GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| 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 2026 | Academic year of realisation of subject | 2026/2027 |
| 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 -> 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 | 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.<br>Student is able to apply the above issues in solving calculus and practical problems. | [SU2] Assessment of ability to analyse information<br>[SU4] Assessment of ability to use methods and tools |

<table>
<tr><td>Subject contents</td><td>Course content – laboratory<br>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<br>2. Qualitative analysis of cations and anions 2h<br>3. Identification of organic compounds 2h<br>4. Properties of solutions - concentrations 2h<br>5. Properties of solutions - acidity 2h<br>6. Precipitation reactions 2h<br>7. Quantitative analysis of inorganic substances. Spectroscopic methods: UV-Vis spectroscopy 2h<br>8. Quantitative analysis of inorganic substances. Electrochemical methods: conductivity 2h<br>9. Kinetics of chemical reactions 2h<br>10. Water and water treatment processes: softening and demineralisation, membrane processes, water hardness determination: alkacymetry and complexonometry 2h<br>11. Colloids and nanoparticles 2h<br>12. Redox reactions 2h<br>13. Electrochemical series of metals. Cells 2h<br>14. Conductivity of solutions and electrolysis 2h<br>15. Corrosion, galvanic coatings 2h</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of general and inorganic chemistry</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>Practical completion of all exercises; passing tests and preparation of reports</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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.</td></tr><tr><td>Supplementary literature</td><td>Z. Hubicki, Ćwiczenia laboratoryjne z chemii nieorganicznej. Podręcznik dla studentów ochrony środowiska. Wyd. UMCS, 2010.</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Calculate the pH of a 0.1 mol/dm3 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.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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