GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Chemistry, PG_00037262		
Field of study	Technical Physics		
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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Ewa Wagner-Wysiecka	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	0.0	0.0	60

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	60	5.0	35.0	100

Subject objectives

The main goal of the course is to consolidate knowledge of students in general chemistry.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] is able, individually or in a team, to plan and conduct experiments in physics and related fields, including applied computer science or energy engineering, and to analyse and interpret results and formulate conclusions.	The student has experience in working in a chemical laboratory	[SU4] Assessment of ability to use methods and tools
[K6_W01] demonstrates an understanding of the civilisational significance of physics and its applications.	The student is able to integrate knowledge from physics and chemistry and understands their combined role in the advancement of science, technology, and the modern world.	[SW1] Assessment of factual knowledge
[K6_K01] demonstrates readiness for continuous learning and updating knowledge in physics and related fields, critically evaluating it and recognising its importance in solving practical and theoretical problems.	The student is able to systematically update and expand their knowledge of chemistry using available scientific sources and computer-based methods. Student understands the significance of the acquired chemical knowledge in solving practical problems and in preparation for further studies in physics and related sciences.	[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice

<table>
<tr><td>Subject contents</td><td>Course content – lecture
1. The periodic table and electronic configuration of atoms
2. Fundamental chemical laws and chemical equations
3. Types of chemical bonds and their characteristics
4. Theories of chemical bonding: molecular orbital theory and hybridization
5. The VSEPR method and molecular geometry
6. Intermolecular interactions and the hydrogen bond
7. States of matter and crystals
8. Inorganic compounds and their nomenclature
9. Coordination compounds and the coordination bond
10. Organic compounds: classification, isomerism, reactivity
11. Polymers and biologically important macromolecules
12. Fundamentals of chemical thermodynamics
13. Chemical equilibria and aqueous solutions
14. Theories of acids and bases, buffer solutions
15. Electrochemistry and redox reactions

Course content – laboratory
1. Introduction to laboratory classes
2. Qualitative analysis of cations
3. Qualitative analysis of anions
4. Identification of organic compounds
5. Oxidation and reduction reactions. Colloidal solutions
6. Conductivity of solutions: aqueous and non-aqueous electrolytes
7. Acidity of solutions
8. Methods of water softening and demineralization
9. Extraction and chromatography
10. Chemical reaction kinetics
11. Galvanic cells
12. Electrochemical and chemical corrosion of metals
13. Electrolysis</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Passing laboratory exercises</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>Passing the lecture - written colloquium</td><td>50.0%</td><td>50.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. L. Jones, P. Atkins Chemia ogólna. Czasteczki, materia, reakcje" PWN 2009. 2. A. Bielański Podstawy chemii nieorganicznej PWN 2002. 3. F.A. Cotton, G. Wilkinson, P.L. Gaus Chemia nieorganiczna. Podstawy PWN 2002. 4. P.W. Atkins Podstawy chemii fizycznej PWN 1999. 5. J. McMurry Chemia organiczna PWN 2005. 6. E. Luboch, M. Bocheńska, J.F. Biernat (red.) Chemia ogólna. Ćwiczenia laboratoryjne, Wyd. PG 2003.</td></tr>
<tr><td>Supplementary literature</td><td>1. W. Kołos, J. Sadlej Atom i cząsteczka WNT 2007. 2. P.W. Atkins Przewodnik po chemii fizycznej PWN 1997. 3. A. Cygański Metody elektroanalityczne WNT 1995.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>How do the properties of the main group elements change as their atomic weight increases?Concepts of chemical bonding: ionic bonding, covalent bonding.Properties of ionic substances.The pH scale. Importance of pH in nature and economy.How does the rate of a chemical reaction depend on temperature? Give the relevant mathematical relationships (van't Hoff's rule, Arrhenius equation).</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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