UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Basic Elements of Neuroanatomy and Neurophysiology - 2

2627-1-E2403P003-T2

Learning area

Knowledge and skills useful to understand, promote and change individual psychological functioning.

Learning objectives

Knowledge and understanding:
• Overview of anatomic, physiological and neuroscientific methods to the study of the human brain
• Basis of neurobiology, neuroanatomy and neurophysiology of the central nervous system

Applying knowledge and understanding:
• Linking the main motor and sensory functions to the anatomo-functional structure of the human nervous system
• Basic knowledge of the anatomo-functional underpinnings of brain dysfunctions e related behavioural disorders

Making judgments
During classes, active discussion will promote the development of the ability to critically evaluate theoretical problems concerning the relationship between brain and sensorimotor functions. By discussing pathologies of the central nervous system, students will learn to interpret the functional implications of anatomical and physiological deficits of the nervous system.

Communication Skills
The course promotes the development of communication skills through classroom discussions on the content and through the writing of an open response during the written exam regarding different brain structures and their functional role in human behavior. These activities encourage the use of specific technical language concerning the anatomical and functional aspects of the central nervous system and human behavior.

Learning Skills
Through the study of the anatomical and functional foundations of the central and peripheral nervous systems, the

course provides the basis for a specific learning approach in the neuroscientific field, which will enable independent learning of more advanced aspects of cognitive neuroscience. This ability will also be useful in view of subsequent courses with greater specialization, as well as in future clinical or research practice.

Contents

The course aims to provide fundamental knowledge about the anatomical, neurobiological, and physiological organization of the human nervous system in relation to major neurophysiological functions with special emphasis on those relevant from a psychological and neurocognitive perspective.

Detailed program

• Fundametal basis of neurobiology and electrophysiology of the neuron (Neuron Anatomy, Action and resting Potential, SynapticTransmission)
• Development of the human nervous system
• Neuroanatomy of the human brain (Telencephalin, Brainstem, Spinal Cord)
• Cerebral blood and liquoral circulation
• Sensory systems (Visual, Somatosensory, Auditory, Vestibular, Chemical Systems)
• Motor system (Spinal Motor Control, Pyramidal and Extrapyramidal systems, Cerebellum)
• Neurotransmitters and homeostatic control of the brain and behavior

Prerequisites

A basic knowledge of biology facilitates the understanding of the course contents.

Teaching methods

Lectures in Italian, with the aid of sample videos also in English. In addition to lectures, about the 15% of the teaching will take place through exercises using 3D models and drawings of the human brain. Review sessions of macro-topics of the course and tutorial and simulations of the written exam are scheduled.
The study material supporting the textbook (slides, scientific articles) is made available on the e-learning site of the course so that it can also be used by non-attending students.

Assessment methods

The final examination is written, with optional oral at the student's request or at the request of the lecturer. The written exam comprises a section with multiple-choice questions and one open question. Multiple-choice questions are designed at ascertaining the extensive preparation on the course topics, and it consists in questions assessing the acquisition of knowledge of the neuroanatomy, neurobiology and neurophysiology of the human brain. The open question allows assessing the ability to expound on a topic covered in class, using an appropriate technical

language. The evaluation criteria are: the number of correct answers to the multiple-choice questions, a comprehensive and timely answer at the open question. The optional oral test consists of an interview on the topics covered in class.

International students (Erasmus program) may opt to answer the open question in English or to require to take the oral exam in English.

Textbooks and Reading Materials

Maravita A., Bolognini N. Fondamenti anatomofisiologici e neuroscienze del comportamento. Poletto Editore, 2025.

Texts for further study (optional): Felten D.L., Shetty A.N., Atlante di Neuroscienze di Netter. Elsevier, 2010 (also available in English).

International students may adopt: Bear M.F., Connor B.W., Paradiso M.A., Neuroscience: Exploring the Brain. Publisher: Lippincott Williams (from IV edition and later)

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING