TEACHING DISCIPLINE: ENVIRONMENTAL CHEMISTRY

(Specialization Environmental Engineering; 2nd Year of study, 3rd Semester)

Credit value (ECTS): 5

Course category: mandatory

Course holder: Camelia Elena Luchian

Discipline objectives (course and practical works)

- deepening of the basic concepts, theoretical, methodological and practical development specific to the discipline of environmental chemistry;
- the proper use of the specific language in communicating with different professional environments, the highlighting, and relevance to respect the norms and laws regarding environmental protection;
- knowledge of the physicochemical properties of the soil;
- knowledge of the fundamental notions regarding water and soil pollution;
- knowledge of the fundamental notions regarding the chemical structure and composition of the soil;
- description of macro- and micronutrients in the soil;
- knowledge of the data regarding the natural water sources, the water circuit in nature, the water structure, the aggregation states and the properties of the water;
- identification of the methods and techniques, materials, substances and equipment necessary for carrying out experiments specific to environmental chemistry.

Contents (syllabus)

Course (chapters/subchapters)
1. General aspects regarding environmental chemistry
2. Introduction to the atmosphere chemistry
2.1. The structure of the atmosphere
2.2. The air chemical's composition
3. The atmosphere's main pollutants
3.1. The functions of the atmosphere
4. The physical properties of the air
5. Chemical and photochemical reactions from the atmosphere
6. The atmospheric water
7. The atmosphere's pollution
8. Introduction to the water chemistry
9. The water's circuit in nature
10. Physical properties of the water
11. Chemical properties of the water
11.1. Bacteriological and biological properties of the water
12. Classification of the natural substances of the water
12.1. Water pollution
Practical works
1. The working protection on the environmental chemistry laboratory
2. Information regarding the analysis of environmental components (air, water, soil)
3. Sampling methods for environmental analysis
4. Determination of carbon dioxide from the air
4. Methods for determining air pollution level. Determination of total dust in the air. Determination of the air's oxidant substances
5. The sampling process for water analysis. The conservation and transport of water samples. Determination of the water's organoleptic characteristics (smell, taste, color)

6. Determination of physical characteristics of the water (temperature, turbidity, transparency). Determination of physicochemical characteristics of the water (pH, conductivity, radioactivity)
7. First partial test
8. Determination of total suspended matter. Determination of fixed residue
9. Determination of calcinated residues
10. Determination of pollutants by organic origin from water (fats, tar substances, mineral oils)
11. Qualitative determination of water organic compounds
12. The water's acidity
13. 2nd partial test

Bibliography

1. Lupea X. A., Branic A. G., Ardelean A., Ardelean D., 2008 – *Fundamente de chimia mediului*, Ed. Did. Ped., ISBN: 978-973-30-2015
2. Orbeci C., Turtoi D., 2006 – *Chimia mediului*, Ed. Agir
3. Puscas E., 2005 – *Chimia mediului*, Ed. Pim, Iași
4. Surpățeanu M., 2004 – *Elemente de chimia mediului*, Ed. MatrixRom, București
5. Garry W., Van Loon, Stephen J. Duffy, 2000 – *Environmental Chemistry. A Global Perspective*, Oxford University Press Inc., New York
6. Luchian C., 2018 - *Tehnici și echipamente de investigare a factorilor de mediu - îndrumar de laborator*, Ed. Stef, Iași
7. Cuciureanu R., 2001 - *Chimia și igiena mediului și alimentului. Metode de analiză*, Editura Junimea, Galați
8. Nistor I. D., 2007 - *Chimia mediului, tehnici de laborator*, Ed. Alma Mater, Bacău
9. Surpăţeanu M., Zaharia C., 1999 - *Chimia mediului - manual de lucrări practice*, Tipografia Univ. Gh. Asachi, Iaşi

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Course	Exam	60%
	Course presence	10%
Practical works	Tests + cours and practical	30%

Contact

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TEACHING DISCIPLINE: ENVIRONMENTAL CHEMISTRY

(Specialization Environmental Engineering; 2nd Year of study, 4th Semester)

Credit value (ECTS): 3

Course category: mandatory

Course holder: Camelia Elena Luchian

Discipline objectives (course and practical works)

- deepening of the basic concepts, theoretical, methodological and practical development specific to the discipline of environmental chemistry;
- the proper use of the specific language in communicating with different professional environments, the highlighting, and relevance to respect the norms and laws regarding environmental protection;
- knowledge of the physicochemical properties of the soil;
- knowledge of the fundamental notions regarding water and soil pollution;
- knowledge of the fundamental notions regarding the chemical structure and composition of the soil;
- description of macro- and micronutrients in the soil;
- knowledge of the data regarding the natural water sources, the water circuit in nature, the water structure, the aggregation states and the properties of the water;
- identification of the methods and techniques, materials, substances and equipment necessary for carrying out experiments specific to environmental chemistry.

Contents (syllabus)

Course (chapters/subchapters)
1. Introduction to soil chemistry
2. Soil formation
3. Soil structure
4. Chemical composition of soil
5. Physical properties of the soil
6. Chemical properties of soil. Macronutrients and micronutrients from the soil
7. Soil functions. Soil pollution
Practical works
1. Determination of dissolved oxygen and oxygen deficiency
2. Determination of oxidizable substances in water and chemical oxygen consumption
3. Determination of the CO2 content of the water
4. Determination of residual chlorine and hydrogen sulfide in water
5. Determination of calcium and magnesium in water. Total and temporary hardness of water
6. Taking soil samples for analysis. Determination of the physical properties of the soil
7. 1st partial test
8. Determination of soil porosity and water retention capacity
9. Determination of soil moisture. Determination of organic substances in soil - Method of calcination - Determination of soil organic carbon
10. Determination of soil pH. Determination of the hydrolytic acidity of the soil. Determination of alkaline carbonates and bicarbonates from soil
11. Determination of chlorides in soil. Determination of trivalent iron from the soil
12. Determination of exchangeable calcium from soil - complexometric method

Bibliography

1. Lupea X. A., Branic A. G., Ardelean A., Ardelean D., 2008 – *Fundamente de chimia mediului*, Ed. Did. Ped., ISBN: 978-973-30-2015
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Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Course	Exam	60%
	Course presence	10%
Practical works	Tests + cours and practical	30%

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