



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Basic Sciences

2425-1-H4101D252

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#### Aims

The course aims to provide students with the necessary tools to understand vital processes at the molecular level and the foundations to identify cause-effect relationships of the most relevant chemical and physical processes for their studies and medical profession. This knowledge will form the basic foundation for interpreting the complex reactions that represent life and will be aimed at introducing students to the scientific method, of an inductive type.

#### Contents

The student must acquire knowledge on: atoms and bonds, properties of matter, qualitative and quantitative aspects of chemical reactions. Equilibrium reactions. Catalysis of chemical transformations. Energetic aspects of chemical reactions. Acids, bases, and buffer solutions. Biological buffer systems. Classification, structure, reactivity, and general properties of organic compounds aimed at interpreting biochemical processes. Compounds of significant biological interest: carbohydrates, amino acids, lipids, nucleotides, polysaccharides, proteins, and nucleic acids.

The student must acquire theoretical and practical knowledge for the isolation, purification, and characterization of proteins.

The student must acquire knowledge on the following physical phenomena: biomechanics, physics of radiation and biological effects of radiation, optics, thermodynamics, fluid mechanics, electrostatics, and electrodynamics.

#### Detailed program

Chemistry and Biochemical Propaedeutics, Principles of Proteomics, Medical Physics and Biophysics: for details, refer to the description of the individual modules.

## **Prerequisites**

Scientific knowledge at the high school level. In particular, basic knowledge of mathematics and analysis, and basic knowledge of chemistry and biochemical propaedeutics.

## **Teaching form**

Frontal lectures, exercises, laboratories in person and remotely, in erogative and interactive modes.  
For details, refer to the description of the individual modules.

## **Textbook and teaching resource**

For Medical Physics and Biophysics:

A. Alessandrini, "Fisica per le scienze della vita," CEA

For Chemistry and Biochemical Propedeutics:

F.A. Bettelheim, W.H. Brown, M.K. Campbell, S.O. Farrell, "Chimica e Propedeutica Biochimica," EdiSES

Tiziana Bellini, "Chimica Medica e Propedeutica Biochimica," Zanichelli

For Principles of Proteomics:

Voet D, Voet JG, "BIOCHIMICA," Zanichelli

Voet D, Voet JG, Pratt CW, "FONDAMENTI DI BIOCHIMICA" (2005), Zanichelli

Teaching materials provided by the instructor

## **Semester**

First semester

## **Assessment method**

No in-term tests are planned.

Closed-ended tests.

Multiple-choice exercises.

Multiple-choice quizzes.

Open-ended questions.

For details, refer to the description of the individual modules.

## **Office hours**

For Medical Physics and Biophysics:

By appointment via phone (02 6448 8209) or email (francesco.mantegazza@unimib.it).

For Chemistry and Biochemical Propedeutics:

By appointment (email) at Building U28, 1st floor.

For Principles of Proteomics:

By appointment (email) at Building U28, 1st floor.

## **Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY | REDUCED INEQUALITIES

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