GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Inorganic Chemistry, PG_00054688		
Field of study	Biotechnology		
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	exam
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Pladzyk	
	Teachers	dr hab. inż. Agnieszka Pladzyk dr inż. Aleksandra Ziółkowska dr hab. inż. Rafał Grubba dr inż. Daria Kowalkowska-Zedler dr inż. Mateusz Daśko 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

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	10.0	75.0	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_W02	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
K6_U02	Student can apply the rules of general and inorganic chemistry to predict the nature of intermolecular interactions determining the properties of biomolecules.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
K6_U03	Student is able to plan and carry out simple experiments based on basic techniques such as precipitation, filtration, etc., which allow the identification of cations and anions	[SU1] Assessment of task fulfilment

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
Written exam	60.0%	50.0%
Laboratory - short tests and detailed reports	45.0%	25.0%
Exercises - three written tests during semester	60.0%	25.0%

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	Adresy na platformie eNauczanie: Chemia nieorganiczna BT & ZT 2 semestr 2023/2024 - Moodle ID: 37243 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37243

Example issues/ example questions/ tasks being completed

Write down the dissociation equations for orthophosphoric(V) and ortoboric(III) acids. In each equation, indicate the acid and base according to Brønsted or Lewis theory.

Describe the industrial method of obtaining nitric acid.

Describe the industrial method of obtaining ammonia.

Describe the industrial method of obtaining sulfuric acid (VI)

Describe the industrial method of obtaining sodium carbonate.

Describe the industrial method of obtaining aluminum.

Describe the industrial method of obtaining sodium hydroxide.

Write down the reaction equations for the preparation of superphosphates (two reaction equations) and calculate the diphosphorus pentoxide content in these superphosphates.

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.

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.

Work placement	Not applicable