

KARTA PRZEDMIOTU**I. Dane podstawowe**

Nazwa przedmiotu	Chemia ogólna z elementami chemii fizycznej
Nazwa przedmiotu w języku angielskim	General chemistry with elements of physical chemistry
Kierunek studiów	Biotechnologia
Poziom studiów (I, II, jednolite magisterskie)	I
Forma studiów (stacjonarne, niestacjonarne)	stacjonarne
Dyscyplina	
Język wykładowy	Grupy w języku polskim – język polski, grupy w języku angielskim – język angielski

Koordinator przedmiotu/osoba odpowiedzialna	Dr Ludomir Kwietniewski
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Forma zajęć (<i>katalog zamknięty ze słownika</i>)	Liczba godzin	semestr	Punkty ECTS
wykład	45	I, II	10
ćwiczenia	45	I, II	
konwersatorium	20	I, II	

Wymagania wstępne	Basics of chemistry, physics and mathematics.
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II. Cele kształcenia dla przedmiotu

1. To acquaint students with laboratory equipment and laboratory routines, learn about essential chemical laws, familiarize with the structure of the atom and the periodic table of elements. Discussion of the properties of representative elements, their preparation and application.
2. To familiarize students with chemical concepts to describe chemical processes, solutions, chemical formulas and chemical reaction as well as solution concentrations, electrolytic dissociation and pH of solutions and classical chemical thermodynamics.
3. Discussion of Bronsted and Lewis theory and processes occurring in buffer solutions and during hydrolysis of salt.
4. To familiarize students with definitions and descriptions of interfaces phenomena, e.g. adsorption and wetting.

III. Efekty uczenia się dla przedmiotu wraz z odniesieniem do efektów kierunkowych

Symbol	Opis efektu przedmiotowego	Odniesienie do efektu kierunkowego
WIEDZA		
W_01	describes issues in the field of chemistry required to understand and interpret basic natural phenomena and processes	K_W02
W_02	presents knowledge in terms of statistics and computer science giving the possibility to describe and interpret natural phenomena especially relevant for general and physical chemistry	K_W03
W_03	presents the principles of health, safety work and ergonomics, indicates the psychophysical possibilities of a human in the work environment	K_W09
UMIEJĘTNOŚCI		
U_01	carries out observations and performs physical and chemical measurements	K_U02
U_02	describes, explains and interprets chemical and physicochemical phenomena at an advanced level	K_U08
U_03	uses knowledge in the field of physical-chemical conditions of phase boundary in order to describe and interpret life sciences phenomena	K_U09
U_04	performs qualitative and quantitative analyzes by using classical and instrumental method	K_U10
U_05	prepares a written study on issues related to general and physical chemistry in the language in which classes are conducted and in another modern language using the scientific language	K_U13
U_06	uses statistical methods and information technology to describe natural phenomena as well as to analyze and process experimental data	K_U14
U_07	designs and performs research tasks or expertise in the field of chemistry	K_U15
U_08	learns independently in a targeted manner in the field of general and physical chemistry, updates his knowledge and skills, applies new research techniques	K_U17
KOMPETENCJE SPOŁECZNE		
K_01	possesses appropriate habits required to the work in scientific laboratories, proceeds according to work safety regulations, knows how to react in states of danger	K_K04

IV. Opis przedmiotu/ treści programowe

Essential chemical laws. Periodic table of elements and the structure of atoms. Properties of representative elements, their preparation and application. Chemical bonds. Chemical equilibrium. Theories of acids and bases. Solubility and solubility product. The concept of ionic product of water and pH. Hydrolysis of salt. Oxidation and reduction reactions. Physical chemistry, thermodynamics. The first law of thermodynamics. The second law of thermodynamics. Enthalpy, entropy and Gibbs'

potential. Division of substances between two phases, extraction. Adsorptive surface layers, adsorption isotherms. Rate of chemical reactions, kinetic equation. Theories of chemical kinetics. Electrochemistry.

V. Metody realizacji i weryfikacji efektów uczenia się

Symbol efektu	Metody dydaktyczne (lista wyboru)	Metody weryfikacji (lista wyboru)	Sposoby dokumentacji (lista wyboru)
WIEDZA			
W_01	Conventional lecture	Exam	Evaluated written paper
W_02	Laboratory classes	Test/written test	Evaluated test/written test
W_03	Laboratory classes	Observation	Rating card
UMIEJĘTNOŚCI			
U_01	Laboratory classes	Report	Report printout / Report file
U_02	Laboratory classes Conventional lecture	Report Exam	Report printout / Report file Evaluated written paper
U_03	Laboratory classes	Report	Report printout / Report file
U_04	Laboratory classes	Report	Report printout / Report file
U_05	Laboratory classes	Report	Report printout / Report file
U_06	Laboratory classes	Report	Report printout / Report file
U_07	Laboratory classes	Report	Report printout / Report file
U_08	Laboratory classes Conventional lecture	Test/written test Exam	Evaluated test/written test Evaluated written paper
KOMPETENCJE SPOŁECZNE			
K_01	Laboratory classes	Observation	Rating card

VI. Kryteria oceny, wagi

VII. **Lecture:** Grade from the written exam (100 %).

VIII. **Classes:** Written tests in the form of colloquia and / or tests on issues from the main chapters (80%), preparation of written reports on the classes (8%), assessment of student's activity during classes (theoretical preparation for classes, practical exercises, activity, ability to work in a group, compliance with health and safety rules) (12%).

Konwersatorium: Written tests in the form of colloquia and / or tests on issues from the main chapters (90%), activity.

Mark	Evaluation criteria	
verygood (5)	the student realizes the assumed learning outcomes at a very good level	the student demonstrates knowledge of the education content at the level of 91-100%
overgood (4.5)	the student accomplishes the assumed learning outcomes an over good level	the student demonstrates knowledge of the education content at the level of 86-90 %
good(4)	the student accomplishes the assumed learning outcomes at a good level	the student demonstrates knowledge of the education content at the level of 71-85%
quitegood(3.5)	the student accomplishes the assumed learning outcomes at a quite good level	the student demonstrates knowledge of the education content at the level of 66-70%
sufficient (3)	the student accomplishes the assumed learning outcomes at a sufficientlevel	the student demonstrates knowledge of the education content at the level of 51-65%
insufficient (2)	the student accomplishes the assumed learning outcomes at an insufficientlevel	the student demonstrates knowledge of the education content below the level of 51%

IX. Obciążenie pracą studenta

Forma aktywności studenta	Liczba godzin
Liczba godzin kontaktowych z nauczycielem	110
Liczba godzin indywidualnej pracy studenta	140

X. Literatura

Literatura podstawowa i uzupełniająca
<ol style="list-style-type: none"> 1. P. Atkins, Physical Chemistry, 10th edition, P. Atkins, J. De Paula, Oxford University Press 2014. 2. P. Atkins, The Elements of Physical Chemistry, 6th edition, Oxford University Press 2013. 3. P. Atkins, J. De Paula, Physical Chemistry for Life Science, 2nd edition, Oxford University Press 2010. 4. E. Brady, J.R. Holm, Fundamentals To of Chemistry, J. Wiley, New York, 1988.