BSc in Physiotherapy

INTEGRADED COURSE TITLE: PHARMACOLOGY AND NEUROPSYCHIATRIC SCIENCES
NUMBER OF ECTS CREDITS: 7
SSD: MED/26- BIO/14 – MED/25 – MED/27
MODULE CONVENOR: PROF.SSA SILVIA CONSALVI
E-MAIL: silvia.consalvi@unicamillus.org

MODULE: PHARMACHOLOGY
NUMBER OF ECTS CREDITS: 2
SSD: BIO/14
PROFESSOR: SILVIA CONSALVI e- mail: silvia.consalvi@unicamillus.org

MODULE: NEUROLOGY
NUMBER OF ECTS CREDITS: 2
SSD: MED/26
PROFESSOR: ALESSANDRO STEFANI e- mail: alessandro.stefani@unicamillus.org

MODULE: NEUROSURGERY
NUMBER OF ECTS CREDITS: 2
SSD: MED/27
PROFESSOR: SANTINO OTTAVIO TOMASI e- mail: ottavio.tomasi@unicamillus.org

MODULE: PSYCHIATRY
NUMBER OF ECTS CREDITS: 1
SSD: MED/25
PROFESSOR: STEFANIA CHIAPPINI e- mail: stefania.chiappini@unicamillus.org

PREREQUISITES

There are no specific prerequisites, however the student must have basic knowledge of anatomy and physiology of the central and peripheral nervous system, synaptic functioning, cellular biology and biochemistry, as well as basic concepts of physics, biology and microbiology. This knowledge constitutes a prerequisite for understanding the course.

LEARNING OBJECTIVES

After completing the course, students should be able to:

- understand and describe the basic principles of pharmacology, in particular notions of pharmacokinetics and pharmacodynamics, and the experimental phases for the development of new drugs. Students will also know the main pharmacological strategies used for anticancer and antibacterial therapies, for the treatment of inflammation, pain, cardiovascular, respiratory and neurological diseases.
- describe the mechanisms of damage subtending the most common diseases affecting the central and the peripheral nervous system and their clinical and instrumental diagnostic process. Particular attention must be paid to the description of the neurobiological mechanisms favoring the recovery from acute and chronic

neuronal damage as well as the mechanisms that support plasticity, including functional properties of circuitries.
- acquire scientific and medico-clinical knowledge necessary to identify, define, frame and possibly classify the neurosurgical pathologies most commonly encountered in daily clinical practice
- understand the pathophysiological mechanisms that led to the "neurological deficit", knowing how to trace its origin and how to define its anatomical-clinical features.
- know the the fundamentals of psychopathology and the history of psychiatry.
- know the basic mechanisms of of pathophysiology, the clinic and the treatment of the main psychiatric disorders.

LEARNING OUTCOMES

Knowledge and Understanding

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

- know the basic principles of pharmacokinetics, pharmacodynamics, clinical pharmacology and the main classes of drugs
- be able to identify the most common signs of neurological diseases and recognize the anatomical site of the lesion
- 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; acquire basic confidence onto modern neurofunctional visions (circuit engineering; mirror neurons; default systems; connectomics)
- understand the main mechanisms leading to functional recovery
- have basic notions of neuropharmacology, particularly symptomatic therapies
- know the fundamentals of the "functional" anatomy of the cranio-cerebral system
- know the fundamentals of the "functional" anatomy of the vertebro-medullary system
- know the general principles underlying the Intracranial Pressure and "impaired CSF circulation" pathologies
- distinguish the different types of intracranial, intra- and extra-cerebral hemorrhage, and understand their relative prognoses.
- know the basic principles of Cranial Traumatology and related outcomes.
- know the basic principles of Spinal Traumatology and related outcomes.
- know the classification of the main brain tumors and their general aspects.
- know the classification of the main spinal tumors and their general aspects.
- learn about the most common spinal degenerative diseases.
- know the main concepts of psychopathology, the primary elements of the main psychiatric disorders and the principles of treatment of the main psychiatric disorders

Applying knowledge and understanding

At the end of the course the student will be able to use the acquired knowledge to:

- judge the efficacy and basic toxicity of the main classes of drugs
- correctly identify and define a neurological deficit, trace its origin, know its natural history, understand the rationale for specific rehabilitation guidelines.

- have the tools for future independent study of the many neuro-rehabilitative aspects to which the student will dedicate himself in his professional life.
- recognize and describe the main psychiatric disorders.

Communication skills
At the end of the course the student will have to know how to use, in an adequate and unambiguous way, the specific scientific terminology of the pharmacological, psychiatric, neurological and neurosurgical fields.

Making judgements
At the end of the course the student must be able to make general assessments regarding the topics. In particular, he will be able to estimate the effectiveness, toxicity and differences between different classes of drugs, and autonomously assess neurological patients from a neuro-rehabilitative perspective.

COURSE SYLLABUS

Syllabus Pharmachology
- *General principles of pharmacology.*
- *Development of new drugs and study phases. Clinical trial of drugs.*
- *Pharmacodynamics: mechanism of action of agonist and antagonist drugs, receptors and signaling pathways*
- *Pharmacokinetics: factors influencing it, drug elimination and biotransformation.*
- *Gene therapy and Epigenetic therapy.*
- *Treatment of pain and inflammation: glucocorticoids, NSAIDs, opioid analgesics.*
- *Cardiovascular therapy.*
- *Drugs for the treatment of asthma and anaphylactic shock.*
- *Sedative-hypnotic drugs for the treatment of insomnia and anxiety.*
- *Pharmacology of neurodegenerative diseases: drugs for the treatment of Parkinson's disease.*
- *Antibacterial chemotherapy.*
- *Antineoplastic chemotherapy, general principles of Target Therapy.*

Syllabus Neurology
- Approach to the patient with neurological diseases
- Language abnormalities
- Neurobiological mechanisms of spasticity and rigidity 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 including SARS, bacterial, prionic

Syllabus Neurosurgery

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

- Topographic Anatomy of the skull and skullbase; functional Anatomy of the brain and brainstem; functional networks of the central nervous system. Anatomy and physiology of the cranial nerves. Anatomy and physiology of the cerebral blood vessels. Anatomy and physiology 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. Normal Pressure Hydrocephalus. Syringomyelia. Pseudotumor Cerebri.

Brain Tumors.

- Principles of Neuro-oncology. W.H.O. Classification. Gliomas. Meningiomas. Tumor of the sellar region. Other primitive cerebral tumors. Secondary tumors (metastasis0.

Traumatic Brain Injury (TBI).

- Biomechanical aspects. State of consciousness alteration. Post-traumatic intracranial bleedings. Traumatic fracture of the skull and skullbase fractures. Diffuse axonal injury. Brain Concussion. Outcomes following TBI.

Spontaneous Intracranial Hemorrhages.

- Hemorrhagic Strokes. Subarachnoid hemorrhage. Intracranial aneurysms. Artero-venous malformations. Intracerebral hematomas (epidural, subdural, intraparenchymal). 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 and spinal roots. 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.

- Low back pain. Radiculopathy. Myelopathy. Disks degeneration and related pathology. Spinal stenosis. The concept of spinal instability. Spondylosis and spondylolisthesis.

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

The course provides a total of 70 hours of frontal lessons. Frontal teaching will include powerpoint and video presentation, storytelling, role play, clinical simulation, written and oral activities, discussions, and group work followed by interactive discussion of clinical cases related to the lesson topic. Attendance at lessons is mandatory amoust for 75% of all the hours of the integrated course.

COURSE GRADE DETERMINATION

The "Pharmacology and Neuropsychiatric Sciences" integrated teaching exam consists of a multiple choice written test including all subjects and an optional oral test, to increase the final grade.
The written learning test verifies the acquisition of the expected knowledge and skills without the help of notes or books. The evaluation parameters used will be the specific knowledge of the topic, together with the ability to discursively organize the knowledge, the critical approach and the competence in the use of specialized language. The unit of measurement used will be a vote expressed out of thirty.
The exam is considered passed with a minimum grade of 18/30 in all subjects.
If the number of students booked for the exam is equal to or less than three students, the exam will take place in oral mode for all subjects.
In determining the final grade, the examining commission will consider the results achieved in the various modules, adopting the following criteria:
Unsuitable: Poor or lacking knowledge and understanding of the topics; limited capacity for analysis and synthesis, frequent generalizations of the required contents; inability to use technical language.
18-20: Just enough knowledge and understanding of topics, with obvious imperfections; just sufficient capacity for analysis, synthesis and independent judgement; poor ability to use technical language.
21-23: Sufficient knowledge and understanding of topics; sufficient capacity for analysis and synthesis with the ability to logically and coherently argue the required contents; sufficient ability to use technical language.

24-26: Fair knowledge and understanding of the topics; discrete capacity for analysis and synthesis with the ability to rigorously argue the required contents; Good ability to use technical language.
27-29: Good knowledge and understanding of required content; good capacity for analysis and synthesis with the ability to rigorously argue the required contents; good ability to use technical language.
30-30L: Excellent level of knowledge and understanding of the requested contents with an excellent capacity for analysis and synthesis with the ability to argue the requested contents in a rigorous, innovative and original way; Excellent ability to use technical language

OPTIONAL ACTIVITIES

Students will have the opportunity to carry out theoretical exercises at the end of the lessons. 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.

READING MATERIALS

Pharmacology

Bertram G. Katzung. Basic and Clinical Pharmacology. 15th edition, 2021.
- Slides fornite dal docente.

- Bertram G. Katzung. Basic and Clinical Pharmacology. 15th edition, 2021.
- Slide sets provided by the teacher.

Neurology

- Adams and Victor's Principles of Neurology 11th ed. McGraw-Hill Medical
- 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. All teaching materials will be provided to students and will be accessible on the university portal.
Recommended texts:
Greenberg's Handbook of Neurosurgery, by Mark Greenberg - Thieme
Diagnostic and Surgical Imaging Anatomy: Brain, Head & Neck, Spine, by Harnsberger, Osborn, MacDonald, Ross – Amirsys
Diagnostic Neuroradiology, by Anne G. Osborn - Mosby
Diagnostic Cerebral Angiography, by Anne G. Osborn – Lippincott Williams & Wilkins
Neurosurgery Knowledge Update, by Harbaugh, Shaffrey, Couldwell, Berger -Thieme
Neurosurgery fundamentals. Ed. Nitin Agarwal - New York: Thieme

Psychiatry

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

- Handbook of psychopathology
  Giovanni Martinotti
  Fila 37 Editore
  EAN: 9788899235222
  ISBN: 8899235228

- Martinotti G. Handbook of Psychopathology. Ed. Fila 37, 2023