



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Fisiologia

2425-1-I0303D003-I0303D012M

---

#### Aims

The student will be able to describe the functional mechanisms of the integrated biological phenomenon in normal conditions and the fundamental tools for interpreting conditions of pathological alteration.

#### Contents

The module provides the student with the essential theoretical knowledge of Physiology in the perspective of their subsequent professional application.

#### Detailed program

- ? Cellular physiology: homeostasis and internal environment; types of transmembrane transport; osmosis; membrane potential; Nernst equation; maintenance of water-salt balance.
- ? Physiology of the nervous system: neuron and types of synapse; action potential; propagation of the action potential, time and space constants; sensory receptors; signal transduction; somatic sensitivity; autonomic nervous system; motor control.
- ? Muscle physiology: muscle structure; nature of the contraction process; neuromuscular transmission; functional characteristics, myogram, force-length and force-velocity relationships; muscle energy, oxygen debt.
- ? Physiology of the cardiovascular system: viscosity and density of the blood; structure and function of vessels; resistances and pressures; the heart; cardiac cycle and ventricular pressure-volume relationship; cardiac work; cardiac output and regional flow distribution; conduction system; potential pacemakers and common myocardium; electrocardiogram; blood pressure and its determinants; measurement of blood pressure.
- ? Respiratory physiology; oxygen transport-use system; Dalton's law, Henry's law, Fick's law; transport of O<sub>2</sub> and CO<sub>2</sub> in the blood; hemoglobin curve, Fick's principle; principles of mechanics, lung volumes, spirometry, thoraco-

pulmonary relaxation curves.

? Physiology of the digestive system.

? Kidney physiology: nephron, renal blood flow, glomerular filtration rate; glomerular ultrafiltration and Starling equation; functions of the proximal convoluted tubule, reabsorption of ions and glucose; loop of Henle, concentration of urine with countercurrent mechanism; distal convoluted tubule and collecting duct; renin-angiotensin-aldosterone system; renal clearance, PAI, inulin and creatinine

? Acid-base equilibrium: Henderson-Hasselbalch equation; Davenport diagram.

? Principles of sports physiology.

## **Prerequisites**

Scientific knowledge at secondary school level.

## **Teaching form**

12 frontal lessons (2 hours each) in attendance and 6 frontal tutorials (2 hours each) in attendance.

## **Textbook and teaching resource**

VV.AA.: Fisiologia dell'uomo. Edizioni Edi.Ermes, Milano.

Guyton A.C.: Elementi di Fisiologia umana. Piccin Editore.

For the texts, reference is made to the latest available edition. Teacher will provide other educational material.

## **Semester**

First Semester

## **Assessment method**

### **Monza**

The written physiology test will consist of 30 multiple-choice questions to check preparation for the examination programme.

### **Bergamo**

31 multiple choice questions to check preparation on the exam programme

## **Office hours**

By appointment required by mail (egidio.beretta@unimib.it, Monza; agennarini@asst-pg23.it, Bergamo).

## **Sustainable Development Goals**

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

---