R O M Â N I A
MINISTERUL EDUCAȚIEI ȘI CERCETĂRII
Universitatea din Craiova
FACULTATEA DE ȘTIINȚE/ DEPARTAMENTUL DE CHIMIE
Craiova, Str. Calea București, nr. 107I
Tel/ fax: 0251597048, e-mail: chimie@ucv.ro

Subject Description

1. Program information

1.1. Institution	University of Craiova
1.2. Faculty	Science
1.3. Department	Chemistry
1.4. Study field	Chemistry
1.5. Study level	Master
1.6. Type of education	full-time
1.7. Study program	Advanced Chemistry

2. Subject information

2.1. Subject			**Practical activities in Inorganic chemistry**				
2.2. Course coordinator			-				
2.3. Application coordinator			Lect.dr. Irina Dăbuleanu				
2.4. Year of study	II	2.5. Semester	4	2.6. Type of evaluation	V	2.7. Subject type	DS/DOB

3. Total estimated type (hours/semester)

3.1. Number of hours per week	4	from which: 3.2 course	-	3.3. lab	4
3.4. Total hours in curriculum	48	from which: 3.5 course	-	3.6. lab	48
Time allocation – hours/week					
Study using textbooks, bibliographies, and notes					20
Additional documentation in the library, on specialized electronic platforms, and in the field					40
Preparation of laboratories, assignments, reports, portfolios					30
Tutoring					6
Examinations					4
Other activities (individual research, problem solving, independent work)					2
3.7. Total hours of individual study					102
3.8. Total hours per semester					150
3.9. Number of ECTS					6

4. Preconditions (if the case)

4.1. of curriculum	•
4.2. of competences	•

5. Conditions (if the case)

5.1. for course	•
5.2. for labs	• Laboratory activities are conducted in dedicated inorganic chemistry laboratories equipped with appropriate infrastructure and analytical instrumentation to support master-level experimental work, in full alignment with the curriculum requirements and EQF Level 7 learning outcomes. The available facilities adequately support inorganic synthesis, characterization, and analytical investigations as specified in the discipline syllabus.

6. Course objectives - expected learning outcomes achieved by completing and passing the course

Knowledge	1. Graduates select and use appropriate experimental and theoretical methodologies to investigate complex scientific problems, assessing their impact on the environment and society. 2. The graduate describes and integrates interdisciplinary knowledge into the implementation of research projects.
Skills	1. Graduates evaluate and analyze experimental techniques to conduct and design experiments, analyze and test (qualitatively and quantitatively) chemical elements and substances; design, coordinate, and conduct chemical experiments. 2. Graduates apply interdisciplinary methods to solve complex theoretical and practical chemical problems in their professional and research activities.
Responsibility and autonomy	1. Graduates use classical laboratory instruments/techniques and modern equipment independently, design experiments, and interpret and analyze the obtained results accurately. They design learning situations focused on developing experimental techniques and methods specific to chemical laboratories. 2. Graduates assume responsibility for managing interdisciplinary collaborations and coordinating activities within work and research teams.

7. Table of contents

7.1. COURSE	Mode of operation	Teaching methods	Allocated time (hours)
References:			

7.2. Lab	Mode of operation	Teaching methods	Allocated time (hours)
Laboratory safety, risk assessment, and experimental planning in inorganic chemistry • Advanced laboratory safety rules • Chemical risk assessment and waste management • Planning and documentation of laboratory experiments	On site (week 1)	Interactive demonstration; guided discussion; case-based learning (analysis of laboratory incidents); supervised practical instruction.	4
Synthesis and purification of inorganic compounds • Preparation of simple inorganic salts • Crystallization, filtration, drying techniques • Yield calculation and purity assessment	On site (week 2)	Demonstration-based learning; guided laboratory practice; learning by doing; formative feedback during experimental work.	4

Coordination compounds: synthesis and structural considerations • Preparation of coordination complexes • Ligand denticity and coordination geometry • Structure–property relationships	On site (week 3)	Problem-based laboratory work; guided inquiry; supervised experimental practice; reflective discussion on structure–property relationships.	4
UV–Vis spectroscopy applied to inorganic and coordination compounds • Electronic transitions in metal complexes • Acquisition and interpretation of UV–Vis spectra • Correlation with ligand field theory	On site (weeks 4)	Experimental investigation; guided data acquisition; analytical interpretation tasks; instructor-led clarification of theoretical models.	4
Infrared spectroscopy of inorganic compounds • Metal–ligand vibrations • Functional group identification • Spectral interpretation and reporting	On site (week 5)	Hands-on spectroscopic analysis; comparative spectral analysis; guided interpretation; collaborative discussion of results.	4
Thermal analysis of inorganic materials • TG, DTA, DSC techniques • Thermal stability and decomposition pathways • Data analysis and interpretation	On site (weeks 6)	Experimental demonstration; inquiry-based learning; data-driven analysis; interpretation of thermal curves through guided questioning.	4
Redox processes and electrochemical methods in inorganic chemistry • Redox reactions of inorganic systems • Electrochemical measurements • Interpretation of redox behavior	On site (week 7)	Experimental problem solving; guided laboratory experiments; analytical reasoning; discussion of experimental outcomes.	4
Qualitative and quantitative analysis of metal ions • Selective reactions and separation techniques • Classical wet chemical analysis • Analytical accuracy and selectivity	On site (week 8)	Algorithmic laboratory procedures; guided analytical practice; learning by repetition and comparison; instructor feedback.	4
Solid-state inorganic chemistry • Preparation of inorganic solids and oxides • Structural considerations in the solid state • Basic characterization methods	On site (week 9)	Experimental synthesis; exploratory laboratory work; guided observation; discussion of structure–property correlations.	4

Magnetic and electrical properties of inorganic materials • Measurement of magnetic behavior • Electrical conductivity experiments Structure–property correlations	On site (week 10)	Experimental measurement activities; data interpretation exercises; guided analysis; application-based discussion.	4
Inorganic catalysis: preparation and evaluation • Synthesis of simple inorganic catalysts • Catalytic activity testing Interpretation of catalytic performance	On site (weeks 11)	Project-based laboratory learning; experimental design under supervision; comparative analysis of catalytic performance; reflective discussion.	4
Integrated laboratory project and scientific reporting • Experimental design and independent work • Data analysis and critical discussion Preparation and presentation of a scientific laboratory report	On site (week 12)	Independent laboratory work; project-based learning; critical analysis; scientific writing; oral presentation and feedback.	4

References:

1. **Housecroft, C. E.; Sharpe, A. G.** 2023. *Inorganic Chemistry*. Pearson Education.
2. **Miessler, G. L.; Fischer, P. J.; Tarr, D. A.** 2022. *Inorganic Chemistry*. Pearson Education.
3. **Rao, C. N. R.; Müller, A.; Cheetham, A. K. (eds.)** 2022. *The Chemistry of Nanomaterials: Synthesis, Properties and Applications*. Wiley-VCH.
4. **Elschenbroich, C.** 2023. *Organometallics*. Wiley-VCH.
5. **Royal Society of Chemistry.** 2022–2025. *Inorganic Chemistry Frontiers*. Royal Society of Chemistry Publishing.

8. Corrrelation of the discipline content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The content of the discipline *Practical Activities in Inorganic Chemistry* is aligned with the expectations of the epistemic community by emphasizing experimental rigor, advanced laboratory techniques, and critical analysis of experimental data, in accordance with current standards in inorganic chemistry research.

The discipline responds to the requirements of professional associations through the systematic application of laboratory safety regulations, ethical research practices, and standardized experimental methodologies, ensuring responsible and compliant professional conduct.

The expectations of representative employers are addressed by developing practical laboratory skills, autonomy in experimental work, problem-solving abilities, and effective scientific communication, competencies that are directly applicable in research, industrial, and quality control environments at EQF Level 7.

9. Evaluation

Activity	9.1. Evaluation criteria	9.2. Evaluation method	9.3. Contribution to final score
9.4. Course			
9.5. Lab	Correct application of laboratory safety rules; compliance with risk assessment and waste management procedures.	Continuous assessment during laboratory work.	10 %
	Correct execution of synthesis and characterization procedures; accuracy and reproducibility of experimental results.	Observation of practical skills; laboratory notebook; laboratory reports.	70 %
	Ability to analyze and interpret experimental data; quality and coherence of scientific reporting.	Project evaluation; written laboratory report.	20 %

9.6. Minimum performance standard
To pass the course, the student must demonstrate the following: • correct application of health and safety regulations specific to the inorganic chemistry laboratory; • ability to carry out, under supervision, the basic laboratory experiments included in the syllabus; • correct use of fundamental synthesis and analytical techniques in inorganic chemistry; • basic interpretation of experimental results, establishing simple correlations between experimental data and theoretical concepts; • proper completion of the laboratory notebook and laboratory reports in a coherent and scientifically correct manner; • achievement of a minimum score of 50% of the total laboratory assessment.

Date
22.09.2025

Laboratory coordinator,
Lect.dr. Irina Dăbuleanu

Date of approval
25.09.2025

Head of Department,
Conf.dr. Nicoleta Cioateră