


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Nazwa przedmiotu		Kod ECTS	
Experimental methods for studying chemical equilibria in aqueous solutions		13.3.1218	
Nazwa jednostki prowadzącej przedmiot			
Katedra Chemii Ogólnej i Nieorganicznej			
Studia			
wydział	kierunek	poziom	drugiego stopnia
Wydział Chemii	Biznes chemiczny	forma	stacjonarne
		moduł specjalnościowy	wszystkie
		specjalizacja	wszystkie
Wydział Chemii	Chemia	poziom	drugiego stopnia
		forma	stacjonarne
		moduł specjalnościowy	wszystkie
Wydział Chemii	Ochrona środowiska	specjalizacja	wszystkie
		poziom	drugiego stopnia
		forma	stacjonarne
Wydział Chemii	Ochrona środowiska	moduł specjalnościowy	wszystkie
		specjalizacja	wszystkie
Nazwisko osoby prowadzącej (osób prowadzących)			
dr hab. Dariusz Wyrzykowski			
Formy zajęć, sposób ich realizacji i przypisana im liczba godzin		Liczba punktów ECTS	
Formy zajęć		4	
Ćw. laboratoryjne		classes - 30 h	
Sposób realizacji zajęć		tutorial classes - 30 h	
zajęcia w sali dydaktycznej		student's own work - 40 h	
Liczba godzin		TOTAL: 100 h - 4 ECTS	
Ćw. laboratoryjne: 30 godz.			
Termin realizacji przedmiotu			
2023/2024 zimowy			
Status przedmiotu		Język wykładowy	
fakultatywny (do wyboru)		angielski	
Metody dydaktyczne		Forma i sposób zaliczenia oraz podstawowe kryteria oceny lub wymagania egzaminacyjne	
Lecture with the use of the multimedia presentation; Practical laboratory work – chemical experiments, analysis of obtained results and discussion.		Sposób zaliczenia	
		Zaliczenie na ocenę	
		Formy zaliczenia	
		reports and short tests	
		Podstawowe kryteria oceny	
		Laboratory classes: a positive note from all short tests and reports; final note is an average from notes from tests and reports:	
		91-100%: 5.0	
		81-90%: 4.5	
		71-80%: 4.0	
		61-70%: 3.5	
		51-60%: 3.0	
		< 51%: 2.0	
Sposób weryfikacji założonych efektów uczenia się			

The method of verifying the acquisition of knowledge:

Written reports and short tests in the field of solution chemistry. During the laboratory exercises, the student solves problems in writing (short tests, reports) or oral (oral answer) in the field of fluorescence spectroscopy.

The method of verifying the acquisition of skills:

Assessment of the student's involvement in discussions on the issues related to the subject. Assessment of independent conducting of chemical experiments by the student. 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 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.

Określenie przedmiotów wprowadzających wraz z wymogami wstępnymi

A. Wymagania formalne

lack

B. Wymagania wstępne

lack

Cele kształcenia

presenting basic issues in solution chemistry

presenting the basis of chemical calculations

familiarize students with the basic and more advanced aspects of chemical equilibria in aqueous solutions

familiarize students with the commonly used experimental methods and data processing

Treści programowe

The set of physico-chemical experiments includes 10 laboratory classes thematically related to chemical equilibria in aqueous solutions. The course is intended to familiarize students with the commonly used experimental methods, namely potentiometry and conductometry as well as an advanced method, namely isothermal titration chemistry for studying chemical equilibria, designing experiments, calculations as well as presentation of the obtained results.

Wykaz literatury

Extracurricular readings

Robert de Levie, How to Use Excel® in Analytical Chemistry And in General Scientific Data Analysis, Cambridge University Press (2001)

Jean-Louis Burgot, Ionic Equilibria in Analytical Chemistry, Springer Science+Business Media (2012)

Brian M. Tissue, Basics of Analytical Chemistry and Chemical Equilibria, John Wiley & Sons, Inc. (2013)

Kierunkowe efekty uczenia się

Chemical Business:

K_BChII_W01

knows and understands in-depth complex physicochemical processes and is able to analyse their course in connection with other fields of science

K_BChII_W02

knows and understands the axiological conditions regarding the use of modern techniques and measuring instruments as well as IT tools in chemistry, taking into account economic aspects K_BChII_U01

is able to based on the acquired knowledge, propose a solution to problems in chemistry, taking into account the economic aspect, using advanced measurement and analytical techniques K_BChII_U02

is able to define his/her interests, develop them within the chosen field of study and in connection with the subject of the master's thesis by implementing the process of self-education and planning his/her professional career

K_BChII_K01

is willing to develop and disseminate appropriate best practices in the workplace and beyond

K_BChII_K02

is willing to create and manage group work plans and take responsibility for the work of the entire team, properly assessing his/her own work and that of individual team members

Wiedza

Students know the commonly used experimental methods for studying chemical equilibria in aqueous solutions

Umiejętności

Students: design experiments, process experimental data as well as present the obtained results; interpret and analyze information connected with chemistry presented as text, tables, plots, schemes, figures; formulate descriptions of different chemical phenomena and processes, describe them with use of own words and figures (schemes); notice causal links in chemical processes performed in different conditions, where typical chemical reactions occur; explain course of different phenomena from everyday life with the use of chemical knowledge in correlation with other sciences; interpret information, formulates conclusions and explain opinions

Kompetencje społeczne (postawy)

Students: understand need for learning, inspire other for learning; cooperate in group, taking different roles; exhibit creativity in determination of priorities necessary for realization of different tasks; understand social aspects of practical use of knowledge and abilities as well as connected with them responsibility.

<p>Chemistry:</p> <p>K_W03 demonstrates in-depth knowledge in the field of modern measuring techniques used in chemical analysis</p> <p>K_W03 applies mathematics to the extent necessary to understand, describe and model chemical processes of extended complexity</p> <p>K_W10 uses knowledge of the principles of operation of the scientific and research apparatus used in chemistry</p> <p>K_U01 plans and implements chemical experiments of extended complexity</p> <p>K_U02 critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors</p> <p>K_U04 applies acquired knowledge of chemistry and related scientific disciplines</p> <p>K_K02 works in a team taking on various roles in it</p> <p>Environmental Protection:</p> <p>K_OŚII_W09 applies safety and hygiene principles when working independently on a test or measurement stand in a laboratory or in the field</p> <p>K_OŚII_U07 has advanced skills in presenting the results of their own research, discussions based on literature data and public speaking, including leading a debate</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> <p>K_OŚII_K07 is willing to undertake individual and team activity; to professionally plan and organise its course and set priorities for their actions</p> <p>K_OŚI_K08 is responsible for and takes care of the specialist equipment entrusted to her/him for research and laboratory or field work</p>	
Kontakt	
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