Degree Programme in Physiotherapy

Academic Year 2026 / 2027

INTEGRATED COURSE (I.C.): PHARMACOLOGY AND NEUROPSYCHIATRIC SCIENCES
NUMBER OF CFU (ECTS credits): 7
SSD (Academic Discipline Code): MEDS-12/A- BIOS-11/A – MEDS-11/A – MEDS-15/A

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MODULE 1: PHARMACOLOGY
NUMBER OF CFU (ECTS credits): 2
SSD (Academic Discipline Code): BIOS-11/A
LECTURER: Marzia Del Re
e-mail: marzia.delre@unicamillus.org

MODULE 2: NEUROLOGY
NUMBER OF CFU (ECTS credits): 2
SSD (Academic Discipline Code): MEDS-12/A
LECTURER: Chiara Piccininni
e-mail: chiara.piccininni@unicamillus.org

MODULE 3: NEUROSURGERY
NUMBER OF CFU (ECTS credits): 2
SSD (Academic Discipline Code): MEDS-15/A
LECTURER: Santino Ottavio Tomasi
e-mail: ottavio.tomasi@unicamillus.org

MODULE 4: PSYCHIATRY
NUMBER OF CFU (ECTS credits): 1
SSD (Academic Discipline Code): MEDS-11/A
LECTURER:Angelo Giovanni Icro Maremmani
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PREREQUISITE COURSES

None required.

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.
- understand the pathophysiological mechanisms that led to the "neurological deficit", knowing how to trace its origin and how to define its anatomical-clinical features
- knowing the fundamentals of general psychopathology.
- knowing the basic mechanisms of physiopathology, clinic and treatment of the main psychiatric pathologies. Information on the psychiatric organization care will be provided, as well as mentions of pharmacotherapy.

EXPECTED LEARNING OUTCOMES

DD 1: 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 cognitive functions

- be able to perform a complete neurological examinations, including cognitive function assessment and the state of consciousness.
- 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.
- acquisition of the main concepts of general psychopathology and the ability to perform a mental state examination
- acquisition of notions on the evolution of the organization of care in psychiatry
- acquisition of knowledge of the main psychiatric disorders, their nosography and clinical presentation.
- acquisition of basic knowledge of pharmacological and therapeutic treatments.

DD 2: 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
- ability to recognize psychopathological symptoms and psychiatric disorders

DD3: 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.

DD4: 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.

DD5: Learning skills

The student will have acquired skills and learning methods suitable for deepening and improving their knowledge and skills in the subjects covered by integrated teaching, also through consultation of scientific literature.

SYLLABUS

Syllabus MODULE 1: PHARMACOLOGY

- *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.*
- *Pharmacogenetics*
- *Principles of drug-drug interactions in patients treated with multiple drugs*
- *Treatment of pain and inflammation: glucocorticoids, NSAIDs, opioid analgesics*
- *Pharmacology of neurodegenerative diseases*
- *Antibacterial chemotherapy*
- *Pharmacology of anti-psychotic diseases*

Syllabus MODULE 2: NEUROLOGY

- Principles of neuroanatomy of the central and peripheral nervous system
- Principles of neurophysiopathology: synaptic plasticity and neurobiology of rehabilitation - pathophysiological mechanisms of spasticity and rigidity
- Cognitive functions and main disorders of higher cortical functions
- Approach to the neurological patient: anamnesis, neurologic examination and clinical semiotics of the main neurological syndromes
- Imaging (MRI, CT scan) and electrophysiologic techniques (evoked potentials, electromyo-grography, electroneurography, electroencephalography) for neurologic diagnosis
- Disorders of Consciousness and severe acquired brain injury
- Cerebrovascular diseases : ischemic stroke and hemorrhagic stroke
- Multiple sclerosis and other inflammatory demyelinating diseases
- Parkinson's disease and other movement disorders
- Alzheimer's disease and other neurodegenerative disorders

- Infections of the nervous system (viral, bacterial and prionic)
- Epilepsy
- Motoneurons disease
- Genetic and acquired diseases of the peripheral nerves
- Myasthenia gravis and other diseases of the neuromuscular junction
- Myopathies

Syllabus MODULE 3: 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 MODULE 4: PSYCHIATRY

General psychopathology: general functions and specific functions. The Concept of Craving
• Mental Status Examination
• Organization of Psychiatric Care in Italy
• Introduction to Pharmacotherapy and Psychotherapy: Antidepressant Drugs, Sedatives, Antipsychotics, Mood Stabilizers, Notions of Cognitive-Behavioral and Brief Interpersonal Psychotherapy
• Neurodevelopmental Disorders: Autism Spectrum Disorder, Tourette Syndrome, ADHD, Cyclothymia (Emotional Dysregulation)
• Affective Temperance and Personality Disorders
• Mood Disorders: Critical Phases of Hypomania, Mania, Depression, Mixed States, and Longitudinal Course of Bipolar and Unipolar Type
• Psychosis and Schizophrenia: Paranoia, Schizophrenia, Schizoaffective Disorders
• Anxiety Disorder: Panic Disorder with Agoraphobia, Generalized Anxiety Disorder, Social Phobia, Post-Traumatic Stress Disorder
• Obsessive-Compulsive Disorder
• Mind-Body Disorders: somatization, conversion disorder, dissociative disorder, factitious disorder
• Syndromes characterized by prevalent or overvalued ideas: hypochondria, dysmorphophobia, hoarding syndrome
• Substance use disorders: knowledge of the basic principles of drug addiction medicine and predictors of substance use and the drug addiction process. Mention on substance use disorders (sedatives, stimulants, neurodysleptics) and non-substance addictions (gambling). The concept of dual diagnosis.
• Eating disorders: anorexia nervosa, bulimia nervosa, obesity.

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. To be eligible for integrated course exams, students must attend at least 75% of all the hours of the integrated course.

COURSE GRADE DETERMINATION

The exam for the integrated course “Pharmacology and Neuropsychiatric Sciences” consists of a written test for the modules “Psychiatry” and “Pharmacology”, and an oral test for the modules “Neurology” and “Neurosurgery”.
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.
In determining the final grade, the examining commission will consider the results achieved in the various modules, adopting the following criteria:

Fail	Significant gaps and/or inaccuracies in knowledge and understanding of the topics; limited analytical and synthesis skills; argumentation absent or frequently incorrect.
18–20	Barely sufficient knowledge and understanding of the topics, with possible imperfections; sufficient analytical, synthesis, and judgement skills.
21–23	Routine knowledge of the topics; correct analytical and synthesis skills with coherent logical argumentation.
24–26	Fair knowledge and understanding of the topics; good analytical and synthesis skills; rigorously expressed argumentation.
27–29	Complete knowledge of the topics; considerable analytical and synthesis skills; good independent judgement.
30–30L	Excellent level of knowledge and understanding. Considerable analytical, synthesis, and independent judgement skills. Original argumentation expressed with full command of specialized terminology.

In accordance with current legislation and with the guidance of the University's inclusion services, students with certified disabilities or specific learning disorders are entitled to the compensatory tools and measures provided for (e.g. additional time, concept maps, equivalent tests). Adaptations of the examination are agreed between the lecturer, the student and the competent office, without prejudice to the equivalence of the learning outcomes assessed.

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

Texts MODULE 1: PHARMACOLOGY

Bertram G. Katzung. Basic and Clinical Pharmacology. 16th edition, 2024.

- Slides fornite dal docente.
- Bertram G. Katzung. Basic and Clinical Pharmacology. 16th edition, 2024.
- Slide sets provided by the teacher.

Texts MODULE 2: 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

Texts MODULE 3: 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

Texts MODULE 4: PSYCHIATRY

- A Short Textbook of Psychiatry: 20th Year Edition by Niraj Ahuja, Jaypee Brothers Medical Pub
- Addiction 2e (Oxford Psychiatry Library): Addiction by David J. Nutt, Nestor. Oxford University Press, 2018. ISBN-13 978-0198797746