



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Medical Physics I

1819-1-H4102D001-H4102D004M

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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

Physics of radiation and biological effects of radiation.

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

Optics: mechanism of the human visual system.

#### Detailed program

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

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.

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**

Basic knowledges of mathematics and analysis.

### **Teaching form**

Lectures and exercises

### **Textbook and teaching resource**

FISICA MEDICA: Zinke-Allmang, Sills, Nejat, Galiano-Riveros, "Physics for the life sciences", Nelson Education

### **Semester**

Second semester

### **Assessment method**

PHYSICS Written exam with questions and exercises with open answers (numerical exercises which require the application of some physical principle).

### **Office hours**

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

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