UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Fisiologia - 5

2526-1-I0102D004-I0102D014M-T5

Aims

To enhance knowledge of human physiology through teaching delivered by instructors specialized in the relevant field. Particular emphasis is placed on the integration of bodily systems and the function of the entire human body, making the instruction methodologically essential for understanding the monitoring of parameters and the procedures necessary for practicing as a midwife.

Knowledge and Understanding At the end of the course, the student will be able to:
Describe in detail the physiological mechanisms at both the cellular and systemic level, understanding how different organs cooperate to maintain the organism's homeostasis.
Analyze the functional interactions between systems (cardiovascular, respiratory, renal, endocrine) under physiological conditions and in response to internal or external stimuli.
Understand the molecular and biochemical foundations of physiological functions, with particular attention to regulatory signals, intercellular communication, and adaptive processes.
Interpret early signs of dysfunction and describe the continuum between normal physiology and the initial pathophysiological changes.

Applying Knowledge and Understanding At the end of the course, the student will be able to:
Apply integrated models to interpret system functions in complex, dynamic, and real-life conditions.
Recognize and analyze compensatory mechanisms and early functional changes that signal a transition toward pathophysiology.
Use a translational approach, integrating concepts of experimental physiology with clinical and preclinical scenarios.

Autonomy of Judgment The student will develop the ability to:
Formulate physiological and pathophysiological hypotheses based on evidence, interpreting both quantitative and qualitative data.
Critically evaluate the integration and coherence of information from various sources (biological, clinical, environmental).
Make independent assessments of adaptive mechanisms and functional deviations that precede disease.

Communication Skills The student will be able to:
Communicate physiological knowledge and its pathophysiological implications effectively using appropriate technical language.
Use digital tools, graphs, and experimental data to illustrate integrated functional models.
Actively participate in interdisciplinary discussions, clearly and concisely presenting complex concepts.

Learning Skills The student will be able to:
Plan autonomous learning strategies to update and deepen physiological knowledge.
Connect course content with related disciplines (pathology, pharmacology).
Identify personal learning needs and determine the most appropriate and up-to-date informational sources.

Contents

The student will be guided through the physiological analysis of the main cellular functions and the interactions among the different body systems (e.g., cardiovascular, respiratory, endocrine, digestive), with an in-depth focus on specific key functional aspects selected for their clinical and pathophysiological relevance. Regulatory mechanisms and their integration across systems will be explored in detail, including responses to physiological stress and pregnancy.
The course will encourage a critical and integrated view of biological function, promoting the development of physiological thinking oriented toward translational medicine and clinical practice

Detailed program

Introduction to Physiology and General Principles
Definition of physiology and levels of biological organization
Homeostasis and control systems
Body compartments and membrane transport
Principles of biophysics: membrane potential, diffusion, osmosis
Cellular Physiology and Communication
Resting membrane potential and action potential
Synapses and nerve transmission
Hormonal communication: receptors, intracellular signaling, feedback
Nervous and Endocrine Systems
Organization of the central and peripheral nervous systems
Motor and sensory control
Hypothalamus and the endocrine system
Hypothalamic-pituitary axes, stress, and hormonal regulation
Neuroendocrine adaptations during pregnancy
Cardiovascular Physiology
Structure and function of the heart
Cardiac cycle, cardiac output, heart rate
Systemic and pulmonary circulation
Blood pressure and its regulation
Cardiovascular changes during pregnancy
Respiratory Physiology
Mechanics of breathing
Gas exchange and transport in the blood
Regulation of respiration
Respiratory adaptations in pregnancy

Renal Physiology and Fluid-Electrolyte Balance
Glomerular filtration, reabsorption, and secretion
Regulation of fluid-electrolyte and acid-base balance
Role of the renal system in pregnancy
Digestive Physiology and Metabolism
Digestion, absorption, and gastrointestinal motility
Hormonal regulation of the digestive system
Basal metabolism and thermoregulation

Prerequisites

Basic knowledge of Biology, Chemistry, Biochemistry.

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

Office hours

Previous appointment
ilaria.rivolta@unimib.it

Sustainable Development Goals

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