UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Analisi Chimiche Ambientali

2627-3-E3201Q083

Aims

The course aims to provide students with both the theoretical and practical knowledge necessary for assessing the chemical quality of different environmental compartments and for selecting the correct analytical approaches.

1. Knowledge and understanding: By the end of the course, students will have acquired theoretical knowledge regarding the principles of analytical chemistry applied to the environment. They will understand the operating mechanisms of the main instrumental techniques, sampling criteria, and guidelines for assessing the quality of environmental matrices. They will be able to comprehend and critically describe official or literature-based analytical methods.
2. Applying knowledge and understanding: Students will be able to apply theoretical knowledge to plan and perform the analytical characterization of real environmental matrices (water, air, soil). They will know how to put analytical protocols into practice, use dedicated laboratory instrumentation, and process raw experimental data to obtain meaningful quantitative results.
3. Making judgments: Students will develop the ability to critically evaluate the reliability and quality of the experimental data obtained, interpreting it in terms of accuracy, precision, and detection limits. Furthermore, they will be able to make independent judgments regarding the contamination status or compliance of an environmental compartment with respect to current regulations.
4. Communication skills: Students will be able to present the objectives, procedures, and results of the analyses performed in a clear, fluent manner, using appropriate language. They will be able to engage in scientific discussions using appropriate technical terminology and rigorous specialized vocabulary, both in writing reports (laboratory reports) and during oral presentations.
5. Learning skills: Students will acquire the methodological tools necessary to independently update their skills. They will be able to consult relevant scientific literature, technical manuals, and regulatory developments, evaluating the applicability of alternative or innovative analytical methods for solving complex environmental problems.

Contents

Chemical analyses on environmental matrices.

Detailed program

The course includes an introductory part on the meaning of the chosen descriptors and their experimental determination.

The experiences concern some analyses of water, soil and waste matrices.

In detail:

- Water matrix: hardness, dissolved oxygen, Kubel oxidation, phosphorus determination as orthophosphate;
- Waste matrix: commodity analysis, humidity, volatile solids, calorific value;
- Soil matrix: extraction, clean-up and analysis of polycyclic aromatic hydrocarbons.

Prerequisites

General, organic and analytical chemistry.

Teaching form

8 two-hour lectures, in person, Delivered Didactics
10 four-hour lab activities, in person, Interactive Teaching

Textbook and teaching resource

D.C. Harris “Chimica Analitica Quantitativa”, Zanichelli or Holler, Crouch: Fondamenti di Chimica Analitica di Skoog & West - III Edizione. EdiSES

F.W. Fifield, P.J. Haines “Environmental Analytical Chemistry, Blackie Academic

Semester

Second semester

Assessment method

The assessment of learning takes place with a practice activity during the course and an oral examination.The practical activity consists of a laboratory test preceded by solving some exercises.

The oral examination involves the deepening of the chemical knowledge of the experiments carried out in the laboratory.

In the final mark, the practical activity weighs 70%, 20% the oral exam and the remaining 10% the laboratory behavior.

For admission to the exam it is necessary to have attended at least 8 of the 10 laboratory experiences.Mark range from 18 to 30/30

Office hours

Only by appointment.

Sustainable Development Goals

QUALITY EDUCATION | RESPONSIBLE CONSUMPTION AND PRODUCTION