BACHELOR'S DEGREE
GEOCHEMISTRY
3RD YEAR OF STUDY, 2ND SEMESTER

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| COURSE TITLE | ENVIRONMENTAL GEOCHEMISTRY |
| COURSE CODE | 31020030020SL1223144 |
| COURSE TYPE | full attendance |
| COURSE LEVEL | 1ST cycle (bachelor's degree) |
| YEAR OF STUDY, SEMESTER | 3rd year of study, 2nd semester |
| NUMBER OF ECTS CREDITS | 4 |
| NUMBER OF HOURS PER WEEK | 3 (2 lecture hours + 1 seminar hour) |
| NAME OF LECTURE HOLDER | Assistant Lecturer Iuliana Buliga |
| NAME OF SEMINAR HOLDER | Assistant Lecturer Iuliana Buliga |
| PREREQUISITES | Geochemistry, Hydrogeochemistry, Biogeochemistry, Atmospheric Geochemistry |

## A GENERAL AND COURSE-SPECIFIC COMPETENCES

General competences:

→ Developing students' interest for consulting relevant national and international sources in order to devise a research paper on a topic pertaining to the academic discipline

Course-specific competences:

→ Defining the main geospheres

→ Corroborating geological knowledge with information from related fields so as to identify the contaminants that affect each geosphere and explain the geological phenomena through which they are generated

→ Knowing the methodology required in the complete investigation of an environmental issue

## B LEARNING OUTCOMES

→ Students accumulate general knowledge on the systemic approach to the environment in Geology: the environment, the geospheres, the interactions occurring within the geosystem, as well as on the structure, functioning and contamination of the geosystem with various compounds

→ Students analyze specific situations and devise plans for the tackling of environmental issues

## C LECTURE CONTENT

| Week | Title of lecture | Teaching methods | Duration |
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| 1 | Introduction to Environmental Geochemistry | Lecture based on video projection | 2 hours |
| 2 | The atmosphere: atmospheric monitoring, EU directives, Atmospheric Geochemistry, atmospheric pollution in Romania | Lecture based on video projection | 2 hours |
| 3 | The hydrosphere: monitoring water pollution, EU directives. Pollution with microelements, mineral or organic chemical compounds. Wastewater sludge | Lecture based on video projection | 2 hours |

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| | 4 | Marine Geochemistry | Lecture based on video projection | 2 hours |
| | 5 | The pedosphere: monitoring the biosphere using moss and lichens. Agricultural soils and forest soils. EU directives. The geochemistry of Fe, Al, Ti, Mn, Na, K, Ca, Mg, S, N, P, C and heavy metals in agriculltural soils. The geochemistry of forest soils. | Lecture based on video projection | 2 hours |
| | 6 | The permafrost | Lecture based on video projection | 2 hours |
| | 7 | The biosphere: biogeochemical aureolas on U, Mn, Cu, Pb and Zn mineralizations | Lecture based on video projection | 2 hours |
| | 8 | Acid mine drainage | Lecture based on video projection | 2 hours |
| | 9 | Weathering of clay minerals | Lecture based on video projection | 2 hours |
| | 10 | Seismic and volcanic hazards | Lecture based on video projection | 2 hours |
| | 11 | Global climate change: the greenhouse effect, the carbon cycle, $CO_2$ and temperature variations, global warming | Lecture based on video projection | 2 hours |
| | 12 | Non-renewable energy sources (fossil fuels) | Lecture based on video projection | 2 hours |
| | 13 | Renewable energy sources (alternative energy) | Lecture based on video projection | 2 hours |
| | 14 | Geochemistry of solid household waste | Lecture based on video projection | 2 hours |
| D | RECOMMENDED READING FOR LECTURES | | | |
| | Manahan S. E., (2000) – *Fundamentals of Environmental Chemistry,* Second Ed., vol. I – III,<br>New York, 967 p.<br>http://mineral.gly.bris.ac.uk/envgeochem/index.shtml<br>Cunningham, W. P., Woodworth Saigo, Barbara (1995) – *Environmental Science - A Global*<br>*Concern, 3rd ed.,* W.C.B. Publish., Dubuque, U.S.A.<br>Lundgren W. L. (1999) – *Environmental Geology*, Prentice Hall, New Jersey. | | | |
| E | SEMINAR CONTENT | | | |

| Week | Title of seminar | Teaching methods | Duration |
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| 1 | Atmospheric pollution. Smog, acid rain, the depletion of the ozone layer. Atmospheric pollution in Romania. | Case studies | 1 hour |
| 2 | The pollution of water sources with industrial waste. The pollution of water sources with heavy metals. | Case studies | 1 hour |
| 3 | Mine waters and acid mine drainage | Case studies | 1 hour |
| 4 | Heavy metals in soils | Case studies | 1 hour |
| 5 | The permafrost | Case studies | 1 hour |
| 6 | Energy sources: renewable and non-renewable | Case studies, documentary | 1 hour |
| 7 | Energy sources: renewable and non-renewable | Case studies, documentary | 1 hour |
| 8 | Seismic and volcanic hazards | Case studies, documentary | 1 hour |
| 9 | Recycling | Case studies | 1 hour |
| 10 | Visit to the water treatment station in Dancu | Fieldwork | 4 hours |
| 11 | Oral exam | - | 1 hour |

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| F | RECOMMENDED READING FOR SEMINARS |
| | http://mineral.gly.bris.ac.uk/envgeochem/index.shtml |
| G | EDUCATION STYLE |
| LEARNING AND TEACHING METHODS | Lecture based on video projection, case studies, viewing of documentaries, individual study |
| ASSESSMENT METHODS | Written exam and continuous assessment (lecture) – 57,5%, oral exam and continuous assessment (seminar) – 42,5% |
| LANGUAGE OF INSTRUCTION | English |