UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Fisiologia Umana

2526-1-I0101D004

Aims

Knowledge and understanding
Acquire in-depth knowledge of human physiology and biophysics, with a specific focus on the functional integration of body systems, through teaching delivered by researchers with expertise in the relevant scientific fields.

Applying knowledge and understanding
Apply the principles of biophysics (statics, hydrostatics, hydrodynamics, radiation physics) to understand human body functions and to interpret physiological parameters relevant to nursing or midwifery practice.

Making judgements
Develop the ability to integrate theoretical knowledge and observable data in order to interpret complex physiological phenomena, especially in relation to clinical monitoring and healthcare procedures.
This competence will be enhanced through interactive teaching activities.

Communication skills
Use appropriate scientific language to describe the main physiological and biophysical mechanisms, and to communicate clearly and effectively with healthcare team members and patients.
This skill will be developed through group discussions and interactive learning activities.

Learning skills
Strengthen autonomous and critical learning abilities required for continuous professional development in scientific and clinical contexts, also through the use of specialist sources and practical experiences.
This competence will be supported by interactive teaching methods focused on reflection and problem-solving.

Contents

Human Physiology course aims to give the student the concepts that govern integrated body functions in the living

organisms. Emphasis is put on relationships between health and body homeostasis, from the cells to the organ systems. Thus, an attempt will be made to define the limit of physiological adaptation to environmental conditions or to a developing disease. The course also aims to provide the basic principles of biophysics and medical physics needed to understand the biophysical mechanisms underlying the more relevant physiological processes.

Detailed program

PHYSIOLOGY - Cellular physiology: homeostasis; the properties of the plasma membrane; transports (the diffusion, primary and secondary active transport); osmosis. Basic Electrophysiology: membrane potential; action potential; nerve impulse propagation; synapses. Muscle physiology: muscle contraction; electromechanical coupling; relationships between force-length and strength-speed into the muscles; types of motor-neuron units. Cardiovascular system: hemodynamic of circulation; systemic pressure and mechanical properties of blood vessels; adjustment of systolic and diastolic pressure; blood velocity; systemic and pulmonary circulation; the venous system. The heart as a mechanic pump: mechanical work of the heart; cardiac output; self-regulation of cardiac output; regulation of heart rate and electrocardiography. Physiology of the interstitial tissue: exchange of liquid between capillaries and interstitium; the function of the lymph: the volume control of the interstitial fluid. Respiratory system: functional anatomy of the respiratory system; pulmonary ventilation; the ventilation-perfusion mismatch; mechanical properties of the lung and chest wall; the diffusion of gases: the alveolar-capillary units; hemoglobin saturation curve; gas transportation. The kidneys function: functional anatomy of the nephron; the mechanism of glomerular filtration; the renal clearance: filtration function, reabsorption and secretion; proximal tubular functions, Henle's loop functions; sodium and water balance. Digestive system: gastrointestinal motility; gastrointestinal secretions and digestion; absorption of food nutrients and dietary balance.

Prerequisites

Basic knowledge of Chemistry, Biochemistry, and Mathematics

Teaching form

Lectures; in particular, 30 hours of lecture-based teaching and 4 hours of interactive teaching

Textbook and teaching resource

Poltronieri Elementi di Fisiologia EdiSES

PHYSIOLOGY - Sherwood L. (2012) Fondamenti di Fisiologia Umana, Piccin-Nuova Libraria. Open choice by students among the Medicine Library’s Physiology text books.

Semester

1 year - 2 Semester

Assessment method

Written exam. A quiz with 33 questions will be proposed with 5 possible answers of which only one is the correct one. Allocated time: 120 minutes

Office hours

Previous appointment

Sustainable Development Goals

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