UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Neuroanatomy I

2021-4-H4102D028-H4102D101M

Aims

The objectives of the course are to provide expertise in normal anatomy, embryology of the nervous system. Teaching will include reference to topographic, radiologic, and clinical anatomy. Practical activities using models (also virtual 3D) and clinical case simulations will be used to reach the teaching objectives.

Contents

The goal of the course is to provide a detailed knowledge of anatomy of the nervous system required for a correct physical examination and understanding of the diseases pathogenesis.

Detailed program

Neuroanatomy I (2nd term of 4th year, 30 hours).

Development of the nervous system: neurulation, neural crest formation and differentiation, primary and secondary brain vesicles and their development, formation of midline structures, development of the spinal cord. Neural tube defects and major disorder of brain development.

Introduction to the study of the nervous system: general organization of the central and peripheral nervous

system.

Central nervous system:

1. External and internal structure of spinal cord, brainstem, cerebellum, diencephalon and telencephalon.

2. Brainstem: medulla, pons and mesencephalon; nuclei of cranial nerves and other major nuclei; reticular formation.

3. Tectum mesencephali.

4. Diencephalon: thalamus, hypothalamus, subthalamus, epithalamus

5. Telencephalon: cerebral cortex, cortical areas, localization of functions; basal ganglia.

6. The limbic system.

7. Blood supply of the brain and spinal cord.

8. Ventricular system and cerebrospinal fluid.

9. Coverings of the brain and spinal cord (meninges).

10. The major pathways: spinal and medial lemniscal tracts; spinocerebellar tracts; lateral and medial descending motor systems; cerebellar and basal ganglia motor control; visual, auditory and vestibular system.

Neuroanatomy II (1st term of 5th year, 10 hours).

Peripheral nervous system:

1. spinal nerves, spinal roots and plexuses

2. cranial nerves

3. autonomic and enteric nervous system

Neuroanatomy in clinical practice:

1. Functional neuroanatomy. Interactive clinical cases will be presented. Students will be invited to recognise the site of lesion on the basis of the loss/gain of function reported in the clinical history/examination

2. Guided learning of advanced neuroanatomy: students will use both different anatomy models and multimedia sources such as 3D virtual models, to recognize the main features of each part of the nervous system. Some laboratories will focus on computer-assisted learning, to allow students to recognize radiological images, such as computed tomography and magnetic resonance imaging. In addition, some laboratories will be focused on quizzes based on lectures' topics, and/or on basic clinical cases, later discussed with the teacher.

Prerequisites

Knowledge acquired during the 1st year in the “Fundamentals of Human morphology” course.

Teaching form

Frontal lessons are given mainly *in Neuroanatomy I course* to reach a comprehensive knowledge of neuroanatomy. Small groups activities will be assigned to consolidate knowledge. In *Neuroanatomy II* an even more interactive approach is followed: after a recapitulation of peripheral nervous system main features, students will consolidate knowledge through small groups activities solving clinical cases via anatomy knowledge and by use of Anatomage™ table.

During COVID-19 emergency, changes might be required and in this case remote teaching activities will be implemented.

Textbook and teaching resource

· Gray's Anatomy: The Anatomical Basis of Clinical Practice, 41st Edition, by Susan Standring (Elsevier)

· Snell's Clinical Neuroanatomy, 8th Edition, by Ryan Splittgerber (Lippincott Williams & Wilkins)

· Clinical Neuroanatomy, 29th Edition, by Stephen Waxman (Mc Graw Hill)

· Fitzgerald's Clinical Neuroanatomy and Neuroscience, 7th or (the soon to be released 8th) Edition, by Estomih Mtui, Gregory Gruener, Peter Docker (Elsevier)

Semester

2nd term of 4th year for Neuroanatomy I and 1st term of 5th year for Neuroanatomy II.

Assessment method

Neuroanatomy I.

Topics presented in Neuroanatomy I course will be verified with a written test at the end of the course composed by multiple choice questionnaires and open questions and it will be part of the general assessment of the Neuroscience Track I. Optional oral examination will be possible if indicated by the examination committee.

Neuroanatomy II.

Topics presented in Neuroanatomy II course will be verified with a written test at the end of the course composed by multiple choice questionnaires and open questions and it will be part of the general assessment of the Neuroscience Track I. Optional oral examination will be possible if indicated by the examination committee.

During COVID-19 emergency, changes might be required and in this case remote examination activities will be implemented.

Office hours

Appointments will be given upon contacting by email the teaching staff.