



## Subject card

Subject name and code	INORGANIC CHEMISTRY, PG_00053213						
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		5.0		
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 hab. Katarzyna Kazimierczuk  dr inż. Anna Ordyszevska  prof. dr hab. inż. Anna Dołęga  dr inż. Kinga Kaniewska-Laskowska				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	45.0	0.0	0.0	75
	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	75		10.0		40.0	125
Subject objectives	Basic knowledge of inorganic chemistry, properties of elements and their compounds - part 2, metals.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W03		The student can interpret the properties of elements and their compounds at the molecular level. The student understands the relationship between the properties of chemical elements and their applications and occurrence in living organisms.		[SW1] Assessment of factual knowledge		
	K6_W02		The student understands the laws, concepts and chemical phenomena, uses terminology and chemical symbolism related to: construction of inorganic compounds, types of chemical reactions, ionic dissociation and neutralization and precipitation reactions, oxidation and reduction reactions; knows the physicochemical properties of the elements and their chemical compounds and their applications; understands chemical phenomena and processes, including: energy effects of changes, factors affecting the course of reactions chemical.		[SW1] Assessment of factual knowledge		

Subject contents	LECTURE: 1. Boron group, boron and aluminum 2. Structure of solids. Metals and their alloys. Boron group: gallium, indium, thallium. 3. Noble gases. Chemistry of the elements of the block s. Alkali metals. 4. Chemistry of the elements of the block s. Alkaline earth metals. 5. Chemistry of the elements of the block d. Elements Sc ... Zn versus Y ... Cd and La ... Hg. Skandium group 6. Titan group. 7. Vanadium group 8. Chromium group 9. Manganese 10. Iron triad 11. Light and heavy platinoids. 12. Copper group 13. Zinc group 14. Lanthanides and lanthanide contraction. 15. Actinides.  LABORATORY: 1. Analysis of 3 inorganic salts, including one sparingly soluble - cation and anion among those discussed in semester II 2. Analysis of 3 inorganic substances: metal, non-metal, oxide, hydroxide, inorganic acid 3. Chemical reaction stoichiometry: determination of the limiting reagent and determination of the reaction yield 4. Equilibrium in solutions of electrolytes: determination of the pH and degree of dissociation and the equilibrium constant of the dissociation reaction of weak and strong acids and bases 5. Buffer solutions and salt hydrolysis: preparation of a buffer solution and testing its buffer capacity; determination of pH and degree of salt hydrolysis 6. Kinetics of chemical reactions: study of the effect of hydrochloric acid concentration and temperature on the rate of sodium thiosulphate decomposition 7. Determination of manganese in steel (8 weeks) 9. Determination of copper in brass by iodometric method 8. Determination of oxygen in water using the Winkler's method 9. Determination of phosphate content in Cola drinks and fertilizers.		
Prerequisites and co-requisites	"Inorganic chemistry" 2nd semester tutorials and laboratory passed.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory - 10 short tests and 10 detailed reports	50.0%	35.0%
	Written exam	60.0%	65.0%
Recommended reading	Basic literature	A. Bielański Chemia nieorganiczna, PWN recent editions; 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: Inorganic Chemistry. Laboratory exercises. Issued by Gdansk University of Technology, Gdansk 2004.	
	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 Inorganic Qualitative Analysis, Issued by UAM, Poznań	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Describe the industrial method of soda ash synthesis.  Write the reactions of lithium, sodium and potassium with the oxygen. What kind of ions are present in combustion products? Are these ions diamagnetic or paramagnetic? Answer justify using electron configurations and / or diagrams of molecular orbitals of the corresponding ions.  For sodium, specify: a) electron configuration and the number of unpaired electrons in the ground state of Na atom; b) hydride type; answer the question whether the bonds in sodium hydride are ionic or covalent; write the reaction equation of sodium hydride with water; c) what is the main reaction product of the reaction of sodium with excess oxygen; write down the equation for this reaction and the reaction equation for the resulting sodium compound with carbon dioxide; write what the last reaction is used for; d) what is the chemical nature (alkaline, amphoteric, acidic, neutral) of sodium oxide; record at least two equations of reaction justifying the selected chemical character of this oxide.  Among the given hydroxides, indicate amphoteric and write the reaction equations showing their amphotericity: aluminum hydroxide, sodium hydroxide, lead hydroxide (II), barium hydroxide.  Provide the chemical composition of the following substances: a) quick lime; b) slaked lime; c) gypsum water; d) dolomite.		
Work placement	Not applicable		