KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

Course title	ECTS code
Basic chemical equilibria in aqueous solution	13.3.1200

Name of unit administrating study

null

Studies

faculty	field of study		
Wydział Chemii	Biznes chemiczny	type	pierwszego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie
Wydział Chemii	Chemia	type	pierwszego stopnia
		form	stacjonarne
		specialty	chemia biomedyczna, chemia kosmetyków, analityka i diagnostyka chemiczna, chemia żywności
		specialization	wszystkie
Wydział Chemii	Ochrona środowiska	type	pierwszego stopnia
		form	stacjonarne
		specialty	wszystkie
		specialization	wszystkie

Teaching staff

dr hab. Dariusz Wyrzykowski

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 15 hours

ECTS credits

2
calsses - 15 h
tutorial classes - 15 h
student's own work - 20 h
TOTAL: 50 h - 2 ECTS

The academic cycle

2025/2026 summer semester

Type of course

an elective course

Language of instruction

English

Teaching methods

multimedia-based lecture

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

Final evaluation

Graded credit

Assessment methods

- written exam with open questions
- written exam (test)

The basic criteria for evaluation

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements
lack

B. Prerequisites
lack

Aims of education

presenting basic issues in solution chemistry
familiarize students with fundamental properties of the electrolytes in aqueous solutions

familiarize students with the basis of chemical calculations in the field of solution chemistry

Course contents

Topics:
acid-base equilibria
Buffer solutions and polyprotic acids
Complexation equilibria (complex equilibria, competing equilibria, stepwise complexation)
Species distribution diagrams

Bibliography of literature

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)

The learning outcomes (for the field of study and specialization)

Chemical Business:
K_BCh_W03: describes in an advanced level the techniques of higher mathematics and IT tools necessary to describe and model chemical phenomena and technological processes
K_BCh_W07: describes the construction and operating principles of scientific, technological and control-measuring apparatus
K_BCh_U08: uses the chemical nomenclature and engineering terminology properly

Chemistry:
K_W02: describes in an advanced level the properties of electrilytes in aqueous solutions
K_W08: demonstrates knowledge of computational methods to solve problems in chemistry, physics, mathematics
K_U01: identifies, analyses and solves problems in the field of broadly understood solution chemistry on the basis of the acquired knowledge
K_U08: presents in an understandable way the facts about chemistry using a scientific language typical of chemical sciences
K_U09: is able to learn independently
K_K06: raises her/his professional and personal competences by using information provided in various sources

Environmental Protection:
K_OŚI_W01: describes in an advanced level physical, chemical and biological phenomena occurring in nature
K_OŚI_U04: uses specialist language in the discussion and properly uses the nomenclature in the field of environmental protection and individual disciplines related to it
K_OŚI_K05: identifies the level of her/his knowledge and skills, demonstrates the need to update knowledge about the environment and its protection, demonstrates the need for continuous professional training and personal development

Knowledge

Students know the basic properties of electrolytes
(acids, bases, complex compounds) in aqueous solutions

Skills

Students present plainly the impact of a different environmental conditions (temperature, pH, the presence of other species) on equilibria of electrolytes in aqueous solutions; explain similarities and differences in properties of different types of electrolytes, notice causal links in chemical processes performed in aqueous solutions, where typical chemical equilibrium 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

Social competence

Students are aware of existing connections between the environment and chemistry; understand social aspects of practical use of knowledge and abilities as well as connected with them responsibility.

Contact

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