



## Subject card

Subject name and code	Chemistry I, PG_00037332						
Field of study	Nanotechnology						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2020/2021		
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	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Katarzyna Kazimierczuk				
	Teachers		dr hab. Katarzyna Kazimierczuk				
			dr inż. Daria Kowalkowska-Zedler				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	0.0	0.0	0.0	0.0	45
	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	45		15.0		65.0	125
Subject objectives	The aim of this course is the repetition of basic chemical knowledge, including inorganic and organic chemistry. Some aspects of physical chemistry will be explained.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W01		- can give examples of chemical substances used in every-day life - can give examples of polymers produced in a large scale		[SW1] Assessment of factual knowledge		
	K6_U01		- student presents wider knowledge in chosen fields of chemistry  - student uses knowledge in solving problem, not only in the chemistry field		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W05		- can give examples of basic organic and inorganic compounds, describe their properties and give typical reactions. - do basic calculations		[SW1] Assessment of factual knowledge		

Subject contents	Periodic Table and the properties of the elements. Periodic Table and atomic structure. Electronic configuration of atoms.  Types of bonds. Molecular orbitals. Nomenclature, synthesis and properties of basic inorganic substances: oxides and hydrides. Nomenclature, synthesis and properties of basic inorganic substances: acids and bases. Nomenclature, synthesis and properties of basic inorganic substances: salts. Every-day applications of inorganic compounds. Ions and the chemistry of ionic substances: electrolytes; dissociation; weak acids and weak bases; hydrolysis.  Ions and the chemistry of ionic substances: reactions in aqueous solution: metathesis and redox reactions; oxidation numbers; the activity series. Stoichiometry, formulas and equations: Gas Law's, the mole, balancing chemical equations etc.  Volumetric analysis: concentration of solution. Volumetric analysis: acids, bases and salts, neutralization, pH, pH indicators, buffers. Saturated, unsaturated, and aromatic hydrocarbons. Source, properties and applications. Alcohols, thiols, amines and ethers. Source, properties and applications. Aldehydes and ketones. Source, properties and applications. Carboxylic acids and their derivatives. Source, properties and applications. Polymers: synthesis and every-day applications. Chemistry of biomolecules. The biological roles of proteins, carbohydrates, nucleic and lipids.		
Prerequisites and co-requisites	Basic knowledge of chemistry, physics and mathematics is required.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm exams	51.0%	100.0%
Recommended reading	Basic literature	Any high school chemistry handbook.  J. D. Lee - Związła chemia nieorganiczna  L. Jones, P. Atkins- Chemistry: Molecules, Matter, and Change	
	Supplementary literature	A. Bielański – Chemia ogólna i nieorganiczna  McMurry - Organic chemistry.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Polarized covalent bonds. Give an example of compound.  2. Calculate the % and molar concentration of potassium hydroxide solution, obtained by introducing of 39 g of potassium into 500 g of water. The solution density is 1.09 g/cm <sup>3</sup> .  3. What is the pH of HNO <sub>2</sub> solution of conc. 0.5 M. K= 2·10 <sup>-4</sup>  4. Write down the reactions:  a) neutralizing of magnesium hydroxide  b) potassium carbonate hydrolysis  c) synthesis of sulfuric(VI) acid  5. Write down the reactions of butadiene and cyclohexane combustion.  6. Write down the nitration reaction of chlorobenzene and toluene. Name the products.		
Work placement	Not applicable		