GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	PHYSICAL CHEMISTRY, PG_00049195		
Field of study	Chemistry		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2021/2022
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	7.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Physical Chemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Janusz Stangret	
	Teachers	dr hab. inż. Piotr Bruździak dr hab. Aneta Panuszko prof. dr hab. inż. Janusz Stangret prof. dr hab. inż. Jan Zielkiewicz	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	45.0	0.0	15.0	105

E-learning hours included: 0.0

Adresy na platformie eNauczanie:

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	105	5.0	65.0	175

Subject objectives

The aim of the course is to gain the knowledge of the laws governing physical and chemical transitions of systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W03	Student presents a chosen physicochemical problem on the basis of self study of the subject literature.	[SW2] Assessment of knowledge contained in presentation
K6_U07	Student defines and describes basic laws and phenomena of chemical thermodynamics. Student solves calculation problems in ideal gas thermodynamics, thermochemistry, chemical equilibria and phase equilibria. Student explains theoretical background of physicochemical experiments in phenomenological thermodynamics. Student applies knowledge of phenomenological thermodynamics in practical laboratory experiments. Student elaborates and interprets results of self-conducted physicochemical experiments.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

Subject contents	Properties of basic states of matter. Elementary kinetic-molecular structure of matter. Intermolecular interactions. Basic terms of chemical thermodynamics: work, heat, internal energy, reversible and irreversible processes, I law of thermodynamics, enthalpy, heat capacity, termochemistry, II law of thermodynamics, entropy, - molecular and phenomenological interpretation, consequences of I and II laws of thermodynamics, free energy and enthalpy and their temperature dependence, criteria for spontaneous processes, partial molar thermodynamic quantities, III law of thermodynamics. Chemical equilibria: thermodynamic criteria for chemical equilibrium, dependence of equilibrium constant on temperature and pressure. Phase equilibria: phase rule, Clausius-Clapeyron equation, phase diagrams in one- and multicomponent systems, distillation, rectification, crystallization, extraction. Solutions: ideal and non-ideal solutions, standard states, activity coefficients, colligative properties, thermodynamics of mixing. Surface phenomena. Adsorption. Colloids. Transport phenomena.
Prerequisites and co-requisites	Preceding subjects: mathematics, physics, general chemistry. Elementary knowledge of matter structure , general chemistry and calculus

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exercise - 2 written tests	50.0%	40.0%
tests + laboratory reports	60.0%	30.0%
short tests + seminar presentation	60.0%	30.0%

Recommended reading

Basic literature	1. Chemia fizyczna, P. W. Atkins, PWN. 2. Chemia fizyczna, 1.Podstawy fenomenologiczne, K. Pigoń i Z. Ruziewicz, PWN. 3. Chemia fizyczna. Ćwiczenia laboratoryjne. Red. H. Strzelecki i W. Grzybkowski, Wydawnictwo PG.
Supplementary literature	1. Chemia fizyczna, Część I, W. Libuś, Wydawnictwo PG. 2. Chemia fizyczna. Zbiór zadań z rozwiązaniami, P.W. Atkins, C.A. Trapp, M.P. Cady, C. Giunta, PWN. 3. Zbiór zadań testowych z chemii fizycznej, I. Uruska, Wydawnictwo PG. 4. Eksperymentalna chemia fizyczna dla inżynierów, Praca zbiorowa, Red. H. Strzelecki, Wydawnictwo PG. 5. Chemia fizyczna. Laboratorium fizykochemiczne, L. Komorowski, A. Olszowski, PWN.
eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable