



## Subject card

Subject name and code	General and inorganic chemistry - laboratory, PG_00063391						
Field of study	Technologies for Industry 5.0						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
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		Polish		
Semester of study	2		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Ewa Wagner-Wysiecka				
	Teachers		dr hab. inż. Ewa Wagner-Wysiecka				
			dr inż. Radosław Pomećko				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	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	30		5.0		40.0	75
Subject objectives	Laboratory exercises are designed to familiarise students with the specifics of working in a chemical laboratory and to acquire skills useful for further education and professional work. It is important to link the knowledge acquired during the course involving lecture and auditorium exercises and to use specific skills in practice.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W01] demonstrates knowledge and understanding of mathematics, physics, chemistry and IT tools at the level necessary to formulate and solve typical engineering and technological problems		The student is able to independently solve theoretical and calculus problems in general chemistry. Uses basic equipment in a chemical laboratory. Draws and formulates conclusions from own measurements and observations.		[SW1] Assessment of factual knowledge		
	[K6_U01] applies knowledge of mathematics, physics, chemistry, IT tools and other engineering disciplines to solve theoretical, engineering and technological problems		The student knows the structure of the atom, knows the properties of the elements resulting from their position in the periodic table, knows the relationship between the structure and properties of substances. The student knows the principles of nomenclature of chemical compounds. The student knows the types of chemical reactions, including redox reactions. Knows the properties of solutions, including electrolyte solutions. Has the knowledge of the basics of thermodynamics and kinetics, as well as electrochemistry. Student is able to apply the above issues in solving calculus and practical problems.		[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		

Subject contents	1. Introduction, health and safety in the chemical laboratory, discussion of basic glassware and laboratory equipment, disposal of reagents, safety data sheets, preparation of results, estimation of uncertainty 2h 2. Qualitative analysis of cations and anions 2h 3. Identification of organic compounds 2h 4. Properties of solutions - concentrations 2h 5. Properties of solutions - acidity 2h 6. Precipitation reactions 2h 7. Quantitative analysis of inorganic substances. Spectroscopic methods: UV-Vis spectroscopy 2h 8. Quantitative analysis of inorganic substances. Electrochemical methods: conductivity 2h 9. Kinetics of chemical reactions 2h 10. Water and water treatment processes: softening and demineralisation, membrane processes, water hardness determination: alkacymetry and complexonometry 2h 11. Colloids and nanoparticles 2h 12. Redox reactions 2h 13. Electrochemical series of metals. Cells 2h 14. Conductivity of solutions and electrolysis 2h 15. Corrosion, galvanic coatings 2h		
Prerequisites and co-requisites	Knowledge of general and inorganic chemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical completion of all exercises; passing tests and preparation of reports	51.0%	100.0%
Recommended reading	Basic literature	Chemia ogólna. Ćwiczenia laboratoryjne" red. E. Luboch, M. Bocheńska, J.F. Biernat, Wydawnictwo PG, 2003.K.M. Pazdro, A. Rola-Noworyta "Akademicki zbiór zadań z chemii ogólnej" Oficyna Edukacyjna K. Pazdro, 2013 r.P.A. Cox, Krótkie wykłady Chemia nieorganiczna, Wydawnictwo Naukowe PWN, W-wa, 2022.	
	Supplementary literature	Z. Hubicki, Ćwiczenia laboratoryjne z chemii nieorganicznej. Podręcznik dla studentów ochrony środowiska. Wyd. UMCS, 2010.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Calculate the pH of a 0.1 mol/dm <sup>3</sup> aqueous solution of acetic acid.Indicate which chemical transformations are redox type reactions. Balance the redox equation.Identify the type of chemical bond in given chemical compounds, explain the relationship between bond type and chemical properties.Identify electrolytes and non-electrolytes - determine the relationship between conductivity and chemical structure of specific organic compounds.Explain what the rate of chemical reactions depends on.		
Work placement	Not applicable		

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