Academic course description – Environmental geochemistry

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| 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 | | 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 | | 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, CO2  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,  New York, 967 p.  <http://mineral.gly.bris.ac.uk/envgeochem/index.shtml>  Cunningham, W. P., Woodworth Saigo, Barbara (1995) – *Environmental Science - A Global*  *Concern, 3rd ed.,* W.C.B. Publish., Dubuque, U.S.A.  Lundgren W. L. (1999) – *Environmental Geology*, Prentice Hall, New Jersey. | |
| E | **Seminar content** | |
|  | |  |  |  |  | | --- | --- | --- | --- | | Week | Title of seminar | Teaching methods | Duration | | 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 | | |
| F | **Recommended reading for seminars** | |
|  | [**http://mineral.gly.bris.ac.uk/envgeochem/index.shtml**](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 |