"ZATWIERDZAM"

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INFORMATION CARD OF THE SUBJECT MATTER / CLASSES (English version for subject / classes in English)

Subject name	Organiczna chemia fizyczna	Organic Physical Chemistry
Course ID	WTCCXCSE-SPoPC	
Language	English	
Education profile	Chemistry	
Form of study	stationary / non-stationary	
Study level	uniform master's studies / Erasmus +	
Type of study	general / / / selectable	
Valid from recruitment	2022/2023	
Form of classes, number of hours / rigor, total hours, ECTS points	The orientation and background 1.2 Molecular structure and symmetry. Valence-bond theory. Mo- lecular orbital theory. 1.6 The symmetry elements of objects. The electric and magnetic properties of molecules. 1.2 Molecules in motion (in gases and liquids). 1.2 State functions, exact and inexact differentials. 1.4 ex.4 The basic concepts: work, heat, energy, enthalpy, and entropy. Standard enthalpy changes. 1.4 ex.4 The physical transformations of pure substances. Phase stability and phase transitions. The Ehrenfest classification of phase transitions. 1.4 The properties of surfaces. The basic surface phenomena. 1.6 Surface analysis methods. 1.6 Physisorption and chemisorption. Adsorption and catalysis. 14 er4	
Introductory subjects and preliminary REQUIREMENTS	The advanced knowledge of 1. the general chemistry, 2. the analytical chemistry, 3. the organic chemistry, 4. the instrumental analysis.	
Semester / field of study	III / chemistry	
Author	Dr hab. Henryk Grajek	
Organizational unit re- sponsible for the item	The Faculty of New Technol	logies and Chemistry
Short description of the item	The extended knowledge on organic physical chemistry will be presented during the lectures. Some of the lectures will be	

	extended by the auditorium and the laboratory exercises in order to accomplish all requirements to pass the exam.
Full description of the subject (program content)	 The extended knowledge on the selected branches of organic physical chemistry will be presented during the lectures. Some of the lectures will be extended by the auditorium exercises in order to accomplish all requirements to pass the exam. REQUIREMENTS FOR THE SUBJECT'S ACCEPTANCE The subject must be finished by the exam.
Literature	 A. Obligatory: 1. J.H. Noggle, Physical Chemistry, Harper Collins Publishers, 1989; 2. P.W. Atkins, Physical Chemistry, Oxford University Press, Oxford, 1994; 3. G.M. Barrow, Physical Chemistry, The McGraw-Hill Companies, Inc., New York, 1997; 4. J.R. Conder, C.L. Young, Physicochemical Measurements by Inverse Gas Chromatography, John Wiley & Sons, New York, 1979. B. Complementary: 1. T.W.G. Solomons, C.B. Fryle, Organic Chemistry, Wiley, New York, 2004.
Learning outcomes:	 ESTABLISHED EDUCATION EFFECTS Symbol(Education effects)/Treatment to the education effects for the subject of study: W1 Student has: K_W02 K_W03 K_W05 K_U03 K_U04 K_K03 1. the extended and consolidated knowledge within the scope of analytical and organic chemistry (K_W01), involved: a. the periodic law; b. the electronic configurations of atoms and molecules; c. the electronic theory of valence; d. the electronic-vibration-rotation; e. analytical chemistry; f. thermodynamics. 2. the basic ideas about the coordination of compounds and inorganic polymers (K_W02); 3. the basic rules of quantum, statistical and molecular mechanics (K_W06); 4. the extended knowledge enabling justification of the chosen analytical procedure./K_W01,K_W02,K_W06 U1,U2,U3,U4 Student knows: 1. the databases on electrochemistry, chromatography, spectroscopy and thermodynamics, and knows how to employ their contents (K_U01); 2. how to evaluate the precision, confidence and prediction limits for the obtained analytical results (K_U02); 3. how to plan and perform chemical experiments in the manner to abide by the rules for safety and health at laboratory work (K_U03);

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	 4. how to determine the chemical composition and structure of unknown substances (K_U04). /K_U01,K_U02,K_U03,K_U04 K1 Student understands: social aspects of practical application of the studied knowledge (K_K06); the serious responsibility of their activity and the published results (K_K06)./K_K06 U5,U6,U7 Student can: employ the space-filling and the CPK models to portray overall molecular size and shape (K_U01); make the quantitative analysis and formulate the qualitative analysis (K_U02); evaluate a usefulness of routine methods of synthesis and analysis on the basis of the literature and experimental studies (K_U04)./K_U01,K_U02,K_U04.
	Assessment methods and criteria:
Methods and evaluation criteria (method of checking student achievement assumed learning outcomes)	The subject is credited based on an exam and passing the audi- torium exercises.
	1) The exam is conducted in a written form, which is scored with points. The student receives a 3.0 mark for getting 60%, a 3.5 mark for getting 70%, a 4.0 mark for getting 75%, a 4.5 mark for getting 80%, and a 5.0 mark for getting more than 85% of the maximum number of points.
	2) The condition for admission to the exam is passing the audi- torium exercises.
	3) Necessary condition to obtain credit: passing the test in prob- lem-solving skills. The student receives a mark of 3.0 for the correct solution of three, a mark of 4.0 for the right solution of four and a mark of 5.0 for the correct answer of five tasks.
ECTS balance (student workload)	ACTIVITY/STUDENT WORKLOAD in HOURS: 1. Participation in lectures / 30 2. Self-reliant studies of the lecture topics / 60 3. Participation in the exercises / 12 4. Individual preparation for the exercises / 24 5. Participation in the consultations / 16 6. Preparation for exams / 30 7. Participation in the exams with a pass mark / 2 Aggregate of the student workload: 172 / 2 ECTS Classes with the teachers: 1.+3.+5.+7.=88 / 2 ECTS Practical classes: 3.+4.=36 / 2 ECTS

Author	Manager of the organizational unit responsible for the item