



Subject card

Subject name and code	Inorganic Chemistry, PG_00049194						
Field of study	Chemistry						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
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			assessment		
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Łukasz Ponikiewski					
	Teachers	dr hab. inż. Rafał Grubba dr hab. inż. Łukasz Ponikiewski dr inż. Aleksandra Ziółkowska dr inż. Anna Ordyszewska 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	60.0	0.0	0.0	105
	E-learning hours included: 0.0						
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	Types of chemical reactions - electron transfer, electron transfer, proton transfer reactions and ligand transfer reactions. Introduction of the students to the basic concepts of inorganic chemistry - properties of the elements and chemical compounds, their occurrence in nature, processing and use. Part I. p-block elements						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W09] has knowledge on chemical management and the concept of sustainable development necessary to conduct the management of chemicals (including dangerous substances) in the industrial plant, knows health and safety issues and ergonomics.	The student knows the chemical properties of p-block elements and their simple compounds	[SW1] Assessment of factual knowledge
	K6_W02	The student understands the connection between general chemistry rules and properties of simple chemical compounds.	[SW1] Assessment of factual knowledge
	[K6_K01] understands the need for lifelong learning, can inspire and organize the process of teaching other people	The student compiles the knowledge obtained in the various modules of classes to solve problems.	[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness
	[K6_K04] is aware of the importance of ethical behaviour in accordance with the principles of safety and health at work	The student learns how to plan and carry out simple chemical experiments in a safe way.	[SK3] Assessment of ability to organize work
[K6_U02] can work individually and in a team; he/she can assess the necessary task time and plan and organize individual work and in a small team in a way that ensures the execution of the task within a set deadline	The student knows how to plan and carry out simple laboratory activities.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment	
Subject contents	LECTURE: Redox- reactions. Acids and bases. The chemistry of nonmetals. Noble gases and their compounds. Halogens. The elements of groups 15 and 16 and their compounds with special emphasis on sulfur, nitrogen and phosphorus. The chemistry of group 14 elements - allotropes of carbon, inorganic compounds of carbon, silicon, silicates, silicones, germanium, tin and lead. Boron, boranes and oxoboranes. LABORATORY: Every student has to do a two-semester course of classic qualitative analysis. During the running semester it consists of 7 practical exercises covering the qualitative analysis of selected cations. EXERCISES: Solutions - solubility, concentrations percent, molar, normal, mol fraction, stoichiometry of the reactions in solutions. The concept of chemical equilibrium - basic calculations. Equilibria in the electrolyte solutions. Dissociation. Strong and weak electrolytes. The ion product of water. pH scale. Solutions of acids and bases. Solutions of salts. Buffer solutions. Precipitation equilibria and equilibria in solutions of complex compounds.		
Prerequisites and co-requisites	None		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exercises - Two written tests during semester	60.0%	25.0%
	Lecture tests	60.0%	50.0%
	Laboratory - short tests and detailed reports	45.0%	25.0%
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. J. Chojnacki, A. Dołęga, S. Konieczny, A. Konitz, A. Okuniewski (red.), J. Pikies, A. Pladzyk, Ł. Ponikiewski, M. Walewski, A. Wiśniewska: Chemia ogólna i nieorganiczna. Ćwiczenia rachunkowe. <i>Wydawnictwo Politechniki Gdańskiej</i> , Gdańsk 2019. ISBN: 978-83-7348-795-6 .	
	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; Calculations in General Chemistry, collective work, issued by University of Gdansk, Gdańsk.	
	eResources addresses	Adresy na platformie eNauczanie: 2023/2024 Chemia Nieorganiczna dla kierunku Chemia semestr II - Moodle ID: 35996 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=35996	

<p>Example issues/ example questions/ tasks being completed</p>	<p>1) Why does the nitric oxide molecule have a permanent magnetic moment? Explain using the molecular orbitals diagram. Calculate the bond order in the nitric oxide molecule.</p> <p>2) Why does iodine poorly dissolve in water and dissolve well in a solution of potassium iodide? Explain and write down the equation for the appropriate reaction.</p> <p>3) List at least two carbon oxides, write down their names, draw Lewis formulas. Describe briefly the physical properties of these compounds (physical state, color, odor, solubility in water).</p> <p>4) Write down the equations for the reactions of sodium chloride and sodium iodide with sulfuric acid (VI).</p> <p>5) Describe the bonds found in the B₂H₆ molecule</p> <p>6) How sodium hydroxide is obtained on a technical scale. Write down the reaction equations.</p> <p>7) Use the energy diagram to illustrate the molecular orbitals of oxygen in the ground state (triplet oxygen) and in the excited state (singlet oxygen). How can an oxygen molecule be excited from a triplet state to a singlet state?</p> <p>8) Write down the reactions that occur in the production of nitric acid from ammonia. In which reaction is the use of a catalyst necessary? What kind of catalyst is used?</p> <p>9) How is nitrogen obtained on a technical scale and how on a laboratory scale?</p> <p>10) What type of binding occurs in alkali metal hydrides? Write the equation of reaction of lithium hydride with water.</p>
<p>Work placement</p>	<p>Not applicable</p>