



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Environmental Geochemistry

2021-1-F7401Q108

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#### Aims

The aim of the course is to enable students to acquire the tools to understand main geochemical processes occurring in the hydrosphere, atmosphere, lithosphere and biosphere. The course will focus on the processes that affect, on local and global scale, the main geochemical features of waters, both surface water and groundwater, soils and the atmosphere. Beside natural processes, the course will face pollution processes. Attention will be given to the effects of climate change on main geochemical processes affecting the hydrosphere and atmosphere.

The course will enable students to understand the effects of anthropogenic activities on the geochemistry of the different environmental matrices, on local and global scale, developing skills useful for the identification and management of environmental pollution problems.

#### Contents

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## Detailed program

Review of basic concepts of geochemistry. Aqueous systems - the water cycle and its geochemistry; main processes determining water chemistry: dissolution/precipitation, acid-base reactions, redox reaction, adsorption/ion exchange; speciation. Carbonate geochemistry and soil weathering - atmospheric and soil CO<sub>2</sub>; the CO<sub>2</sub>-bicarbonate-carbonate equilibrium; carbonate and silicate weathering. Biogeochemical cycles - the carbon, nitrogen, phosphorus and sulfur cycles. Atmosphere and pollution - composition, evolution and anthropogenic changes. Water pollution - main pollution processes, background levels. Stable isotope geochemistry - general principles, water isotopes, environmental isotopes.

## Prerequisites

Basic knowledge of chemistry and geochemistry.

## Teaching form

Frontal lessons for 5 CFU (35 hours)

Practical sessions for 1 CFU (12 hours)

***During the public health emergency period, remote teaching will be done through live and registered sessions. Details will be provided on the e-learning course page.***

## Textbook and teaching resource

Slides and other documents provided by the teacher.

Textbooks:

- \_\_\_\_\_
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## Semester

I semester.

### **Assessment method**

Oral exam with discussion of a final individual project and theory and topics discussed during the course.

### **Office hours**

By appointment.

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