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		
Faculty of Chemistry	Chemical Business	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Chemistry	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all
Faculty of Chemistry	Environmental Protection	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all

Teaching staff

dr hab. Agnieszka Chylewska

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes

The realization of activities

lectures in the classroom

Number of hours

Laboratory classes: 15 hours

ECTS credits

2
classes – 15 hours
tutorial classes – 10 hours
student's own work – 25 hours
Total: 50 h – 2 ECTS

The academic cycle

2022/2023 winter semester

Type of course

an elective course

Language of instruction

english

Teaching methods

an individual work, experiments and measurements performing and an analysis of obtained results and discussion.

Form and method of assessment and basic criteria for eveluation or examination requirements

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

Business Chemistry:
During the laboratory exercises, the student solves problems in writing (tests) or oral (oral answer) in the field of bioinorganic chemistry. The method of verifying the acquisition of skills: Assessment of the student's involvement in discussions on the issues related to this subject (K_BChII_W01). Assessment of independent conducting of chemical experiments by the student (K_BChII_U04). Assessment of the Student's explanation of the course of chemical experiments, assessment of the correctness of the analysis of the results, drawing conclusions from the experiments and preparation of reports. The student assesses the usefulness and functioning of the existing engineering and technical solutions as well as research and measurement methods in the chemical industry (K_BChII_K04).

Chemistry:
During the laboratory exercises, the student solves problems in writing (tests) or oral (oral answer) in the field of bioinorganic chemistry. (K_W01) the item. Assessment of the student's independent conduct of chemical experiments. Assessment of the Student's explanation of the course of chemical experiments, assessment of the correctness of the analysis of results, drawing conclusions from the conducted experiments and preparation of reports. (K_U05). Method of verifying the acquisition of social competences: Assessment of the Student's ability to solve scientific and research problems on the basis of work The student identifies the level of their knowledge and skills as well as the need for updating knowledge, continuous professional training and personal development. (K_K06).

Environmental Protection:
During the laboratory exercises, the student solves problems in writing (tests) or oral (oral answer) in the field of general and inorganic chemistry. (K_OŚII_W04) The method of verifying the acquisition of skills: Assessment of the student's involvement in discussions on the issues related to this subject. Assessment of the student's independent conduct of chemical experiments. Assessment of the Student's explanation of the course of chemical experiments, assessment of the correctness of the analysis of the results, drawing conclusions from the experiments and preparation of reports. The student correctly assesses the usefulness and functioning of the existing engineering and technical solutions as well as research and measurement methods in the chemical industry. (K_OŚII_U03) The method of verifying the acquisition of social competences: Assessment of the student's ability to solve scientific and research problems on the basis of individual and team work. (K_OŚII_K02)

Required courses and introductory requirements

A. Formal requirements
lack

B. Prerequisites
lack

Aims of education

to give the students an idea of the importance and significance of chemistry in our lives and body;
to develop specific interests, habits, and abilities encompassing all sciences;
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

Course contents

Topics of the lecture:
safety practices and basic laboratory (filtration, crystallization, distillation, extraction, chromatography) and instrumental techniques (UV, ATR, IR, NMR spectroscopy) in chemistry
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)
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)
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)

Bibliography of literature

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 Biologicallnorganic Chemistry" Volume 1, Springer, 1-200, 1999.
R. S. Mikkelsen, E. Corton, „Bioanalytical Chemistry" Wiley-Interscience, 1-375, 2004.
G. A. Lawrance, „Introduction to Coordination Chemistry", University of Newcastle, Callaghan, NSW, Australia A John Wiley, 1-307, 2010.
G.E. Rodgers, „Descriptive Inorganic, Coordination, and Solid-State Chemistry, Third Edition" Belmont, Brooks Cole, USA, 1-668, 2012.

The learning outcomes (for the field of study and specialization)	Knowledge
Chemical Biznes K_BChII_W01 knows and understands in-depth complex physicochemical	Students will be able to: integrate theory and practice to solve qualitative and quantitative problems relating to familiar and unfamiliar aspects of chemistry, integrate information or data from a variety of sources,

processes and is able to analyse their coursee in connection with other fields of science

K_BChII_U04
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

K_BChII_K04
is willing to properly assess the acquired knowledge, respect it and disseminate it in order to solve specific cognitive and practical issues

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

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

Environmental Protection

K_OŚII_W04
chooses methods, techniques and research tools used in environmental protection

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)

K_OŚII_K02
recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work

appreciate the need for good practice in data collection and processing

Skills

Students will be able to:
·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.

Social competence

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.

Contact

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