



Subject card

Subject name and code	Inorganic Chemistry, PG_00022024						
Field of study	Biotechnology						
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	2	ECTS credits			7.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Anna Dołęga					
	Teachers	dr inż. Anna Ordyszewska dr inż. Aleksandra Wiśniewska prof. dr hab. inż. Anna Dołęga dr inż. Daria Kowalkowska-Zedler dr inż. Mateusz Daško dr hab. Katarzyna Kazimierczuk					
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	0.0	90
	E-learning hours included: 0.0						
	Chemia nieorganiczna dla kierunku Biotechnologia i ZT - Moodle ID: 12179 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=12179						
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	90	6.0	79.0	175		
Subject objectives	Through lectures, exercises and laboratories, cause the student to understand and use basic concepts of inorganic chemistry.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U02	The student can apply the rules of general and inorganic chemistry to predict the nature of intermolecular interactions determining the properties of biomolecules.			[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		
	K6_W02	The student have the necessary knowledge about the elements and their simple compounds, which allows a rational analysis of the properties of biomolecules.			[SW1] Assessment of factual knowledge		
Subject contents	LECTURE: Types of inorganic reactions: redox, transfer of proton (acid-base reactions), transfer of ligand (precipitation, complexation). Noble gases. Halogens. Elements of 16 and 15 groups with emphasis on sulfur, nitrogen and phosphorus. The chemistry of group 14 elements - inorganic compounds of carbon; silicon, silica, silicates and silicones. Boron and its compounds, Al, Ga, In, Tl. Metals of s block. Selected metals of d block. Lanthanide contraction. Coordination compounds, the crystal field theory, isomerie in complexes. Essential trace and ultratrace elements, biomolecules with metallic centres - selected examples. EXERCISES: Equilibria in the aqueous solutions of electrolytes. Concentration of ions and pH of strong and weak acids and bases. Common ion effect. Buffers and hydrolysis of salts. Solubility and solubility product. Equilibria in solutions of complexes. LABORATORY: One-semester course of classic qualitative analysis. 6 exercises covering the analysis of aqueous mixtures containing selected cations and anions. Identification of salts.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exercises - three written tests during semester	60.0%	25.0%
	Laboratory - short tests and detailed reports	45.0%	25.0%
	Written exam	60.0%	50.0%
Recommended reading	Basic literature	A. Bielański „Chemia nieorganiczna”, PWN – recent issues; P.A. Cox „Krótkie wykłady, chemia nieorganiczna”, PWN, 2003; F.A. Cotton, G. Wilkinson, P.L. Gaus „Chemia nieorganiczna, podstawy”, PWN, 1995; University scripts: J. Prejzner: “Chemia nieorganiczna. Laboratorium” Wydawnictwo PG, Gdańsk 2004, „Chemia ogólna i nieorganiczna ćwiczenia rachunkowe” Ed. by A. Okuniewski, Wydawnictwo PG, Gdańsk 2019.	
	Supplementary literature	N.N. Greenwood, A. Earnshaw „Chemistry of the elements” Pergamon, 2nd Ed. (2005); C.E. Housecroft, A.G. Sharpe „Inorganic chemistry”, Pearson, Prentice Hall; 1st (2001), 2nd (2005) or 3rd (2008) editions; A.F. Wells „Strukturalna chemia nieorganiczna” WNT, 1993. M. Łaniecki „Basics of Inorganic Qualitative Analysis”, Issued by UAM, Poznań; „Calculations in General Chemistry”, collective work, issued by University of Gdansk, Gdańsk.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>Write down the dissociation equations for orthophosphoric(V) and orthoboric(III) acids. In each equation, indicate the acid and base according to Brønsted or Lewis theory.</p> <p>Describe the industrial method of obtaining nitric acid.</p> <p>Describe the industrial method of obtaining ammonia.</p> <p>Describe the industrial method of obtaining sulfuric acid (VI)</p> <p>Describe the industrial method of obtaining sodium carbonate.</p> <p>Describe the industrial method of obtaining aluminum.</p> <p>Describe the industrial method of obtaining sodium hydroxide.</p> <p>Write down the reaction equations for the preparation of superphosphates (two reaction equations) and calculate the diphosphorus pentoxide content in these superphosphates.</p> <p>Write down the equations for the laboratory and industrial reactions of chlorine production. Calculate the total mass of substrates in both reactions (separately for each reaction) needed to produce 1 m³ of chlorine under normal conditions.</p> <p>Write down the reactions of burning lithium, sodium and potassium in the air. What kind of ions are present in combustion products? Are these ions diamagnetic or paramagnetic? Justify your answer using electron configurations or molecular orbitals diagrams of the corresponding ions.</p>		
Work placement	Not applicable		