


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Application of spectroscopy in bioinorganic chemistry		13.3.1213	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	second tier studies (MA)
Faculty of Chemistry	Chemical Business	form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Chemistry	type	second tier studies (MA)
		form	full-time
		specialty	all
Faculty of Chemistry	Environmental Protection	specialization	all
		type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Teaching staff			
prof. UG, dr hab. Agnieszka Chylewska			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		2 classes – 15 hours tutorial classes – 10 hours student's own work – 25 hours Total: 50 h – 2 ECTS	
Laboratory classes			
The realization of activities			
classroom instruction			
Number of hours			
Laboratory classes: 15 hours			
The academic cycle			
2023/2024 winter semester			
Type of course		Language of instruction	
an elective course		english	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
an individual work, experiments and measurements performing and an analysis of obtained results and discussion.		Final evaluation	
		Graded credit	
		Assessment methods	
		Students write 4 short tests (Pre-Lab Test) and 4 detailed reports (Post-Lab Report)	
		The basic criteria for evaluation	
		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	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
lack			

B. Prerequisites	
lack	
Aims of education	
<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>	
Course contents	
<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>	
Bibliography of literature	
<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>	
The learning outcomes (for the field of study and specialization)	Knowledge
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,
K_BChII_U04	appreciate the need for good practice in data collection and processing
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	Skills
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	· understand the objective of their chemical experiments, properly carry out the experiments, and appropriately record and analyze the results,
Chemistry	be able to use standard laboratory equipment, modern instrumentation, and classical techniques to carry out experiments,
K_W01	know and follow proper procedures and regulations for safe handling and use of chemicals,
uses in-depth knowledge of spectroscopic methods of chemical compound analysis	communicate the concepts and results of their laboratory experiments through effective writing and oral communication skills.
K_U05	Social competence
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	Students will be able to:
	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.

<p>K_K06 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>K_OŚII_W04 chooses methods, techniques and research tools used in environmental protection</p> <p>K_OŚII_U03 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>K_OŚII_K02 recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work</p>	
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