BACHELOR 'S PROGRAMME
1ST YEAR OF STUDY, 2nd SEMESTER

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| COURSE TITLE | ENVIRONMENTAL CHEMISTRY |
| COURSE CODE | JM1210 |
| COURSE TYPE | full attendance/ tutorial |
| COURSE LEVEL | 1st cycle (bachelor's degree) |
| YEAR OF STUDY, SEMESTER | 1st year of study, 2nd semester |
| NUMBER OF ECTS CREDITS | 6 |
| NUMBER OF HOURS PER WEEK | 4 (2 lecture hours + 2 seminar hours) |
| NAME OF LECTURE HOLDER | Associate Professor Iuliana Gabriela BREABAN |
| NAME OF SEMINAR HOLDER | Associate Professor Iuliana Gabriela BREABAN |
| PREREQUISITES | Advanced level of English |

**A – GENERAL AND COURSE-SPECIFIC COMPETENCES**

General competences:

→ Acquiring the adequate professional and transversal competencies, according to the specific requirements of the subject and the qualifications listed in the National Index of Higher Education Qualifications (RNCIS) for Geography of the Environment

Course-specific competences:

→ Describe the basic chemical principles for understanding the behavior of chemical compounds in environmental pollution

→ Understand in an integrated way the theoretical and practical notions related to the main chemical processes that control / affect the pollution of environmental factors: water, air and soil

**B – LEARNING OUTCOMES**

→ Use appropriate techniques to analyze different contaminants

→ Analyze the local and regional effects that a pollutant can generate in environmental factors.

→ Elaborate studies to analyze the quality of environmental factors that can serve as a support in the management of risk and impact assessment studies on the environment

**C – LECTURE CONTENT**

Introductory notions: history, periodization, units of measurement, classification of substances, chemical reactions
Basic elements of inorganic chemistry: general laws, atomic-molecular theory, atom structure
Basic elements of inorganic chemistry: quantum numbers, electronic configurations, chemical bonds;
The periodic system: structure, properties, distribution, structure-property relations
Chemical bonds and chemical reactions, types of chemical reactions that take place in the environment
Biogeochemical cycles: Carbon, nitrogen, oxygen, phosphorus, iron, sulfur cycle
Biogeochemical cycles: Phosphorus, iron, sulfur cycle
Atmospheric chemistry (definition, distribution, composition). Sources of air pollution
Air pollutants (primary and secondary). Chemical processes in the atmosphere (photolysis, radical, oxidation and acid-base reactions)
The effects of air pollution (acid rain, photochemical smog, tropospheric ozone)
Hydrosphere chemistry. Types of waters. Sources of water pollution, Inorganic pollutants in water (heavy metals, nitrogen and phosphorus compounds)
The effects of water pollution (eutrophication, hypoxia, acidification, etc.) and water quality parameters
Soil chemistry. Chemical and biochemical processes in soil. Sources of soil pollution
Soil pollutants. Biodegradation, bioaccumulation and biomagnification of soil pollutants

**D – RECOMMENDED READING FOR LECTURES**


1. A.X Lupea, A. Ardelean, A.G. Branic, D. Ardelean, (2008), Fundamente de chimia mediului, ed. Didactica si Pedagocica R.A.
2. Rodica Popescu (2000)- Hidrogeochimie, Editura Universităţii din Bucureşti;
3. S. Mănescu, M. Cucu, M.L. Diaconescu (1994) – Chimia sanitară a mediului, Ed. Medicală, Bucureşti;
4. S. Manahan (2007) – Environmental Chemistry – Sixth Ed. CRC Press USA;
5. Mioara Surpateanu, (1994) Chimia mediului, Ed. Univ. Tehnice Iasi;
6. J. V. Moore, Elizabeth A. Moore, (1976) Environmental Chemistry, Academic Press Inc.;
7. Rodica Cuciureanu (2001), Chimia şi igiena mediului şi alimentului- metode de analiză, Ed. Junimea;
8. R.I. Olariu, C. Arsene (2002), Degradarea atmosferica a hidrocarburilor aromatice, Ed. PIM Iasi
9. C. Arsene, R.I. Olariu, (2003), Sulful in atmosfera, Editura Tehnica, Stiintifica si Didactica, 198 p., CERMI, Iasi


**E – SEMINAR CONTENT**

Labor protection, analytical balance, weighing rules, dispersed systems, preparation of a solution
Determining the temporary, permanent and calcic hardness of natural waters;

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| | Determining the pH in different environments and interpreting the results<br>Drawing the absorption spectrum in the visible and determining the concentration of a substance;<br>Determination of assimilative pigments in plants;<br>Determination of SB from soils - Kappen method;<br>Determination of a conservative ion in water: chlorine;<br>Final laboratory evaluation based on the results obtained for each paper during the semester. |
| F | RECOMMENDED READING FOR SEMINARS |
| | S. Mănescu, M. Cucu, M.L. Diaconescu (1994) – Chimia sanitară a mediului, Ed. Medicală, Bucureşti;<br>C. Rosu, (2007), Indrumator de lucrari practice de laborator - Bazele chimiei mediulu, Editura : Casa Cartii de Stiinta, Cluj-Napoca<br>Iuliana Gabriela Breaban, Referate de lucrari practice de laborator, material needitat<br>C. Arsene, R.I. Olariu, (2009), Metode analitico-statistice in investigarea sistemelor chimice, Performantica, Iasi, |
| G | EDUCATION STYLE |
| LEARNING AND TEACHING METHODS | Lecture, didactic explanation, heuristic conversation, problematization, case study, demonstration |
| ASSESSMENT METHODS | Examination + Seminar Grades |
| LANGUAGE OF INSTRUCTION | English |