UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

## Integrated Environmental Sciences Laboratory - Part Two

**2021-3-E3201Q016**

### Aims

Provide technical expertise on the experimental determination of fundamental chemical and biochemical parameters
in assessing the quality of waste water.

Knowledge and understanding
At the end of the course the student knows the analytical techniques for the determination of chemical and biochemical parameters on wastewater; the water purification process in an activated sludge plant.

Applied knowledge and understanding
At the end of the course the student is able to calculate the chemical and biochemical parameters based on the data acquired in the laboratory.

Autonomy of judgment
At the end of the course the student is able to analyze and evaluate the problems related to civil water purification.

Ability to learn
Be able to apply the technical and experimental knowledge acquired to samples other than those analyzed during the course.

### Contents

1. Theoretical and practical aspects of the determination of the biochemical oxygen demand (BOD).

2. Theoretical and practical aspects of the determination of the chemical oxygen demand (COD).

3. Visit to a waste water treatment plant.

## Detailed program

Experimental determination of the BOD value of a wastewater sample entering and leaving a purification plant using a manometric technique; preparation of the degradation curve of the organic substance and calculation of the purification efficiency.
Experimental determination of the COD of a sample of effluent exiting a purification plant using potassium dichromate;
guided tour of a civil water treatment plant in the Milan area with description of the various physical, chemical and biological steps that are implemented in order to reduce the levels of pollutants to the limits set by the legislation on water.

## Prerequisites

Knowledge of biochemistry and general chemistry. Prerequisites are not required.

## Teaching form

1. Theoretical description in the classroom of the methodologies that will be applied in the laboratory;
2. two laboratory activities: determination of the BOD and determination of the COD
3. educational field trip consisting of a visit to the purification plant.
4. during the Covid-19 emergency period, the activities will take place in a mixed mode: partial presence and asynchronous videotaped lessons, laboratory activities with distance and didactic outputs for small groups

## Textbook and teaching resource

The e-learning site provides the protocols and the technical sheets that the student must fill out based on the results obtained as specified therein. No study texts are provided. Additional material can be recovered from the website of the purification plant visited.

## Semester

First semester

## Assessment method

Attestation of attendance; interview in which the student must demonstrate that he has understood the laboratory techniques illustrating the results obtained and documented by the relative technical and graphical sheets that he must produce in order to take the exam; the positive evaluation is given with approved. There are no intermediate evaluations, group tests or project presentations. In the event of a health emergency, the oral examination will be carried out remotely via the Webex platform.

## Office hours

On appointment by writing to the e-mail addresses of the teachers.