HUMANITAS UNIVERSITY	**Department of Biomedical Sciences** **Physiotherapy Degree Programme** **Neurology Syllabus**

Academic year 2020-2021. Academic term: first semester of second year
Course coordinator: Prof. Alberto Albanese

NEUROLOGY (4 ECTS)	
Prof. Alberto Albanese	Head of Neurology Unit I at Humanitas Hospital E-mail: alberto.albanese@humanitas.it
Objectives	Present the object of study of neurology by focusing on the neurophysiological mechanisms of normal and pathological motor control, and to present the main neurological syndromes subdivided by pathophysiological element: degenerative, neuromuscular, inflammatory and cerebrovascular.
Teaching methods	Lectures with slides. Classroom discussion at the end of each lesson and answering questions concerning the topics covered
Teaching material	Slides presented in lecture, available on LMS for physiotherapy students

Content

1) General structure of the motor system
Present the functional anatomy of: motor cortex and upper motor neurons; lower motor neurons and peripheral nerves; muscle: basal ganglia and cerebellum

2) Types of movements
Definition and characteristics of voluntary, semi-voluntary, automatic and involuntary movements

3) Voluntary movement
Neurophysiological bases and characteristics of: ballistic and slow movements; integration between basal ganglia and cerebellum; motor learning; semi-voluntary and automatic movements

4) Visual system
Functional anatomy and neurophysiology of: optical pathways; visual field and its defects

5) Somatosensory system
Functional anatomy and neurophysiology of: touch; pain; proprioception

6) Hearing and vestibular system
Functional anatomy and neurophysiology of: hearing and vestibular system

7) Sensory-motor integration
Neurophysiological and pathophysiological bases: postural control (postural reflexes, Romberg); craniocervical reflexes and vertigo; sense of position and sensory ataxia

8) Associative cortical functions

Neurophysiological bases of: memory; language; praxis; gnosis; attention; executive functions

9) General structure of the autonomic nervous system
Anatomy and physiology of the autonomic nervous system; autonomic reflexes and laboratory evaluations

10) Homeostasis and homeostatic reactions
Balance between biological functions and the link between emotions, motor activity and environmental variations

11) Loss of voluntary movement
Definition and characteristics of the different clinical conditions of loss of movement: paralysis; akinesia and apraxia

12) Loss of motor coordination
Definition, pathophysiology and characteristics of cerebellar ataxia and sensory ataxia

13) Alterations in muscle tone
Definition, pathophysiology and characteristics of hypertonia and hypotonia

14) Central and peripheral paralysis (motor neuron syndromes)
Paradigmatic disorders of gait and involuntary movements: tremor; chorea; tics; dystonia; myoclonus

NEUROLOGICAL SYNDROMES

15) Duration and topography
Transient syndromes; permanent syndromes; cortical syndromes; subcortical syndromes; trunk syndromes; spinal cord syndromes

16) Degenerative diseases
Parkinson's disease and movement disorders; cerebellar ataxias; motor neuron diseases

17) Neuromuscular diseases
Neuropathies; polyneuropathy; myasthenia; myopathies

18) Inflammatory diseases
Multiple sclerosis

19) Cerebrovascular Diseases
Ischaemic disease; haemorrhagic disease; aneurysm

20) Epilepsy
Epilepsies

21) Cognitive impairment and dementia
Cortical dementia; subcortical dementia; vascular dementia; Alzheimer's disease and other degenerative dementias

22) Disturbances of consciousness
Mental state; syncope; coma

23) Sleep disorders
Periodic movement and restless legs; sleep apnoea; REM sleep disorders; narcolepsy

24) Headaches and aches
Primary headaches; migraine; cranial neuralgia

NEUROIMAGING (2 ECTS)	
Dr Marco Grimaldi	Specialised in Radiology and Radiotherapy, Specialised in Neurology Head of the Neuroradiology Service at Humanitas Research Hospital E-mail: marco.grimaldi@humanitas.it
Objectives	Provide essential knowledge for understanding the modalities of acquisition and production of radiodiagnostic images with particular reference to the field of neurology. Provide essential knowledge for understanding the potential and clinical significance of different medical tests in order to develop critical judgement; provide essential knowledge of neuro-radiological semeiotics.
Teaching methods	Lectures with slides. Classroom discussion at the end of each lecture and answering questions concerning the topics covered; visit to the Radiodiagnostics department.
Teaching material	Slides presented during the lecture, available on LMS for physiotherapy students

Content

1) Course introduction
Radiology and Neuroradiology, history, applications and definition of the field of study.

2) Modalities of image production
Elements of radiation physics, interaction of energy with matter, elements of dosimetry.

3) Physics principles of conventional radiology imaging
Imaging principles of CT and MRI; elements of dosimetry.

4) Radiological examination
Principles behind the indications, contraindications, appropriateness of radiological examinations.

5) Skull and spine
Elements of radiological semeiotics in conventional radiology, CT and MRI with reference to the

cranium-brain and spine.

6) Angiography
Functioning principles, indications and how to perform one.

7) Imaging Anatomy
Elements of normal and pathological anatomy of the skull, encephalon, spine and spinal cord.

8) Intracranial neuroradiology
Neuro-radiological approach to some of the main intracranial pathologies: ischaemia, neoplasms, trauma.

9) Spinal neuroradiology
Neuro-radiological approach to some of the main spinal pathologies; low back pain, disc pathology.

10) Advanced imaging techniques
Functional Magnetic Resonance Imaging, diffusion techniques, CT and MRI perfusion techniques.

NEUROPHARMACOLOGY (1 ECTS)	
Dr Antoniangela Cocco	Physician specialised in Neurology, she has been working as an assistant and researcher at the Istituto Clinico Humanitas in Rozzano since 2016. E-mail: antoniangela.cocco@humanitas.it
Objectives	The aim of this module is to provide essential knowledge of pharmacology necessary to integrate physiotherapy with the knowledge of mechanisms of drug action, their therapeutic properties and their undesired effects. The learning objectives include the acquisition of basic knowledge of drug-organism interactions, with reference to drug targets and the molecular mechanisms underlying their action, and fundamental elements of drug use in the treatment of diseases of the nervous system relevant to the physiotherapy pathway.
Teaching methods	Lectures with classroom discussion.
Teaching material	Slides presented during the lecture, available on LMS for physiotherapy students. Farmacologia per le professioni sanitarie - Rossi F., Cuomo V., Riccardi C. – Edizioni Minerva Medica

Content

Principles of pharmacology and an overview of pharmacokinetics and pharmacodynamics. Knowledge of the anatomical and functional basis of neuronal excitability. Pharmacological modulation of neurotransmission. Main neurotransmitters.

Neurodegenerative disease 1. Outline of the pathogenesis of the main neurodegenerative diseases. Dopaminergic system and its pharmacological modulation in the treatment of Parkinson's disease and hypokinetic disorders. Hyperkinetic disorders and their therapeutic management.

Neurodegenerative diseases 2. Pharmacological modulation in dementia treatment. Amyotrophic lateral sclerosis: disease modifying therapies and symptomatic treatments.

Autoimmune and inflammatory neurological diseases of the CNS. Pathophysiology of autoimmune diseases of the CNS. Therapeutic targets of disease modifying therapies in Multiple Sclerosis and symptomatic drugs.

Neuromuscular and peripheral nervous system diseases. Outline of the pathophysiology of neuromuscular diseases and their treatment.

Epilepsy. Therapeutic targets of the main drugs used in the treatment of epilepsy, side effects and drug interactions.

Psychopharmacology. Basic principles of inhibitory GABAergic transmission in the CNS and its pharmacological modulation. Functions of the serotonergic and dopaminergic systems in the CNS. Antidepressants, anxiolytics, neuroleptics.

Pain therapy. Mechanisms of action and use of analgesic drugs.

Examination for the Neurology course. Written examination with multiple-choice questions on topics from all modules (Chairman of the Examination Committee: Prof. Alberto Albanese)