



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Chemistry

1920-4-G8501R036-G8501R036M

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#### Course title

Chemistry

#### Topics and course structure

The course is focused on basic concepts of the molecular sciences (chemistry, biochemistry, biology) present in topics of ministerial recommendations for teaching. The micro- and macroscopic world. The matter composition, the structure of the atom, the periodic properties of elements, the aggregation states, the chemical bond, the properties of molecules, DNA and proteins, the enzymes, the molecules of life, molecules and environment.

The course is organized in frontal lessons and experimental classroom activities for elementary school students.

#### Objectives

This course, through a constant and participated attendance to the lessons and the Laboratory, has the aim to promote the following learning skills:

Knowledge and understanding of basic molecular concepts in chemistry, biochemistry, biology.

Ability to relate differentiated knowledge and models

Ability to apply knowledge and models to the experimental world

#### Methodologies

Lectures, movies, active didactic methods, laboratories. Experiments at home, analysis of experimental data and observations, discussion on how communicate to students of elementary school the basic concepts of molecular sciences through the elaboration of the results of practical experiences.

## **Online and offline teaching materials**

Lessons are on power point slides uploaded on the E-learning site, books (paper and electronic), internet sites

## **Programme and references for attending students**

The program is based on four blocks of lessons that will cover approximatively the following topics:

- 1) Basic concepts of modern chemistry: - Macroscopic and microscopic; - The composition of the matter; - Aggregation states of the matter
- 2) Atomic structure and periodic properties of the elements; - The chemical bond and properties of molecules.
- 3) The molecules of life: DNA, proteins, enzymes, molecules and environment
- 4) Chemical experiences as a starting point for educational paths
- 5) Educational paths for primary school: Summary of the experiences carried out; Generalization on the ways of learning from experience; General outline of the educational method; Proposals for educational methods to be developed individually.

Bibliography:

- 1) Laura Cipolla, The notebooks of teaching. Methods and tools for teaching and learning chemistry. EDISES.
- 2) Philip Ball, Elements.
- 3) Peter Atkins, The Periodic Kingdom
- 4) Aldersey-Williams Hugh Periodic Fables
- 5) Primo Levi, The periodic table

## **Programme and references for non-attending students**

The programme and the bibliography are the same than for attending students.

## **Assessment methods**

Written and oral exam

The written exam consists of a multiple test of closed questions, aimed at ascertaining the knowledge of the basic biology concepts, and a set of open questions to understand communication skills of the student.

The oral exam will start from the written test, and will then extend to the verification of the knowledge of the whole program and of what has been learned in the laboratories.

### **Office hours**

to be decided at the beginning of the course

### **Programme validity**

one academic year

### **Course tutors and assistants**

Prof. Laura Cipolla

Dr. Andrea Luraghi

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