CHEMISTRY

(Environmental engineering, 1st Year of study, 1st and 2nd Semester)

Credits (ECTS): 4

Course category: Further study (mandatory)

Course holder: PhD / Lecturer Tucaliuc Roxana Angela

Objectives of the discipline:

Accumulation of general chemistry knowledge and the ability to apply them in understanding the specialized disciplines

Acquiring of the methods, techniques, materials, substances and equipment necessary to perform specific analysis of the studied discipline.

Contents (syllabus)

Course **1st Semester**
1. INTRODUCTORY NOTIONS IN CHEMISTRY
2. THE PERIODIC SYSTEM The Atom The connection between the structure of the atom and the periodic system of the elements
3. GENERAL CHARACTERIZATION OF THE ELEMENTS OF THE MAIN AND SECONDARY GROUPS.
4. CHEMICAL COMPOUNDS AND CHEMICAL BOND Ionic bond Covalent bond Coordinative bond
5. CHEMICAL SOLUTIONS Definitions and classification of solutions Concentration of solutions
6. REACTIONS AND ANALYTICAL REAGENTS Classification of chemical reactions Analytical reactions in solution: a. Electron transfer reactions b. Proton transfer reactions: - Ionization reactions. Water ionization. Hydrogen exponent. - Neutralization reactions. Chemical indicators. - Hydrolysis reactions

Practical activity **1st Semester**
1. Processing of labor protection norms and P.S.I. in the chemistry lab. Introduction to analytical chemistry
2. Solutions concentrations
3. Anorganic qualitative analysis. Cation identification
4. Anion identification

5. Volumetry by neutralization reactions. Determination of the concentration for a solution of sodium hydroxide
6. Volumetry by neutralization reactions. Determination of the concentration of a sulfuric acid solution
7. Knowledge verification test
8. Volumetry by oxidation-reduction reactions: permanganometry
9. Volumetry by oxidation-reduction reactions. Dosage of Fe^{+2} ion from compounds. Identification of Fe^{+2}, Fe^{+3} ions
10. Volumetry by oxidation-reduction reactions: iodometry. Determination of the concentration of a solution of sodium thiosulphate
11. Volumetry by oxidation-reduction reactions. Determination of the concentration of a sulphite solution (SO32-)
12. Complexometry. Determination of water hardness.
13. Volumetry by precipitation reactions. Chlorine ion dosing by the Mohr method.
14. Knowledge verification test

Bibliography

1. Tucaliuc R. - **C*himie generală,*** Editura Ștef, Iași, **2024.**
2. Trofin A.- ***Chimie anorganică și analitică***, Ed. StudIS, Iasi, **2021.**
3. Trofin A. – ***Chimie generală***, Ed. StudIS, Iasi, **2018**.
4. Trincă L. C., Trofin A. - **C*himie,*** Ed. Pim, Iași, **2014.**
5. Neniţescu D.C. **- *Chimie generală,*** Ed. Did. Ped. Buc**urești, 1980.**
6. Mircea Stefanescu, Oana-Elena Stefanescu - ***Chimie analitica instrumentală: principii, aplicatii, experimente. Volumul I și II,*** Ed. Politehnică, **2016.**

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Final exam	Written / oral examination	60
Evaluation of the activity during the semester	Written and oral assessments during the semester	40

Course **2nd Semester**
1. INTRODUCTORY NOTIONS IN ORGNIC CHEMISTRY
3-7. HYDROCARBONS: 3. - Alkanes 4. - Alkenes 5. - Dienes 6. - Alkynes 7. - Aromatic hydrocarbons
8-12. ORGANIC COPOUNDS WITH SIMPLE FUNCTION 9. - Alcohols 10. - Phenols 11. - Carbonyl compounds 12. - Carboxylic acids
13-14. FUNCTIONAL DERIVATIVES OF CARBOXYLIC ACIDS 13. - Esters 14. - Amino acids

Practical activity 2nd Semester
1. Processing of labor protection norms and P.S.I. in the chemistry lab. Introduction to ORGANIC chemistry
2. General laboratory operations for the isolation and purification of organic substances
3. Structure determination of organic compounds
4. Determination of the elemental composition of organic molecules
5. Specific reactions of hydrocarbons.
6. Specific reactions of organic compounds with simple functions: halogenated derivatives.
7. Knowledge verification test
8. Specific reactions of organic compounds with simple functions: alcohols, phenols
9. Specific reactions of organic compounds with simple functions: aldehydes and ketones
10. Specific reactions of organic compounds with simple functions: carboxylic acids
11. Reactions specific to derivatives of carboxylic acids: esters
12. Specific reactions of derivatives of carboxylic acids: amino acids
13. Knowledge verification test
14. Recapitulation. Final conclusions on the analysis performed.

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Final exam	Written / oral examination	60
Evaluation of the activity during the semester	Written and oral assessments during the semester	40

Contact

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