



## Subject card

Subject name and code	Inorganic Chemistry, PG_00054688						
Field of study	Biotechnology						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
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 -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Agnieszka Pladzyk					
	Teachers						
Lesson types	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	This course provides students with a fundamental understanding of inorganic chemistry, essential for interpreting natural processes and designing independent research projects in chemistry and biotechnology.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	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 ions and chemical compounds			[SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment		
	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		

Subject contents	Course content – lecture LECTURE:			
	1. Types of inorganic reactions: redox reactions, proton transfer (acid-base equilibria), ligand transfer (precipitation reactions, complexation reactions). 2. Equilibria in electrolyte solutions (acids, bases, buffers, hydrolysis of salts). 3. Classification and properties of s, p, and d-block element compounds 4. Essential trace and ultra trace elements, bio-molecules, metalloproteins-selected examples.			
	Course content – exercises TUTORIALS -Practical calculations: 1. Equilibria in aqueous electrolyte solutions. Ion concentrations and pH of solutions of weak and strong acids and bases. The effect of a common ion. 2. Buffer solutions. Hydrolysis of salts. 3. Solubility and solubility product. Equilibria in solutions of complex compounds.			
Course content – laboratory LABORATORY - practical classes. Classical qualitative analysis course. 6 exercises including: 1. analysis of aqueous solutions of selected cations and anions. 2. analysis of inorganic substances: metal, non-metal, oxide, acid, base, salt, 3. study of the properties of buffer solutions and aqueous solutions of inorganic 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	<ul style="list-style-type: none"> <li>A. Bielański Chemia nieorganiczna, PWN wydania z ostatnich lat;</li> <li>P.A. Cox Krótkie wykłady, chemia nieorganiczna, PWN 2003;</li> <li>L. Jones, P. Atkins, L. Leroy, Chemia ogólna, Wydawnictwo naukowe PWN 2020, wydanie II;</li> <li>Skrypty uczelniane: J. Prejzner: Chemia nieorganiczna. Laboratorium Wydawnictwo PG, Gdańsk 2004.</li> <li>Chemia ogólna i nieorganiczna ćwiczenia rachunkowe Praca zbiorowa pod redakcją A. Okuniewskiego, Wydawnictwo PG, Gdańsk. (2019)</li> </ul>		
	Supplementary literature	<ul style="list-style-type: none"> <li>N.N. Greenwood, A. Earnshaw Chemistry of the elements Pergamon, wyd. II (2005);</li> <li>C.E. Housecroft, A.G. Sharpe Inorganic chemistry, Pearson, Prentice Hall; wyd I (2001), II (2005) lub III (2008);</li> </ul>		
	eResources addresses			
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>Write the dissociation equations of orthophosphoric(V) and orthoboric(III) acid. In each equation, indicate the acid and base according to Brønsted or Lewis theory.</li> <li>Describe the industrial method for obtaining nitric acid.</li> <li>Describe the industrial method for obtaining ammonia.</li> <li>Describe the industrial method of obtaining sulfuric(VI) acid.</li> <li>Describe the industrial method for obtaining sodium carbonate.</li> <li>Describe the industrial method for obtaining sodium hydroxide.</li> <li>Nitrate and phosphate fertilizers - obtaining, properties and effects on living matter and the environment.</li> <li>Determine the dissociation constant of acetic acid</li> <li>Calculate the pH of the solution formed by mixing equal volumes of aqueous solutions of ammonia and a concentration of 0.3 M and formic acid with a concentration of 0.15M</li> <li>Give examples of the use of d-block elements</li> <li>Give examples of the occurrence of elements with important functions in proteins.</li> <li>What interactions are crucial to the activity of biological systems, such as proteins</li> </ol>			
Practical activities within the subject	Not applicable			

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