Degree Course of Physioterpy

Integrated Teaching: PHARMACOLOGY AND NEUROPSYCHIATRIC SCIENCES
CFU: 8
SSD: MED/26- BIO/14 – MED/25 – MED/27
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CFU: 1
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MODULE: PSYCHIATRY
CFU: 1
SSD: MED/25
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PREREQUISITES

Pharmacology
Basic knowledge of the main definitions of clinical pharmacology

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.

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

Psychiatry
Preliminary knowledge is not provided

LEARNING OBJECTIVES

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.

Neurology

Essential learning objectives of this course are the ability to describe the damage and the ethiopatogenetic 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.

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.

Psychiatry

The course has the following educational objectives: to achieve a basic preparation in theoretical, design and operational fields of psychiatric pathology. Achieve ability to use cognitive and intervention tools aimed at prevention, diagnosis and support activities in the psychiatric field. Acquire basic skills to establish characteristics of the main psychiatric disorders. To acquire the ability to assess the severity index concerning situations in which psychiatric disorders. Be able to collaborate in interventions, to be collaboratively performed in multidisciplinary groups. To acquire knowledge on the main information tools and on the telematic communication in the specific areas of competence.

LEARNING OUTCOMES

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.

Neurology

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 peripherical 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

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.

Appling 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.

Psychiatry

At the end of this teaching the student will need to know:

Applying knowledge and understanding

- To have the ability to recognize in the various sectors of psychiatric pathologies, as well as the clinical disciplines (neurological, psychiatric, neuroradiological) that are at the basis of knowledge about psychic processes, and interventions for the promotion, recovery and maintenance of health conditions and well-being within health institutions for individuals at different stages of their life span;
- Acquire skills for the approach to people affected by physical and mental, cognitive and emotional disorders;
- Operate in institutions, companies and healthcare organizations in multidisciplinary teams in the area of psychiatric sciences.

Communication skill

At the end of the course the student have to know:

- use the updated tools for communication and management of information, experience and professional skills in the field of services aimed at people, groups, organizations and communities.
- Use specific terminology appropriately

Making judgements

At the end of the course the student have to know:

- carry out general evaluations of the topics covered.

COURSE 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

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, electromyo-grography, 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)

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 proprieties, 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.

Psychiatry

- Psychiatric disorders: international classifications (DSM, ICD)
- Principles of neuroanatomy and neurophysiology: neural basis of psychiatric disorders
- Anxiety disorders: diagnosis, clinical forms and principles of therapy

- Mood disorders: diagnosis, clinical forms and principles of therapy
- Schizophrenia and other psychotic disorders: diagnosis, clinical forms and principles of therapy
- Eating disorders: diagnosis, clinical forms and principles of therapy
- Principles of psychopharmacology: mechanisms of action and therapeutic indications of the main classes of drugs used in psychiatry

COURSE STRUCTURE

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

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.

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.

Psychiatry
The teaching is structured in 10 lessons of frontal teaching, divided into lessons from 2 to 4 hours according to the academic calendar. Lectures will include theoretical lessons and possible seminars on the topics covered

COURSE GRADE DETERMINATION

Pharmacology
Group work, oral interview and / or final written test

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.

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.

Psychiatry
The verification of the preparation of the students will take place with an oral exam. During the test, the examining commission will assess the specific skills acquired. Autonomy of judgment, communication skills and learning skills will also be assessed as indicated by the Dublin descriptors.

OPTIONAL ACTIVITIES

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

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.

Psychiatry
Possible seminars on the topics covered

READING MATERIALS

Pharmacology
Basic pharmacoloy 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

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

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

Psychiatry
Essentials of Mental Health Nursing Karen Wright (Author, Editor), Mick McKeown (Editor)
SAGE Publications Ltd; 1 edition (6 Mar. 2018)