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
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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			**Advanced separation and purification**				
2.2. Course coordinator			Lect. dr. Simionescu Andreea				
2.3. Application coordinator			Lect. dr. Simionescu Andreea				
2.4. Year of study	I	2.5. Semester	1	2.6. Type of evaluation	E	2.7. Subject type	DS/DOB

3. Total estimated tipe (hours/semester)

3.1. Number of hours per week	3	from which: 3.2 course	1	3.3. seminar/lab	2
3.4. Total hours in curriculum	42	from which: 3.5 course	14	3.6. seminar/lab	28
Time allocation – hours/week					
Study using textbooks, course materials, bibliographies, and notes					35
Additional documentation in the library, on specialized electronic platforms, and in the field					20
Preparation of seminars/labs, assignments, reports, portfolios, and essays					19
Tutoring					5
Examinations					4
Other activities.....					
3.7. Total hours of individual study					83
3.8. Total hours per semester					125
3.9. Number of ECTS					5

4. Preconditions (if the case)

4.1. of curriculum	•
4.2. of competences	•

5. Conditions (if the case)

5.1. for course	• Lecture hall equipped with computer, video projection system, and internet connection
5.2. for labs	• Laboratory equipped with the materials, equipment, and reagents necessary to carry out experimental work

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

Knowledge	1. Graduates define, understand, explain, and apply advanced knowledge of chemistry from specialized literature in practice. 2. Graduates select and use appropriate experimental and theoretical methodologies to investigate complex scientific problems, assessing their impact on the environment and society. 3. Graduates write analysis and scientific reports, presenting the results of their research and experiments, in line with professional ethics and standards. 4. The graduate describes and integrates interdisciplinary knowledge into the implementation of research projects.
Skills	1. Graduates apply major concepts in analytical, inorganic, organic, and physical chemistry to chemical practice. 2. 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. 3. Graduates apply critical thinking, following the structure and principles of scientific writing to develop and present scientific reports. 4. Graduates apply interdisciplinary methods to solve complex theoretical and practical chemical problems in their professional and research activities.
Responsibility and autonomy	1. Graduates are able to adapt major scientific concepts in the field of chemistry to conduct research, improve or develop new concepts, knowledge, theories, and operational methods, products, and services in order to apply them in specific activities for product and process quality control. 2. 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. 3. Graduates prepare and present scientific reports in line with ethical standards for collecting and interpreting results. 4. 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)
1. The need for advanced separation and purification processes. Classification of separation methods.	On site (weeks 1-2)	Lecture, explanation and interactive presentation, heuristic conversation, problem solving	2
2. Interphase balance. Measuring the efficiency of separations.	On site (weeks 3-4)	Lecture, explanation and interactive presentation, heuristic conversation, problem solving	2
3. Separation in the presence of ion exchangers. Selectivity and exchange equilibrium of ion exchange.	On site (weeks 5-6)	Lecture, explanation and interactive presentation, heuristic conversation, problem solving	2
4. Thin layer chromatography. Analytical applications	On site (weeks 7-8)	Lecture, explanation and interactive presentation, heuristic conversation, problem solving	2
5. Peculiarities of solvent extraction as a method of purification and concentration.	On site (weeks 9-10)	Lecture, explanation and interactive presentation, heuristic conversation, problem solving	2
6. Extraction concentration and inhibition.	On site (weeks 11-12)	Lecture, explanation and interactive presentation,	2

		heuristic conversation, problem solving	
7. Advanced Extraction Concentration and Purification Techniques.	On site (weeks 13-14)	Lecture, explanation and interactive presentation, heuristic conversation, problem solving	2
References:			
1. G. D. Christian, Analytical chemistry, Fifth Edition, John Wiley, 1996			

7.2. Lab	Mode of operation	Teaching methods	Allocated time (hours)
1. Notions of labor protection.	On site (week 1)	Experiment, explanation, discussion, debate, and questioning	4
2. Separation of amino acids by C.S.S.	On site (week 3)	Experiment, explanation, discussion, debate, and questioning	4
3. Separation of Co and Ni elements by ion exchange chromatography.	On site (week 5)	Experiment, explanation, discussion, debate, and questioning	4
4. Separation of Co and Zn elements by ion exchange chromatography.	On site (week 7)	Experiment, explanation, discussion, debate, and questioning	4
5. Separation by L-L extraction of copper from wastewater and its spectrometric determination.	On site (week 9)	Experiment, explanation, discussion, debate, and questioning	4
6. Separation by L-L extraction of lead from wastewater and its spectrometric determination	On site (week 11)	Experiment, explanation, discussion, debate, and questioning	4
7. Laboratory colloquium and presentation of papers.	On site (week 13)	Experiment, explanation, discussion, debate, and questioning	4
References:			
1. Lab work presentations, 2025.			

8. Correlations 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 course is in line with those of similar courses at universities in Romania and abroad, while also meeting the expectations of professional associations and representative employers in the field.

9. Evaluation

Activity	9.1. Evaluation criteria	9.2. Evaluation method	9.3. Contribution to final score
9.4. Course	theoretical concepts and mechanisms, critical analysis of literature or design of a catalytic system	Written Exam	50%
		Portfolio	20%

9.5. Lab	synthesis, characterization, data interpretation	Project Work	30%
9.6. Minimum performance standard			
• Basic understanding of core concepts. • Knowledge of main types of catalytic nanostructures. • Elementary understanding of synthesis methods. • Simple correlation between structure and catalytic activity. • Completion of practical/project tasks			

Date
22.09.2025

Course coordinator,
Lect. dr. Simionescu Andreea

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Date of approval
25.09.2025

Head of Department,
Conf. dr. Nicoleta Cioateră