UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Physiology

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 O2 and CO2 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