accordance with its role (group manager / group member)
- 5. is aware of the need for a critical analysis of his own work
- 6. shows cautious criticism in receiving information, particularly available in the mass media
- 7. is aware of the need for honest and reliable work

### Contact

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