

## COURSE SYLLABUS

### Integrated Environmental Sciences Laboratory - Part Two

2425-2-E3201Q016

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#### Aims

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

##### 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 wastewater 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 wastewater treatment plant.

## **Detailed program**

1. 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.
2. Experimental determination of the COD of a sample of effluent exiting a purification plant using potassium dichromate.
3. Guided tour of a civil wastewater 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.

## **Teaching form**

1. Description in the classroom of the methodologies that will be applied in the laboratory; 2 h Delivered Didactis
2. Two laboratory activities: 2 four-hour lab activities, in person, Interactive Teaching; 6 h Interactive Teaching
3. One five-hour field activities, in person, Interactive Teaching; 5 h Interactive Teaching

## **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 wastewater treatment plant visited.

## **Semester**

Second 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.

## **Office hours**

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

## **Sustainable Development Goals**

QUALITY EDUCATION | CLEAN WATER AND SANITATION

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