



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Medical Physics

2425-1-H4101D252-H4101D001M

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#### Aims

The primary goal of the course is to provide students with the tools for the understanding of the complex reactions that represent the molecular basis of life, and with the fundamentals to identify the cause-effect relations of the most important chemical and physical processes for the curriculum and the work of a physician. This knowledge will form the primary basis for a rationale approach to the knowledge of medical sciences.

#### Contents

Biomechanics: Statics of the rigid body with applications to the human body.

Physics of radiation and biological effects of radiation.

Optics: mechanism of the human visual system.

#### Detailed program

BIOMECHANICS - Moment of a force. - Balance of a body with exemplifications of Human Body. - Levers. - Mechanics of locomotion. - Statics of the body. - Young's modulus and elasticity. - Compression module. - Deflections, twists, fractures.

RADIATION PHYSICS: - Overview of the physics of the nucleus. - Radioactive decay. - Alpha, beta, gamma and nuclear reactions decay. - Emission and absorption of corpuscular and electromagnetic radiation. - X-ray. - Radiation-matter interaction. - Biological effects of radiation

OPTICS: - Spectrum of electromagnetic radiation. - Absorption of the radiation - Light and image formation - Lenses and geometrical optics - Construction of images according to geometrical optics - Eye as an optical system - Optical defects of the eye - Theory of the color perception

## **Prerequisites**

Scientific knowledge at the high school level, particularly basic knowledge of mathematics and analysis.

## **Teaching form**

Frontal lectures and exercises.

All lectures and exercises are conducted in person in an erogative mode.

6 lectures of 2 hours each conducted in person in an erogative mode.

6 exercises of 2 hours each conducted in person in an erogative mode.

## **Textbook and teaching resource**

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

## **Semester**

First semester

## **Assessment method**

MULTIPLE CHOICE TEST: Multiple-choice problems requiring the application of several physical principles (A total of 22 numerical problems including the integrated Biophysics module, each problem with one and only one correct answer).

No midterm exams are scheduled..

## **Office hours**

By telephone appointment (02 6448 8209) or by email ([francesco.mantegazza@unimib.it](mailto:francesco.mantegazza@unimib.it)).

## **Sustainable Development Goals**

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

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