

Degree Course of Physiotherapy

INTEGRATED TEACHING: PHARMACOLOGY AND NEUROPSYCHIATRICS SCIENCES

NUMERO DI CFU: 8

SSD: MED/26- BIO/14 – MED/25 – MED/27

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MODULE: Farmacologia/ Pharmacology

CFU: 2

SSD: BIO/14

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MODULE: NEUROLOGIA/NEUROLOGY

CFU: 2

SSD: MED/26

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MODULE: NEUROCHIRURGIA/NEUROSURGERY

CFU: 1

SSD: MED/27

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MODULE: PSICHIATRIA /PSYCHIATRY

CFU: 1

SSD: MED/25

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PREREQUISITES

Farmacologia/ Pharmacology

Basic knowledge of the main definitions of clinical pharmacology

Neurologia/Neurology

There are no specific prerequisites, however the study of Neurology requires knowledge of basic anatomy a physiology of central and peripheral nervous system and synaptic functioning.

Neurochirurgia/Neurosurgery

Basic concepts of Histology and Human Anatomy. Principles of Human Physiology, Cellular Biology and Biochemistry. Basic elements of Physic. Fundamentals of General Pathology.

Psichiatria /Psychiatry

No prior exams are necessary to follow the course, however, in order to understand the course, the student should have basic knowledge of human biology and physiology, elements of medical pathology and pharmacology.

LEARNING OBJECTIVES

Farmacologia/ Pharmacology

At the end of the academic training course the student is likely to be able to describe the basic principles of clinical pharmacology and in particular, notions of pharmacokinetics and

pharmacodynamics and absorption mechanisms; classify the active substances according to their composition and specificity of action.

Neurologia/Neurology

Essential learning objectives of this course are the ability to describe the damage and the etiopathogenetic mechanisms subtending the most common diseases affecting the central and the peripheral nervous system and their clinical and instrumental diagnostic process. The course will also aim at providing knowledge to discern the neurobiological mechanisms favouring the recovery from acute and chronic neuronal damage as well as the mechanisms that support maladaptive plasticity.

The course will achieve its objectives through lectures and interactive learning activities with the aim of improving students ability to understand and solve the main issues emerging in everyday clinical practice.

Neurochirurgia/Neurosurgery

Fundamental and indispensable objectives are the following:

- To acquire precise scientific knowledge necessary to classify and correctly define the neurosurgical diseases most frequently encountered in the clinical setting.
- Comprehension of the main pathophysiological mechanisms responsible of the neurological deficit. Identify the origin of the impairment and define its type and natural history.

Psichiatria /Psychiatry

The course is aimed at providing the fundamentals of psychopathology and the history of psychiatry and a basic knowledge of pathophysiology, the clinic and the treatment of the main psychiatric disorders.

LEARNING OUTCOMES

Farmacologia/ Pharmacology

Knowledge of the basic principles of clinical pharmacology, pharmacokinetics and pharmacodynamics and of the main classes of drugs.

Knowledge and understanding

At the end of the academic training course the student will have to know the basic notions of clinical pharmacology, the main classes of drugs, and the history of the drug

Applying knowledge and understanding

At the end of the academic training course the student will be able to judge the basic efficacy and toxicity of the main drug classes

Communication skills

At the end of the academic training course the student is likely to be able to present historical notes on pharmacology, basic principles of pharmacokinetics and pharmacodynamics of the main classes of drugs

Making judgements

At the end of the academic training course the student is likely to know the difference, efficacy and toxicity between drugs belonging to the same pharmacological classes.

Neurologia/Neurology

Knowledge and understanding

At the end of the course students will:

- be able to discern the most common signs of neurological diseases and locate the lesion site

- be able to define the clinical and etiopathogenetic characteristics of the main pathologies affecting the central and the peripheral nervous system, particularly the diseases affecting motor pathways, balance and language
- be able to perform a complete neurological examinations, including cognitive function assessment
- know the main diagnostic methods used in neurological clinical practice to locate damage, perform a diagnosis and estimate prognosis
- understand the main mechanisms leading to functional recovery
- have basic notions of neuropharmacology, particularly symptomatic therapies

Applying knowledge and understanding

At the end of this course students will be able to use the new knowledge to:

- Correctly assess neurologic patients
- Further autonomously develop knowledge on specific aspects relative to their future professional practice

Knowledge and understanding

At the end of this course students will be able to

- Use the new knowledge to correctly assess the main neurological pathologies, their aetio-pathogenesis and prognosis
- To understand the rationale and the aim of specific rehabilitative programmes
- To master theoretical and practical tools to autonomously develop further understanding of neuroabilitative issues that students will face in their professional practice

communication skills

At the end of this course students will have to:

- Be able to correctly use scientific terminology

making judgements

At the end of this course students will have to be able to:

- Critically assess what they learned
- Autonomously assess neurological patients from a neuro-rehabilitative perspective

Neurochirurgia/Neurosurgery

Knowledge and understanding

At the end of this course the student will acquire:

- Basic knowledge of the "functional" anatomy of the cranio-cerebral system.
- Basic knowledge of the "functional" anatomy of the vertebro-medullary system.
- Knowledge and ability to detail the principles of their applied physiology.
- Knowledge of the general principles underlying the Intracranial Pressure.
- Knowledge of the most recent acquisitions concerning CSF-related pathologies.
- Ability to classify and distinguish the different types of spontaneous intracranial hemorrhages and to understand their different prognosis.
- Elements and basic principles of Cranial Traumatology and related outcomes.
- Elements and basic principles of Spinal Traumatology and related syndromes and outcomes.
- Capability to classify the most common Brain tumors and their general aspects.
- Capability to classify the most common Spine tumors and their general aspects.
- Knowledge of the most common spinal degenerative diseases.

Applying knowledge and understanding.

At the end of this course the student will be able to:

- Apply the acquired notions to correctly identify and define a neurological impairment or a determined outcome, go back to the origin, know its natural history and understand the rationale of the rehabilitation objectives.
- Dispose of a sufficient body of knowledge to allow further autonomous deepening on more specific subjects included in the vast world of neuro-rehabilitation.

Communication skills.

At the end of this course the student will be able to:

- Use technical and proper terminology to describe any common neurosurgical scenario. To correctly describe the pathophysiology and the mechanism generating the disease.

Making judgment.

At the end of this course the student will be able to:

- Correctly pursue a general assessment concerning the anatomical, physiological and clinical aspects of a certain neurosurgical condition and to predict a possible prognosis.

Psichiatria /Psychiatry**knowledge and understanding**

At the end of this course the student should be aware of:

- main concepts of psychopathology
- primary elements of the main psychiatric disorders
- principles of treatment of the main psychiatric disorders

Applying knowledge and understanding

At the end of the course, the student should have acquired:

- the ability to recognize the main psychiatric disorders
- the ability to describe the main psychiatric disorders

communication skills

At the end of the course, the student will have to use correctly the main terms of psychopathology in the appropriate context.

making judgements

At the end of the course, the student should know how to carry out general assessments of the topics covered.

COURSE SYLLABUS**Syllabus Pharmacology**

- History of ancient and modern, traditional and western pharmacology.
- Basic knowledge of drug regulatory agencies, law and rules
- Clinical study design for the evaluation of drug efficacy and toxicity
- Basic principles of pharmacology, definitions of drugs, pharmacokinetics and pharmacodynamics
- Analgesic drugs: Aspirin: definition, chemical properties, indications, treatments, efficacy, and contraindications
- Analgesic drugs - Non-steroidal anti-inflammatory drugs: definition, mechanisms of action, chemical properties, indications, treatments, efficacy, and contraindications

- Analgesic drugs – Opioids: definition, mechanisms of action, chemical properties, indications, treatments, efficacy, and contraindications
- Analgesic drugs – Steroids: definition, mechanisms of action, chemical properties, indications, treatments, efficacy, and contraindications
- Antimicrobials – Antibiotics: definition, mechanisms of action, chemical properties, indications, treatments, efficacy, and contraindications
- Antimicrobials – Antifungals: definition, mechanisms of action, chemical properties, indications, treatments, efficacy, and contraindications
- Antimicrobials – Antivirals: definition, mechanisms of action, chemical properties, indications, treatments, efficacy, and contraindications
- Antimicrobials – Antifungals: definition, mechanisms of action, chemical properties, indications, treatments, efficacy, and contraindications
- Clinical approach to THERAPEUTIC DOSAGE OF DRUGS (TDM) in the clinical pharmacology service of INMI Spallanzani

Syllabus Neurology

- Approach to the patient with neurological diseases
- Language abnormalities
- Neurobiological mechanisms of spasticity and treatment approach
- Imaging (MRI, CT scan) and electrophysiologic techniques (evoked potentials, electromyography, electroneurography, electroencephalography) for neurologic diagnosis
- Synaptic plasticity and neurobiology of rehabilitation
- Cerebrovascular diseases
- Multiple sclerosis and other inflammatory demyelinating diseases
- Motorneurons disease
- Parkinson's disease and other movement disorders
- Alzheimer's disease and other neurodegenerative disorders
- Genetic and acquired diseases of the peripheral nerves
- Myasthenia gravis and other diseases of the neuromuscular junction
- Infections of the nervous system (viral, bacterial, prionic)

Syllabus Neurosurgery

Principles of Neuro-anatomy and Physiology: the Cranio-Cerebral System.

- Topographic Anatomy of the skull and functional Anatomy of the brain. Functional networks. Anatomy and physiology of the cranial nerves. Anatomy of the cerebral blood vessels. Anatomy of the ventriculo-cisternal system.

Pathophysiology of Intracranial Pressure (ICP).

- Homeostasis of intracranial volumes. Definition of ICP. The Pressure-volume relationship. Cerebral Perfusion Pressure. Cerebral Blood Flow. Cerebral Edema. Syndrome of elevated ICP.

Cerebro-spinal fluid (CSF) related pathologies.

- CSF: Intrinsic properties, production and reabsorption. CSF dynamics. Hydrocephalus: classification and pathophysiology. Syringomyelia. Pseudotumor Cerebri. Normal Pressure Hydrocephalus.

Brain Tumors.

- Principles of Neuro-oncology. W.H.O. Classification. Gliomas. Meningiomas. Secondary tumors (metastasis).
- Traumatic Brain Injury (TBI).

Biomechanical aspects. State of consciousness alteration. Post-traumatic intracranial bleedings. Diffuse axonal injury. Brain Concussion. Outcomes following TBI.

- Spontaneous Intracranial Hemorrhages.

Hemorrhagic Strokes. Subarachnoid hemorrhage. Intracranial aneurysms. Artero-venous malformations. Venous Malformations. Intracerebral hematomas. Related Outcomes.

- Principles of Neuro-anatomy and Physiology: the vertebro-medullary system.

General anatomy of the spine. The cranio-vertebral junction. Anatomy and functional organization of the spinal cord. Spinal nerves. Topographic anatomy of the cervical, dorsal and lumbo-sacral spine and the related spinal cord segments.

Traumatic Spinal Injury (TSI).

- Biomechanical aspects. Principles of vertebral fractures classification. Post-traumatic spinal cord syndromes. The A.S.I.A. system. Outcome following TSI.

Spinal Tumors.

- Classification and general aspects. Primary and secondary tumors. Spinal cord compression syndromes. Prognosis of spinal tumors.

Spinal degenerative disease.

- Disks degeneration and related pathology. The concept of spinal instability. Spondylosis myelopathy. Radiculopathies. The Low back pain.

Syllabus Psychiatry

Introduction to psychiatry

- Notes on history of psychiatry
- Elements of psychopathology

The main psychiatric disorders and their treatment:

- Schizophrenia
- Mood disorders
- Anxiety disorders
- Obsessive Compulsive Disorder
- Disorders associated with traumatic or stressful events
- Personality disorders
- Hysteria and disorders with somatic symptoms
- Eating disorders
- Substance Use Disorder and Behavioral Addictions

Legislation and organization of territorial psychiatric assistance

COURSE STRUCTURE

Farmacologia/ Pharmacology

Traditional lessons, group work, group work presentations, home work

Neurologia/Neurology

The course is delivered through 20 hours of lectures, divided into 2-3 hours-long sessions accordingly with academic schedule. The lectures will be supported by slides and screening of didactic videos. Moreover, during the course there will be occasion for interactive practical activities relevant to the content of the lectures.

Neurochirurgia/Neurosurgery

The course provides a total of 20 hours of frontal lessons divided in six 3h lessons and one 2h (final) lesson. Frontal teaching will include slides and clips projection, followed by interactive discussion of clinical cases related to the lesson topic.

Psichiatria /Psychiatry

The teaching will be delivered through 10 hours of lectures with discussions on exemplary clinical cases.

COURSE GRADE DETERMINATION

Farmacologia/ Pharmacology

Group work, oral interview and / or final written test

Neurologia/Neurology

The final assessment of student's preparedness will be carried out through a test and face to face examination. The test will contain 15 questions with multiple answers; each correct answer will correspond to 2 points. The final mark will result from the sum of points collected in the test. Access to face to face examination will be granted on the basis of 18 points minimum result in the test examination. During the face to face examination the commission will evaluate student's ability to apply his knowledge in the examination of clinical cases and his competence in doing so. Moreover, the commission will evaluate judgement and reasoning capacity, communication skills, use of lexicon according to Dublin criteria.

Neurochirurgia/Neurosurgery

Grading will be determined using the following methodology: a propaedeutic written test will be submitted, followed by an oral examination. The written test is made up by 15 multiple-choice questions; 2 points will be given for every correct answer. The final score will be determined by the sum of the gained points. To obtain the admission to the oral examination the student must achieve a minimum of 18 points. During the oral examination the Commission will evaluate the student knowledge and the skill to apply the acquired notions within the clinical scenarios. Other parameters that will be assessed concern the judgment aptitude and the communication skill; significant importance will be given to the correct use of the proper, technical terminology.

Psichiatria /Psychiatry

Students' knowledge will be verified through an oral interview that will assess the student's ability to discursively organize the information acquired and the quality of the presentation.

OPTIONAL ACTIVITIES

Farmacologia/ Pharmacology

Individual study, group work, and home work on particular topics.

Neurochirurgia/Neurosurgery

Besides the frontal didactics, opportunities to focus and expand any topics will be granted to the student, in an extra-time setting. This supplemental activity should be discussed in advance with the teacher. The issues reviewed in these sessions will not be considered examination matter.

Psichiatria /Psychiatry

READING MATERIALS

Testi Farmacologia/ Pharmacology

Basic pharmacology book as Goodman & Gilman's The Pharmacological Basis of Therapeutics Textbook by Alfred G. Gilman, Alfred Gilman Sr., and Louis S. Goodman, slide sets and original articles from selected international journals

Testi Neurologia/Neurology

- Adams and Victor's Principles of Neurology 11th ed. McGraw-Hill Medical
- Kandel ER, Schwartz JH, Jessell TM 2012, Siegelbaum SA, Hudspeth AJ. 'Principles of Neural Science, 5th ed. McGraw-Hill, New York
- Fuller G. Neurological Examination Made Easy Ed. Churchill Livingstone
- www.pubmed.com

Testi Neurochirurgia/Neurosurgery

During each lesson the teacher will support the student with an abundant source of references, indicating the most important and recent literature to read. Fundamental Book Chapters will be also provided, directly by the teacher. Neurosurgery fundamentals. Ed. Nitin Agarwal. New York: Thieme, 2019. ISBN: 9781626238251

Testi Psichiatria /Psychiatry

A Short Textbook of Psychiatry: 20th Year Edition by Niraj Ahuja, Jaypee Brothers Medical Pub