Karta przedmiotu / Course description

Informacje ogólne o przedmiocie / General information about the course	
1. Kierunek studiów / Major of study: Medical Biotechnology	**2. Poziom kształcenia / Study level:** first cycle studies **3. Forma studiów / Form of study:** stationary
4. Rok / Year: I	**5. Semestr / Semester:** II
6. Nazwa przedmiotu / Course name: Physical chemistry	
7. Status przedmiotu / Course status: obligatory	
8. Jednostka realizująca przedmiot, adres, e-mail / Name of Department, mailing address, e-mail: Medical University of Silesia in Katowice, Faculty of Pharmaceuticals Sciences in Sosnowiec, Department of Physical Pharmacy, Jagiellońska 4, 41-200 Sosnowiec, farmacjafizyczna@sum.edu.pl	
9. Treści programowe przedmiotu / Course contents: To familiarize students with the basic issues of physical chemistry in the field of thermodynamics, chemical equilibrium, kinetics, surface phenomena, diffusion, dispersion systems (colloids), electrochemistry and selected spectroscopic techniques constituting the theoretical basis of work in an analytical, control, diagnostic and industrial laboratory. Enabling the evaluation of the properties and reactivity of compounds, the measurement or determination of physicochemical quantities, interpretation and description of phenomenological physicochemical properties necessary in biotechnology.	
10. Liczba godzin z przedmiotu / Number of hours for the course	**45**
11. Liczba punktów ECTS dla przedmiotu / Number of ECTS points for the course	**4**
12. Formy i tematy zajęć / Forms and topics of classes	**Liczba godzin / Number of hours**
12.1. Lectures 1. Elements of chemical thermodynamics: the first law of thermodynamics, integral energy and enthalpy 2. Elements of chemical thermodynamics: elements of thermochemistry (heat of formation, heat of combustion, Hess's law, Kirchhoff's law), the second law of thermodynamics (entropy, free energy and free enthalpy) 3. Chemical equilibrium: equilibrium reactions, the influence of temperature and pressure on the equilibrium state 4. Phase equilibria and properties of solutions: Gibbs rule, phase equilibria in one-, two- and three-component systems 5. Equilibria in electrolyte solutions: pH 6. Elements of electrochemistry: electrical conductivity of electrolyte solutions 7. Surface phenomena: adsorption on the surface of a liquid, Gibbs equation, surfactants, phenomena of adsorption on a solid, physical and chemical adsorption, adsorption isotherms 8. Dispersion systems: colloids (preparation, purification, durability, optical, kinetic and electrical properties) 9. Physical methods in structural chemistry – introduction 10. Chemical kinetics: elements of chemical kinetics (speed of chemical reactions, order and molecularity of chemical reactions, kinetics of enzymatic reactions), mechanisms of chemical reactions	**15**
12.2. Seminars 1. Physical methods of studying the structure of molecules: molar refraction, molar polarization, dipole moment, parachor. Absorption spectroscopy: Lambert-Beer law, molar absorption coefficient	**15**

2. Phase equilibria and properties of solutions: Gibbs rule, phase equilibria in one-, two- and three-component systems 3. First law of thermodynamics, enthalpy and internal energy as functions of state 4. Isobaric, isochoric, isothermal and adiabatic processes. The molar heat of the gases 5. Thermochemistry: Hess's law, Kirchhoff's law 6. The second law of thermodynamics: entropy, thermodynamic potential 7. Reaction rate, order and molecularity of reactions, kinetic equation of simple reactions, determination of the order of the reaction. The theory of active collisions **12.3 Laboratory classes** 1. Discussion of methods for determining physicochemical values from experimental data and principles of safe work in a laboratory. 2. Study of saccharose inversion rate 3. Dissociation constant determination of the acid-base indicator (Bromothymol blue) from the absorbance measurements 4. Stability of hydrophobic and hydrophilic colloid 5. Distribution coefficient	**15**
13. Literatura / Readings Atkins P.W.: Physical chemistry. Oxford University Press; 11th edition	
14. Kryteria oceny – szczegóły / Detail evaluation criteria Zgodnie z zaleceniami organów kontrolujących / In accordance with the recommendations of the inspection bodies Zaliczenie przedmiotu - student osiągnął zakładane efekty uczenia się / Completion of the course – student has achieved the assumed learning outcomes Szczegółowe kryteria zaliczenia i oceny z przedmiotu są zamieszczone w regulaminie przedmiotu / Detail criteria for completion and evaluation of the course are specified in the course regulations	