UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Fundamentals of Human Physiology

2627-2-H4104D010

Aims

The course aims to provide knowledge about cellular functions at the basis of systems physiology. At the end of the course, the student will be able to understand how a cell can perform its vital functions to guarantee the homeostasis of the tissue to which it belongs thanks to its basic mechanisms. The student will be able to use this knowledge for the interpretation of the pathophysiological signs and symptoms, as a starting point for the study of the physiology of the individual systems subsequently treated in the vertical tracks.

Knowledge and understanding: by the end of the course, the student will be able to:

1. Correlate the normal structure and function of the body as a complex of biological systems in continuous adaptation, interpreting the morpho-functional abnormalities observed in different diseases;
2. Identify normal and abnormal human behavior, being able to indicate the determinants and main risk factors of health and disease, as well as the interaction between human beings and their physical and social environment, with attention to sex/gender and population differences;
   Describe the fundamental molecular, cellular, biochemical, and physiological mechanisms that maintain the body's homeostasis, being able to describe the human life cycle and the effects of growth, development, and aging on the individual, the family, and the community, with attention to sex/gender and population differences.

Applying knowledge and understanding: by the end of the course, the student will be able to:

1. Demonstrate possession of the basic skills required for examination, diagnosis, therapy, and rehabilitation, in a manner appropriate to the situation and respectful of patients, being able to develop questions based on clinical problems, search for and evaluate the best available evidence, and communicate it empathetically and in a form that is understandable to patients.

Making judgements: by the end of the course, the student will be able to:

1. Demonstrate, in the performance of professional activities, a critical approach, constructive skepticism, and

a creative attitude oriented toward research. Students will be able to take into account the importance and limitations of scientific thinking based on information obtained from different sources in order to establish the cause, treatment, and prevention of diseases;
2. Formulate personal judgements to solve analytical and complex problems and independently search for scientific information, without waiting for it to be provided to them, using the foundations of scientific evidence.

Communication skills: by the end of the course, the student will be able to:

1. Listen carefully in order to extract and synthesize relevant information on all issues, understanding their content, and exercise communication skills to facilitate understanding with patients and their relatives, enabling them to share decisions as equal partners.

Learning skills: by the end of the course, the student will be able to:

1. Critically assess their own level of training, recognize its limitations, and reflect on their learning and development needs;
2. Apply appropriate learning strategies to meet professional development needs, including goal setting, planning, and time management for self-directed learning; use available resources to search for, identify, and select health-related information, and critically evaluate content and sources.

Contents

The course is based on the systematic presentation of physiological concepts underlying the functions of the human body. The sequence of events leading to an imbalance of a specific function cannot be appreciated without a deep understanding of the basic biophysical and physiological mechanisms. Therefore, these mechanisms that guarantee functions at the cellular and tissue level will be presented. In particular, membrane transports, neuronal, muscular and cardiac cell excitability, the physiology of sensory systems, the motor control and muscle contraction will be analyzed.
During the course, the effects of the aging process and gender differences on human physiology will be emphasized.

Detailed program

Please, refer to the specific module

Prerequisites

Anatomy, biology, genetics and phisics

Teaching form

Lessons will take place in person. The professor's lectures begin with an initial part where concepts are presented (lecture-based mode), followed by an interaction with the students that shapes the subsequent part of the lecture (interactive mode).

Whenever possible, clinical case analyzes will be proposed for the evaluation of specific physiological parameters. Teaching activities may include, up to a maximum of 30% of the total lecture hours, the use of innovative teaching methods, including delivery under the supervision of the lecturer, co-teaching arrangements and/or remote teaching, in accordance with Ministerial Decree No. 1835 of 6 December 2024.

Textbook and teaching resource

Please, refer to the specific module

Semester

Second year, First semester

Assessment method

There will be no ongoing tests.
The exam consists in a written test. Open questions will be posed to the student in order to evaluate the general knowledge of the topics. Moreover, the student will be asked to answer to questions that require the analysis of a complex phenomenon, its rationalization and the application of specific physiology principles and to solve simple exercises. Finally, a clinical case may be presented which will require the analysis of the interconnections between different physiological variables in the light of the theoretical paradigms.

Office hours

The professors receive by appointment upon agreement by e-mail
Ilaria.rivolta@unimib.it
giulio.sancini@unimib.it

Sustainable Development Goals

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