UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Laboratory for The Analysis of Freshwater and Groundwater

2627-3-E3201Q114

Aims

The main objective of the course is to enable students to acquire:

- **knowledge and understanding** of the main chemical, physical and ecological characteristics of surface water and groundwater bodies, the interactions between surface water and groundwater, and the main techniques for their monitoring;
- **applying knowledge and understanding** to carry out the main field operations necessary for monitoring both surface water and groundwater bodies, such as measuring flow rates and hydrometric and piezometric levels, analysing selected chemical and biological parameters in a laboratory, and processing acquired data using computer tools;
- **making judgements**, which will enable the characterisation of surface water and groundwater bodies and the identification of interrelationships between them;
- **communication skills** relating to the ability to describe topics studied appropriately using the correct specific vocabulary, and to structure a presentation containing the results of collecting, processing and interpreting field data;
- **learning skills** relating to the ability to integrate acquired knowledge with knowledge from other environmental science disciplines independently.

Contents

Theoretical and practical aspects related to the monitoring and characterization of surface water and groundwater bodies.

Detailed program

The course is composed of frontal lessons, field trips, chemical/biological and IT lab sessions.

The frontal lessons will cover the following topics: natural and human-altered water cycle, characteristics of surface water and groundwater and their interconnections, interface areas between surface water and groundwater bodies, water sampling techniques, main physical, physico-chemical and chemical parameters used for the analysis of water bodies, techniques for the elaboration of collected data.

The field trips will be aimed at (a) acquiring several data, such as geographical position and altitude, hydrometric levels of rivers, piezometric levels in piezometers, river and spring discharge, physico-chemical parameters, and (b) sampling surface water and groundwater for chemical and biological analyzes.

The chemical and biological lab will focus on the analysis of chemical compounds and biological communities that are fundamental to define the quality of water and useful for highlighting the interconnections between surface water and groundwater bodies. Adaptation to life of organisms in flowing waters will be also studied.

The IT lab will focus on the (a) post-processing of the geographic positions and elevations acquired in the field, (b) creation of maps of the measured points, (c) processing of the data acquired in the field for the calculation of discharge values and loads of dissolved chemical substances, (d) processing of piezometric and hydrometric data acquired in the field, and of meteorological data downloadable from the web, (e) interpretation of the elaborations to determinate the relationships between surface water and groundwater bodies.

Prerequisites

Basic knowledge of chemistry, earth science, zoology and ecology.

Teaching form

The structure of the course is:

- 8 two-hour lectures, in person, Delivered Didactics;
- 1 three-hour and 2 six-hour field activities, in person, Interactive Teaching;
- 2 two-hour and 2 three-hour ecological lab activities, in person, Interactive Teaching, in which the samples and actual data acquired during the field activities are analysed and processed;
- 3 two-hour and 3 three-hour virtual IT lab activities (LIBaaS), in person, Interactive Teaching, in which the actual data acquired during the field activities are processed and interpreted.

Textbook and teaching resource

Slides and other documents provided by the teachers through the e-learning webpage of the course.

Semester

II semester

Assessment method

Oral examination that includes the presentation of the elaboration and interpretation of the data measured in the field/laboratory and some questions aimed at verifying the degree of knowledge acquired and the ability to apply the interpretative tools acquired.
More specifically, it is required to make a short presentation related to an exam assignment to test problem solving and communication skills.
The oral interview will focus partly on the discussion of the exam assignement and partly on the discussion of topics covered in class, with the aim of assessing the ability to critically understand and analize a poblem.
There will be no in itinere examinations.

Office hours

By appointment

Sustainable Development Goals

CLEAN WATER AND SANITATION | LIFE BELOW WATER