



UNIWERSYTET
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W POZNANIU

Introduction to Inorganic Chemistry

Educational subject description sheet

Basic information

Study programme Chemia (General Chemistry) Speciality - Organizational unit Faculty of Chemistry Study level First-cycle programme Study form Full-time Education profile General academic		Didactic cycle 2024/25 Subject code 02CENS.12K.01815.24 Lecture languages English Course type Obligatory Block Major subjects	
Subject coordinator	Beata Dudziec		
Lecturer	Beata Dudziec		
Period Semester 2	Activities and hours • Laboratories: 15, Graded credit		Number of ECTS points 1

Goals

Code	Goal
C1	Provide knowledge in the field of nomenclature and structures of chemical compounds, as well as the dependence of their construction on the position in the periodic table of the elements.
C2	Provide knowledge in the issue of theories concerning chemical bonds.
C3	Introduction of concepts related to covalent bonds (Lewis formulas, theories: VSEPR, valence bonds and molecular orbital).
C4	Introducing the concept of ionic bond.
C5	Introducing the concept of metallic bond.
C6	Basic issues and examples related to the theories concerning acids and bases.

Entry requirements

No prerequisites required.

Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
Knowledge - Student:			
W1	knows and understands the rules of writing names and formulas of inorganic compounds.	CEN_K1_W01, CEN_K1_W02, CEN_K1_W12	Written colloquium, Test
W2	understands the dependencies resulting from the location of the element in the periodic table on its physicochemical properties.	CEN_K1_W02, CEN_K1_W08, CEN_K1_W13	Written colloquium, Test
W3	knows and understands the theories concerning chemical bonds and structures of chemical compounds.	CEN_K1_W01, CEN_K1_W06, CEN_K1_W08	Written colloquium, Test
W4	knows and understands the theories of acids and bases.	CEN_K1_W01, CEN_K1_W05	Written colloquium, Test
Skills - Student:			
U1	formulates the systematic names and formulas of compounds correctly.	CEN_K1_U01, CEN_K1_U02	Written colloquium, Test
U2	explains the properties of chemical compounds in terms of their structure and position in the periodic table.	CEN_K1_U02, CEN_K1_U03, CEN_K1_U04	Written colloquium, Test
U3	distinguishes examples of appropriate acids and bases and their specific reactions.	CEN_K1_U01, CEN_K1_U02, CEN_K1_U03	Written colloquium, Test

Study content

No.	Course content	Subject learning outcomes	Activities
1.	Introduction to inorganic chemistry, systematic names and formulas of inorganic compounds.	W1, U1	Laboratories
2.	The relation between the position of the element in the periodic table and its physicochemical properties, as well as features of selected compounds.	W2, U2	Laboratories
3.	Properties of non-metals, octet rule, hybridization, molecule's shape prediction, resonance, MO theory and energy diagrams for X ₂ molecules, bond polarity, dipole moment.	W2, U2	Laboratories
4.	Properties of ionic compounds, crystal structures with respective packing, network nodes, octahedral and tetrahedral gaps, lattice energy and factors determining its value.	W3, U2	Laboratories
5.	Properties of metals, band theory, energy diagrams for conductors, semiconductors and dielectrics (insulators).	W3, U2	Laboratories
6.	Acids and bases in inorganic chemistry: theories of Arrhenius, Brønsted-Lowry, Lewis, Pearson (hard and soft acids and bases (HSAB)).	W4, U3	Laboratories

Additional information

Activities	Teaching and learning methods and activities
Laboratories	Lecture with a multimedia presentation of selected issues, Discussion, Case study, Problem-based learning, Work in groups

Activities	Credit conditions
Laboratories	<p>Examination methods: text and written colloquiums.</p> <p>The conditions for passing the classes is attendance at a minimum of 13 out of 15 class hours (1 class hour = 45 minutes) and obtaining at least 50% of the maximum possible amount of points.</p> <p>Grading scale with applied percentage distribution.</p> <ul style="list-style-type: none"> • excellent (A; 5.0) - achievement by the student of the assumed learning outcomes in a range of 90.0 - 100% • very good (B; 4.5) - achievement by the student of the assumed learning outcomes in a range of 80.0 - 89.9% • good (C; 4.0) - achievement by the student of the assumed learning outcomes in a range of 70.0 - 79.9% • satisfactory (D; 3.5) - achievement by the student of the assumed learning outcomes in a range of 60.0 - 69.9% • sufficient (E; 3.0) - achievement by the student of the assumed learning outcomes in a range of 50.0 - 59.9% • fail (F; 2.0): failure to achieve the assumed learning outcomes, result below <50.0% <p>When obtaining less than 49.9% of the maximum possible amount of points, the student is entitled to write a final test on all issues from this subject material, enabling passing the classes and obtaining a sufficient grade (E, 3.0).</p>

Literature

Obligatory

1. J. D. Lee „Concise Inorganic Chemistry”. 5th Edition, Chapman and Hall Ltd., London, 1996
2. P. Atkins, T. Overton, J. Rourke, M. Weller, F. Armstrong, M. Hagerman „Inorganic Chemistry” 5th Ed.; Oxford University Press, 2010

Optional

1. C. E. Housecroft, A. G. Sharpe “Inorganic Chemistry”, 5th Ed.; Pearson Education Ltd., 2018

Calculation of ECTS points

Activities	Activity hours*
Laboratories	15
Preparation for classes	5
Reading the indicated literature	5
Preparation for the assessment	5
Student workload	Hours 30
Number of ECTS points	ECTS 1

* academic hour = 45 minutes

Efekty uczenia się dla kierunku

Kod	Treść
CEN_K1_U01	The graduate can use basic chemical terminology according to IUPAC and PTChem recommendations
CEN_K1_U02	The graduate can present the knowledge acquired in an accessible manner
CEN_K1_U03	The graduate can identify and justify the properties of a substance on the basis of its structure
CEN_K1_U04	The graduate can plan the implementation of chemical processes in terms of the choice of reagents and elimination of the side products formed
CEN_K1_W01	The graduate knows and understands basic chemical laws and issues
CEN_K1_W02	The graduate knows and understands basic physics and their relationship to chemical laws
CEN_K1_W05	The graduate knows and understands the mechanisms of basic chemical reactions
CEN_K1_W06	The graduate knows and understands structure of molecules and crystals
CEN_K1_W08	The graduate knows and understands the chemical properties of substances according to their structure/composition
CEN_K1_W12	The graduate knows and understands chemical compounds, including those discovered recently
CEN_K1_W13	The graduate knows and understands processes and relationships in the environment