



## Subject card

Subject name and code	, PG_00048762						
Field of study	Green Technologies						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		English		
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						
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] has a basic knowledge of chemistry including general chemistry, inorganic, organic, physical, analytical, including the knowledge necessary to describe and understand the phenomena and chemical processes occurring in the environment; measurement and the determination of the parameters of these processes.	The student has knowledge of general and inorganic chemistry, including knowledge necessary for description and understanding phenomena and chemical processes occurring in aqueous solutions, determining the parameters of these processes. Student gives a short description of noble gases and their compounds. Describes the natural resources, preparation and properties of halogens. Describes the natural resources, preparation and properties of the 16th and 15th groups elements, with a special emphasis on sulfur, nitrogen and phosphorus. Gives a description of 14th group elements - describes the allotropes of carbon and its inorganic compounds, properties of silicon, silica, silicates and silicones. Defines the concept of metal. Describes metals of p, s and d block (mainly Sc...Zn series). Explains the lanthanide contraction. Gives a definition of a coordination compound. Student names the trace and ultratrace elements in living organisms and gives representative examples of biomolecules bearing metallic centers. Student is able to do calculations covering the subject of chemical equilibrium. He can explain the common ion effect, calculate buffer solutions and apply the hydrolysis concept. He also can solve the problems regarding solubility, solubility product and equilibria in aqueous solutions of coordination compounds.	[SW1] Assessment of factual knowledge
	[K6_U05] can formulate and solve engineering tasks analytical methods, simulation as well as experimental, able to apply knowledge of basic physics and mathematics to analyze the results of experiments, is able to analyze and assess existing technical solutions	Student is able to use properly selected analytical, simulation and experimental methods and devices enabling basic measurement of quantities characterizing materials and processes occurring in aqueous solutions	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
Subject contents	LECTURE: 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. Metals - an introduction. metals of p block. Metals of s block. Metals of d block - series Sc...Zn versus Y...Cd and La...Hg. Lanthanide contraction. Coordination compounds. Essential trace and ultratrace elements, biomolecules with metallic centres - selected examples. EXERCISES: Equilibria in the aqueous solutions of electrolytes. Common ion effect. Buffers and hydrolysis of salts. Solubility and solubility product. Equilibria in solutions of complexes. LABORATORY: The program of the laboratory includes 10 exercises concerning qualitative analysis of cations and anions. These exercises are performed individually. Every student must write short entrance test and write the report after each exercise.		
Prerequisites and co-requisites	1st semester of Inorganic Chemistry passed		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory	45.0%	25.0%
	tutorials	60.0%	25.0%
	lecture	60.0%	50.0%
Recommended reading	Basic literature	Required reading 1. P. W. Atkins & J. A. Beran "General Chemistry" 2. J. Chojnacki, A. Dołęga, B. Dręczewski "Selected Topics in General and Inorganic Chemistry" Wyd. PG 2013. 3. J.D. Lee "A New Concise Inorganic Chemistry" 1994. 4. C. E. Housecroft, A. G. Sharpe, "Inorganic Chemistry" Pearson Prentice Hall 2008	

	Supplementary literature	Recommended reading 1. P. A Cox, "Instant Notes in Inorganic Chemistry" BIOS 2000. 2. MIT Open Courses in Chemistry 3. T. L. Brown, H. LeMay, B. Bursten, "Chemistry. The Central Science" Prentice Hall, 2000.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Write the definition of buffer solution and give the example of acidic buffer. 2. Write the reaction of hydrolysis of $\text{CH}_3\text{COONa}$ salt. Predict the pH of water solution of given salt. 3. Describe the process of the nitric and sulfuric acid production. 4. Describe the properties of noble gases 5. Describe the chemical properties of the elements of 4 group of periodic table of elements. 6. Write the reaction of metallic copper in nitric acid concentrated and diluted.	
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.