


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
General chemistry		7.2.0590	
Name of unit administrating study			
Faculty of Chemistry			
Studies			
faculty	field of study	type	pierwszego stopnia
Wydział Chemii	Ochrona środowiska	form	stacjonarne
		specjalty	Podstawowa
		specialization	Podstawowa
Teaching staff			
dr hab. Joanna Makowska, profesor uczelni; prof. UG, dr hab. Henryk Myszką; dr inż. Krzysztof Żamojć; mgr Ola Grabowska; dr Aleksandra Tesmar; dr inż. Edward Gleich; prof. dr hab. Mariusz Makowski; prof. dr hab. inż. Lech Chmurzyński; prof. UG, dr hab. Agnieszka Chylewska; dr inż. Małgorzata Gawrońska; dr Mateusz Kowalik; mgr Paulina Mech-Warda; dr hab. Aleksandra Dąbrowska, profesor uczelni; mgr Patrycja Wilczewska; dr inż. Paulina Spisz; dr hab. Dariusz Wyrzykowski			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		7	
Auditorium classes, Lecture		classes - 45 hours	
The realization of activities		consultations - 15 hours	
classroom instruction		student's own work - 115	
Number of hours		TOTAL: 175 hours - 7 points ECTS	
Lecture: 15 hours, Auditorium classes: 30 hours			
The academic cycle			
2023/2024 winter semester			
Type of course		Language of instruction	
obligatory		Polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
- multimedia-based lecture - problem solving		Final evaluation	
		- Graded credit - Examination	
		Assessment methods	
		- (mid-term / end-term) test - written exam with open questions	
		The basic criteria for evaluation	
		Basic criteria	
		1. Lecture:	
		- positive grade (note) in the written exam consisting of 12-20 open questions covering the issues listed in the program content of the lecture	
		- oral exam - supplementation of the written exam, but only for students who obtained 30-50% of the points available for the written exam	
		2. Auditorium exercises - passing two written tests	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			

no requirements

B. Prerequisites

no requirements

Aims of education

- to acquaint students with the basic types of inorganic compounds and methods of balancing chemical equations,
- to introduce students to the basics of chemical calculations.
- to acquaint students with all the issues listed in the program content of the lecture;

Course contents

Basic concepts in radiochemistry (Hydrogen isotopes. Types of radioactive transformations.); Molecule (Chemical bonds. Binding energy. Electronegativity. Hybridization and molecular geometry. VSEPR method.); Kinetics and chemical equilibrium (Rate of chemical reactions. Factors influencing the rate of chemical reactions. Types of kinetic equations. Multi-stage reactions. Law of mass action and equilibrium constant. Influence of external factors on chemical equilibrium.); Solutions (Non-electrolyte solutions (colligative properties). Electrolyte solutions - strong electrolyte theory (dissociation and dissociation degree).); pH of aqueous solutions (Acids and bases - theories of acids and bases. Neutralization. Ionic product of water. pH scale. pH indicators. pH of aqueous solutions of strong acids and bases.); Fundamentals of electrochemistry (Basic issues of electrochemistry (half-cell, cell, electrode, Nernst equation, hydrogen electrode). Electrochemical series of metals. Possibility of metal reacting with water, non-oxidizing and oxidizing acids depending on its position in the periodic table. Electrolysis. Electrode reactions of simple inorganic compounds. The balance of the electrolysis process - Faraday's laws.)

Problems of auditorium exercises: Balancing chemical equations (methods of obtaining oxides, acids, bases and salts as well as their nomenclature and chemical properties; methods of describing chemical reactions; methods of selecting stoichiometric coefficients in redox equations with particular emphasis on the method of half-reactions and in); Basic chemical laws and concepts (absolute mass of an atom and a molecule; relative atomic and molecular mass; mole concept; Avogadro number; molar mass; chemical equivalent and equivalent; basic chemical laws; Avogadro's law; Clapeyron's equation; Dalton's law; molar volume); Stoichiometry (determining the quantitative composition of chemical compounds; determining a chemical formula from the quantitative composition of a chemical compound - empirical formula and real formula; calculations based on chemical equations); Concentrations of the solutions (percentage, mole, normal, mole fraction, ppm and ppb); Chemical equilibrium (the concept of chemical equilibrium; chemical equilibrium constant; defiance rule).

Bibliography of literature

- A. Literature required for the final completion of the course (passing the exam):
- A.1. used during classes Collective work - Calculations in general chemistry - UG script
- A.2. studied independently by the student:
- A. Bielański - General and inorganic chemistry
- J. D. Lee - Concise Inorganic Chemistry L. Jones, P. Atkins General chemistry
- B. Supplementary literature J. Amiel - General chemistry
- L. Sobczyk, A. Kisza - Physical chemistry for naturalists,
- FA. Cotton, G. Wilkinson, P.L. Gaus - "Inorganic Chemistry"

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

<p>K_OŚI_W01 Discusses at an advanced level the concepts of mathematics, physics, chemistry and biology, describes physical, chemical and biological phenomena occurring in nature as well as geological, geomorphological and climatic conditions of the functioning of nature</p> <p>K_OŚI_U04 Uses a specialized language in discussion and correctly uses the nomenclature in the field of environmental protection and individual disciplines related to it</p> <p>K_OŚI_U09 Prepares in Polish / English a short description of the research, observation or task tasks carried out during the classes, using appropriate scientific terminology</p> <p>K_OŚI_K05 Identifies the level of their 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</p> <p>K_OŚI_K08 Is responsible and takes care of the specialist equipment entrusted to him for research and laboratory or field work</p>	<p>- student identifies and recognizes the basic types of chemical bonds, - student explains selected elements of kinetics and chemical equilibrium, - student knows how to determine the structure of chemical particles, - student understands and describes the structure of atoms of individual elements, - student explains and explains the basic theories of acids and bases, - student applies basic chemical rules and concepts, - student recognizes and names the basic types of chemical reactions along with oxidation and reduction reactions, - student knows why acid-base indicators change their color depending on the pH of the solution, - student defines the basic laws of electrochemistry, - student illustrates and describes the properties of elements and their compounds using chemical equations, - student knows the basic computational techniques in chemistry, - student knows how to distinguish solutions of non-electrolytes and electrolytes from each other.</p>
	<p>Skills</p> <p>- student performs basic chemical calculations taking into account the basic chemical and gas rules, stoichiometry and concentrations of solutions, - student can read information from the periodic table, - on the basis of the position of the element in the periodic table, student determines its structure and properties, - student uses the chemical language in an understandable way both in speech and in writing, - student balances the equations of chemical reactions, - student recognizes and compares the most important properties of elements and their compounds, with particular emphasis on the acid-base properties (knowledge), - student chooses the method of solving the task, - student determines the spatial structure of particles and chemical molecules, - student determines the position of equilibrium depending on external factors, - student records the electrode reactions of aqueous solutions of acids, bases and salts during electrolysis, - student determines the oxidizing and reducing properties depending on the position in the voltage series of the elements.</p>
	<p>Social competence</p> <p>- student shows creativity and activity in independent and group work - student understands the need for further education</p>
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