

SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University of Cluj-Napoca
1.2 Faculty	Environmental Science and Engineering
1.3 Department	Environmental Analysis and Assessment
1.4 Field of study	Environmental Engineering
1.5 Study cycle	Bachelor
1.6 Study programme / Qualification	Environmental Engineering

2. Information regarding the discipline

2.1 Name of the discipline	Chemistry I						
2.2 Course coordinator	Assist. Prof. (Lecturer) PhD Roba Carmen						
2.3 Seminar coordinator	Assist. Prof. (Lecturer) PhD Roba Carmen						
2.4. Year of study	I	2.5 Semester	1	2.6. Type of evaluation	E	2.7 Type of discipline	Mandatory

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					26
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					20
Tutorship					-
Evaluations					4
Other activities:					-
3.7 Total individual study hours	70				
3.8 Total hours per semester	126				
3.9 Number of ECTS credits	5				

4. Prerequisites (if necessary)

4.1. curriculum	-
4.2. competencies	-

5. Conditions (if necessary)

5.1. for the course	• Normal (classical) conditions of attendance at teaching activities
5.2. for the seminar /lab activities	• Mandatory attendance at practical work • During the laboratory activities, the students will wear a lab coat • The laboratory report will be submitted no later than the week following the actual completion of the work

6. Specific competencies acquired

Professional competencies	- Critical analysis of models and theories in the field of fundamental sciences to address specific problems of environmental knowledge and protection - Application of notions in the field of fundamental and engineering sciences to address specific problems of environmental knowledge - Explanation and interpretation of properties, concepts, approaches, models and notions related to fundamental and engineering sciences - Recognition and description of concepts, theories, methods and elementary models related to fundamental and engineering sciences - Presentation of projects related to engineering fields
Transversal competencies	- Identifying and respecting the norms of ethics and professional deontology, assuming responsibilities for the decisions made and the related risks - Identifying roles and responsibilities in a multidisciplinary team and applying effective communication and work techniques within the team - Efficient use of information sources and communication resources and assisted professional training (portals, Internet, specialized software applications, databases, online courses, etc.) both in Romanian and in an internationally spoken language - Description, analysis and use of concepts and theories from fundamental scientific fields (mathematics, physics, chemistry) and from the field of engineering sciences - Description, analysis and use of concepts and theories from the economic-managerial field applied to the environmental field

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	• Mastering basic chemical principles to understand the behavior of chemical compounds in environmental pollution
7.2 Specific objective of the discipline	• Knowing the structure and composition of inorganic and organic substances and the main chemical reactions.

8. Content

8.1. Course	Teaching methods	Remarks
8.1.1. Fundamentals of chemistry: the structure of the atom	lecture, explanation, conversation	
8.1.2. Fundamental notions of chemistry: chemical and physical bonds; states of matter	lecture, explanation, conversation	
8.1.3. Applications of the laws of weight in chemistry: determining the coefficients of chemical reactions, determining chemical formulas, calculations with chemical equivalents, purity and chemical yield	lecture, explanation, conversation	
8.1.4. Multi-component systems (mixtures): without chemical interactions (gaseous, liquid or solid mixtures) or with chemical interactions	lecture, explanation, conversation	
8.1.5. Chemical equilibrium: in homogeneous or heterogeneous systems	lecture, explanation, conversation	
8.1.6. Electrochemistry: redox reactions and the laws of electrolysis	lecture, explanation, conversation	
8.1.7. Classes of inorganic compounds: oxides, acids, bases and salts. Their role in chemical pollution of the environment	lecture, explanation, conversation	
8.1.8. Classes of inorganic compounds: electrolytes, ionization of water, pH, types of reactions	lecture, explanation, conversation,	
8.1.9. Introduction to organic chemistry: the C atom, bonds between C atoms, saturated, unsaturated and aromatic hydrocarbons. Their role in chemical pollution of the environment.	lecture, explanation, conversation	

8.1.10. Classes of organic compounds with simple functions: alcohols, aldehydes, ketones, ethers, phenols, carboxylic acids, esters. Their role in chemical pollution of the environment	lecture, explanation, conversation,	
8.1.11. Classes of organic compounds with simple functions: halogens, nitro and amino derivatives. Their role in chemical pollution of the environment	lecture, explanation, conversation	
8.1.12. Introduction to biochemistry: carbohydrates, lipids and proteins	lecture, explanation, conversation	
8.1.13. Introduction to biochemistry: nucleic acids, enzymes and vitamins	lecture, explanation, conversation	
8.1.14. Recap: chemical compounds with negative impact on environmental pollution	lecture, explanation, conversation	

Bibliography:

1. Course support
2. Delia Maria Gligor, Cristina Roşu, Fundamental elements of environmental chemistry, Galaxia Gutenberg Publishing House, Cluj-Napoca, 2012.
3. Mihaela Ligia Ungureşan, Delia Maria Gligor, General chemistry, Galaxia Gutenberg Publishing House, Cluj-Napoca, 2012.
4. Delia Maria Gligor, Mihaela Ligia Ungureşan, Notions of electrochemistry, Galaxia Gutenberg Publishing House, Cluj-Napoca, 2009.
5. Mihaela Ligia Ungureşan, Lorentz Jäntschi, Delia Maria Gligor, Educational applications of chemistry on computers, Mediamira Publishing House, Cluj-Napoca, 2004.

8.2 Seminar / laboratory	Teaching methods	Remarks
8.2.1. Safety measurements in the Chemistry laboratory	experiment, conversation, learning through discovery	2h
8.2.2. Preparation of a percentage aqueous solution of CuSO ₄	experiment, conversation, learning through discovery	4h
8.2.3. Preparation of an aqueous solution of concentration c ₂ from a solution of concentration c ₁	experiment, conversation, learning through discovery	4h
8.2.4. Preparation and determination of the factor of a 0.1 M NaOH aqueous solution; preparation of a 0.02 M NaOH solution from a 0.1 M NaOH solution	experiment, conversation, learning through discovery	4h
8.2.5. Decanting, filtration, extraction	experiment, conversation, learning through discovery	4h
8.2.6. Distillation, crystallization, recrystallization, sublimation	experiment, conversation, learning through discovery	4h
8.2.7. Reaction velocity	experiment, conversation, learning through discovery	4h
8.2.8. Laboratory colloquium.	experiment, conversation, learning through discovery	2h

Bibliography:

1. Laboratory reports.
2. Cristina Roşu, Basics of Environmental Chemistry – Practical Laboratory Work Guide, Casa Cărţii de Ştiinţă Publishing House, Cluj-Napoca, 2007.

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- Critical analysis of models and theories from the field of fundamental sciences to address specific problems of environmental knowledge and protection
- Application of notions from the field of fundamental and engineering sciences to address specific problems of environmental knowledge and protection

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Correctness of answers – correct acquisition and understanding of the issues covered in the course	Written exam - access to the exam is conditional on passing the laboratory colloquium and presenting the laboratory reports corresponding to all practical work	80 %
10.5 Lab activities	The activity carried out in the laboratory – the acquisition and correct understanding of the issues addressed in the laboratory		20 %
	Laboratory colloquium	Laboratory colloquium - test - is held in the last week of teaching activity	
10.6 Minimum performance standards			
- Grade 5 (five) both in the laboratory test and in the exam according to the scale - Knowledge of the structure and composition of inorganic and organic substances and of the main chemical reactions			

Date

Signature of course coordinator

Signature of seminar coordinator

04.12.2024

Assist. Prof. (Lecturer) PhD Roba Carmen

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Date of approval

Signature of the head of department

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