


**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>	
Application of spectroscopy in bioinorganic chemistry		13.3.1213	
<b>Name of unit administrating study</b>			
null			
<b>Studies</b>			
<b>faculty</b>	<b>field of study</b>	<b>type</b>	drugiego stopnia
Wydział Chemii	Biznes chemiczny	<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
		<b>type</b>	drugiego stopnia
Wydział Chemii	Chemia	<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
		<b>type</b>	drugiego stopnia
Wydział Chemii	Ochrona środowiska	<b>form</b>	stacjonarne
		<b>specjalty</b>	wszystkie
		<b>specialization</b>	wszystkie
		<b>type</b>	drugiego stopnia
<b>Teaching staff</b>			
prof. UG, dr hab. Agnieszka Chylewska			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b>	
<b>Forms of classes</b>		2 classes – 15 hours tutorial classes – 10 hours student's own work – 25 hours Total: 50 h – 2 ECTS	
Laboratory classes			
<b>The realization of activities</b>			
classroom instruction			
<b>Number of hours</b>			
Laboratory classes: 15 hours			
<b>The academic cycle</b>			
2024/2025 winter semester			
<b>Type of course</b>		<b>Language of instruction</b>	
an elective course		English	
<b>Teaching methods</b>		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
an individual work, experiments and measurements performing and an analysis of obtained results and discussion.		<b>Final evaluation</b>	
		Graded credit	
		<b>Assessment methods</b>	
		Students write 4 short tests (Pre-Lab Test) and 4 detailed reports (Post-Lab Report)	
		<b>The basic criteria for evaluation</b>	
		positive note from all short tests and reports, final note is an average from notes from all tests	
		91-100%: 5.0	
		81-90%: 4.5	
		71-80%: 4.0	
		61-70%: 3.5	
		51-60%: 3.0	
		< 51%: 2.0	
<b>Method of verifying required learning outcomes</b>			
<b>Required courses and introductory requirements</b>			
<b>A. Formal requirements</b>			
lack			

<b>B. Prerequisites</b>	
lack	
<b>Aims of education</b>	
<p>to give the students an idea of the importance and significance of chemistry in our lives and body;</p> <p>to develop specific interests, habits, and abilities encompassing all sciences;</p> <p>to help the student discover whether he/she has an aptitude for further work in pure or applied sciences and to induce such people to continue science studies</p>	
<b>Course contents</b>	
<p>Topics of the lecture:</p> <p>safety practices and basic laboratory (filtration, crystallization, distillation, extraction, chromatography) and instrumental techniques (UV, ATR, IR, NMR spectroscopy) in chemistry</p> <p>chemical kinetics and equilibria (the effect of certain factors on the reaction rate, type of catalysts, the significance of the equilibrium constant, determining the effect of certain factors on the equilibrium)</p> <p>solutions (types of solutions and solubility, factors affecting the solubility of compounds, calibration plots, expressing solution concentration, solubility equilibria and solubility product constant, stability of complexes, relative strengths of oxidizing and reducing agents, relative reactivities of coordination compounds)</p> <p>acid-base equilibria (the nature of acids and bases, acid strength and the acid ionization constant, autoionization of water and pH, buffers and their effectiveness, titrations and pH curves; reduction and oxidation processes in acidic and basic solutions)</p>	
<b>Bibliography of literature</b>	
<p>I. Bertini, D. Garner, S.J. Lippard. J. Reedijk, A.X. Trautwein, M.J. Clarke, E. Kimura, K.N. Raymond, P.J. Sadler, R. Weiss, „Topics in Biologically Inorganic Chemistry” Volume 1, Springer, 1-200, 1999.</p> <p>R. S. Mikkelsen, E. Corton, „Bioanalytical Chemistry” Wiley-Interscience, 1-375, 2004.</p> <p>G. A. Lawrance, „Introduction to Coordination Chemistry”, University of Newcastle, Callaghan, NSW, Australia A John Wiley, 1-307, 2010.</p> <p>G.E. Rodgers, „Descriptive Inorganic, Coordination, and Solid-State Chemistry, Third Edition” Belmont, Brooks Cole, USA, 1-668, 2012.</p>	
<b>The learning outcomes (for the field of study and specialization)</b>	<b>Knowledge</b>
Chemical Biznes	Students will be able to:
K_BChII_W01	integrate theory and practice to solve qualitative and quantitative problems relating to familiar and unfamiliar aspects of chemistry,
knows and understands in-depth complex physicochemical processes and is able to analyse their course in connection with other fields of science	integrate information or data from a variety of sources,
	appreciate the need for good practice in data collection and processing
	<b>Skills</b>
K_BChII_U04	Students will be able to:
is able to independently plan and perform specific research tasks in the field or in the laboratory, interpret their results working individually or in a team, assuming various roles and functions in it	· understand the objective of their chemical experiments, properly carry out the experiments, and appropriately record and analyze the results,
	be able to use standard laboratory equipment, modern instrumentation, and classical techniques to carry out experiments,
	know and follow proper procedures and regulations for safe handling and use of chemicals,
	communicate the concepts and results of their laboratory experiments through effective writing and oral communication skills.
	<b>Social competence</b>
K_BChII_K04	Students will be able to:
is willing to properly assess the acquired knowledge, respect it and disseminate it in order to solve specific cognitive and practical issues	work effectively in diverse teams both in the classroom and in the laboratory,
	employ critical thinking and efficient problem-solving skills,
	conduct experiments, analyse data, and interpret results, while observing the rules of responsible and ethical scientific conduct;
	develop effective written and oral communication skills, especially the ability to convey complex technical information in a clear and concise manner.
Chemistry	
K_W01	
uses in-depth knowledge of spectroscopic methods of chemical compound analysis	
K_U05	
presents the results of research in the form of an independently written paper containing a description and justification of the purpose of the work, adopted methodology, results and their significance in comparison to other similar research	

<p><b>K_K06</b> undertakes research tasks consciously and responsibly, understanding the social aspects of the practical application of the acquired knowledge and skills and the responsibility related to it</p> <p>Environmental Protection</p> <p><b>K_OŚII_W04</b> chooses methods, techniques and research tools used in environmental protection</p> <p><b>K_OŚII_U03</b> plans and performs research tasks in the field or laboratory and interprets research results on environmental issues (working individually or in a team assuming various roles, including managerial functions)</p> <p><b>K_OŚII_K02</b> recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work</p>	
<b>Contact</b>	
agnieszka.chylewska@ug.edu.pl	