



UNIwersYTET  
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W POZNANIU

## Inorganic chemistry

### Educational subject description sheet

#### Basic information

<b>Study programme</b> Chemistry	<b>Didactic cycle</b> 2023/24
<b>Speciality</b> -	<b>Subject code</b> 02CHSS.21P.00976.23
<b>Organizational unit</b> Faculty of Chemistry	<b>Lecture languages</b> English
<b>Study level</b> Second-cycle programme	<b>Course type</b> Obligatory
<b>Study form</b> Full-time	<b>Block</b> Basic subjects
<b>Education profile</b> General academic	
<b>Subject coordinator</b>	Monika Wałęsa-Chorab
<b>Lecturer</b>	Monika Wałęsa-Chorab
<b>Period</b> Semester 1	<b>Activities and hours</b> • Lecture: 15, Exam; including sub-activities: ◦ Synchronous lecture: 15 • Laboratories: 45, Graded credit
	<b>Number of ECTS points</b> 7

## Goals

Code	Goal
C1	Transfer and consolidation of knowledge on modern aspects of inorganic chemistry.
C2	Transfer of knowledge in the field of methods of obtaining chemical elements and the properties of elements.
C3	Transfer of knowledge in the field of selected issues of coordination and organometallic chemistry.
C4	Transfer of knowledge on the chemistry of metallo-supramolecular structures, their topologies and properties.
C5	Transfer of knowledge in the field of bioinorganic chemistry and inorganic materials with specific properties.
C6	Transfer of knowledge on the applications of coordination complexes as well as metalorganic and supramolecular compounds.
C7	Consolidation of knowledge on occupational health and safety and identifying the ability to use it.
C8	Developing of communication and teamwork skills.
C9	Developing of the ability to develop research results and using literature sources.
C10	Developing of the ability to apply basic concepts and theory of coordination chemistry in predicting structures and reactivity of metal complexes.
C11	Preparation for independent laboratory work and proper interpretation of test results.
C12	Acquainting with analytical and identification techniques of work in the laboratory.

## Entry requirements

No prerequisites required.

## Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
<b>Knowledge - Student:</b>			
W1	knows and understands the synthetic principles of generating elements, coordination compounds and complex inorganic architectures.	CHS_K2_W01, CHS_K2_W02, CHS_K2_W03, CHS_K2_W05	Written exam, Written colloquium
W2	knows and understands the properties and applications of inorganic elements and their compounds.	CHS_K2_W01, CHS_K2_W04, CHS_K2_W06	Written exam, Written colloquium
W3	knows the factors affecting the stability of coordination compounds.	CHS_K2_W01, CHS_K2_W02, CHS_K2_W04	Written exam, Written colloquium
W4	knows the applications of inorganic compounds, complexes of transition metal ions and metalloorganic compounds.	CHS_K2_W06	Written exam, Written colloquium
W5	knows the basic aspects of metallo-supramolecular chemistry.	CHS_K2_W01, CHS_K2_W04	Written exam, Written colloquium
<b>Skills - Student:</b>			

Code	Outcomes in terms of	Learning outcomes	Examination methods
U1	is able to apply the appropriate analytical techniques for the identification and characterization of inorganic compounds.	CHS_K2_U01, CHS_K2_U02, CHS_K2_U03, CHS_K2_U06	Written colloquium
U2	is able to use literature sources.	CHS_K2_U08, CHS_K2_U09, CHS_K2_U13	Written exam, Written colloquium
U3	is able to conduct and control the experimental work according to the given procedure.	CHS_K2_U03, CHS_K2_U04	Written colloquium
U4	is able to plan experimental work according to timeframe given and look after tidiness and safety of working area.	CHS_K2_U08, CHS_K2_U11, CHS_K2_U13	Written colloquium
U5	is able to prepare a written report concerning the conducted experiment, properties and activity of metal complexes.	CHS_K2_U07, CHS_K2_U12	Written colloquium, Report
U6	is able to evaluate the work contribution of themselves and other group members.	CHS_K2_U15	Written colloquium
<b>Social competences - Student:</b>			
K1	is ready to apply the rules of occupational health and safety in the laboratory of inorganic chemistry.	CHS_K2_K01	Written colloquium
K2	is ready to evaluate the correctness of the experiment and the results obtained.	CHS_K2_K01, CHS_K2_K02	Written colloquium, Report
K3	is ready to evaluate the actual contribution of his own work and that of other team members in carrying out the research and preparing the report.	CHS_K2_K02, CHS_K2_K04	Written colloquium, Report

## Study content

No.	Course content	Subject learning outcomes	Activities
1.	Introduction to inorganic chemistry.	W1, W2	Lecture, Synchronous lecture
2.	Chemistry of transition metals and their complexes.	W1, W2, W3, W4, W5	Lecture, Synchronous lecture
3.	Coordination and metallo-supramolecular chemistry.	W1, W2, W5	Lecture, Synchronous lecture
4.	Importance of inorganic chemistry in biological systems.	W1, W2	Lecture, Synchronous lecture
5.	Inorganic catalysis and its applications.	W2, W4	Lecture, Synchronous lecture
6.	Application of inorganic compounds and materials in electronics.	W2, W4	Lecture, Synchronous lecture
7.	Data analysis of the obtained products.	U1, U5, U6, K2	Laboratories
8.	Safety rules of work in laboratory of inorganic chemistry.	K1	Laboratories
9.	Working techniques in the laboratory of inorganic chemistry.	U1, U3, U4	Laboratories

No.	Course content	Subject learning outcomes	Activities
10.	Interpretation of research results, methods of writing reports based on performed experiments.	U2, U5, K2, K3	Laboratories

### Additional information

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues
Laboratories	Laboratory method

Activities	Credit conditions
Lecture	<p>The exam will be in written form. The final mark will base on points obtained on a written exam as well as on points collected on laboratories.</p> <p>Grading scale with applied percentage distribution:</p> <ul style="list-style-type: none"> <li>• excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%.</li> <li>• very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%.</li> <li>• good (4.0): achievement of student learning outcomes 70.0% - 79.9%.</li> <li>• average (3.5): achievement of student learning outcomes 60.0% - 69.9%.</li> <li>• satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%.</li> <li>• unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.</li> </ul>
Laboratories	<p>Before starting the laboratory, the student should be familiar with the principles of occupational health and safety in the laboratory. This knowledge will be checked before first laboratory.</p> <p>Before each laboratory, the knowledge and skills concerning the current topic will be checked. To start, the experiment's student should obtain at least 1.0 point (out of 3 points) from section A with questions concerning realization of the experiment. Additional 2 points can be obtained from section B (questions concerning theoretical knowledge). 2.0 points can be obtained for excellent performance of experiment and 3.0 points for correctness of report with final conclusions. In total, student can obtain maximum 10 points for each exercise, what gives maximum 60 points in total.</p> <p>Grading scale with applied percentage distribution:</p> <ul style="list-style-type: none"> <li>• excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%.</li> <li>• very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%.</li> <li>• good (4.0): achievement of student learning outcomes 70.0% - 79.9%.</li> <li>• average (3.5): achievement of student learning outcomes 60.0% - 69.9%.</li> <li>• satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%.</li> <li>• unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.</li> </ul>

## Literature

### Obligatory

1. Brian W. Pfennig, Principles of Inorganic Chemistry, 2nd Edition, John Wiley & Sons, Inc., 2022
2. Gary L. Miessler, Paul J. Fischer, Donald A. Tarr, Inorganic Chemistry, 5th edition, Pearson 2021

### Optional

1. C. E. Housecroft and A. G. Sharpe, "Inorganic Chemistry", 3rd Edition, Pearson

## Calculation of ECTS points

Activities	Activity hours*
Lecture	15
Laboratories	45
Preparation for classes	45
Report preparation	30
Preparation for the exam	45
Reading the indicated literature	30
<b>Student workload</b>	<b>Hours</b> 210
<b>Number of ECTS points</b>	<b>ECTS</b> 7

\* academic hour = 45 minutes

## Efekty uczenia się dla kierunku

Kod	Treść
CHS_K2_K01	The graduate is ready to identify and evaluate cognitive and practical problems in the field of chemical research
CHS_K2_K02	The graduate is ready to evaluate the collected information critically
CHS_K2_K04	The graduate is ready to appreciating, promoting and adhering to professional ethics in their own and others' activities
CHS_K2_U01	The graduate can use chemical terminology consistent with IUPAC recommendations
CHS_K2_U02	The graduate can analyze the physicochemical properties of substances based on the selection of appropriate methods and tools
CHS_K2_U03	The graduate can carry out chemical processes including the selection of reagents and purification of products
CHS_K2_U04	The graduate can interpret technological diagrams and carry out technological processes on a laboratory scale
CHS_K2_U06	The graduate can use analytical and instrumental techniques to describe the qualitative and quantitative interpretation of chemical phenomena
CHS_K2_U07	The graduate can prepare a final report on conducted research projects and conduct a critical analysis of experiments
CHS_K2_U08	The graduate can find and use information obtained from databases and literature resources in order to plan and carry out a research project
CHS_K2_U09	The graduate can use information and communication techniques in order to deepen his knowledge and communication in specialist circles of recipients
CHS_K2_U11	The graduate can present a complex chemical or physicochemical problem and propose a solution
CHS_K2_U12	The graduate can draw conclusion properly and evaluate critically on the basis of data from self-conducted chemical or physicochemical experiments and literature resources
CHS_K2_U13	The graduate can deepens his specialistic knowledge to the extent necessary to solve and interpret the undertaken problem correctly
CHS_K2_U15	The graduate can work in a group, performing various roles, including a leader
CHS_K2_W01	The graduate knows and understands selected advanced issues in the field of chemistry
CHS_K2_W02	The graduate knows and understands concepts and relationships allowing for a quantitative description of complex physico-chemical phenomena
CHS_K2_W03	The graduate knows and understands mechanisms of advanced chemical reactions and indicates their interrelationship and importance in science
CHS_K2_W04	The graduate knows and understands physico-chemical properties of chemical compounds and materials depending on their structure / composition
CHS_K2_W05	The graduate knows and understands advanced chemical synthesis processes
CHS_K2_W06	The graduate knows and understands the use of chemicals of key importance for the progress of science