

Degree Course of Physiotherapy

Integrated Teaching: HUMAN ANATOMY AND PHYSIOLOGY

CFU: 8

SSD: BIO/9, BIO/16, BIO/17

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MODULE: HUMAN ANATOMY

CFU: 3

SSD: BIO/16

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MODULE: PHYSIOLOGY

CFU: 2

SSD: BIO/09

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MODULE: HYSTOLOGY

CFU: 1

SSD: BIO/17

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PREREQUISITES

Although there are no prerequisites, minimum basic knowledge of cell biology, histology and cytology is required, in order to optimize learning and the achievement of specific objectives. This makes the content of the teaching more comprehensible.

LEARNING OBJECTIVES

HUMAN ANATOMY

At the end of the course the student must be able to: Describe the macroscopic organization of the human body using the appropriate terminology appropriately. Describe the main cavities of the body, describe the individual organs of the various apparatuses and systems from the macroscopic, microscopic and topographic point of view.

FISIOLOGIA / PHYSIOLOGY

The aim of the teaching is to develop the student's ability to understand the principles of the functioning of the human body, starting from the knowledge of the basic concepts and the normal quantitative parameters of body functions and their variations in the different conditions of dynamic engagement. The cellular mechanisms and integrated functions of the main organs and systems aimed at maintaining body homeostasis in the context of changes in the environment will also be analyzed.

HYSTOLOGY

The course aims to provide student with the skills necessary for the full understanding of the most important tissues of the human organism. The student must be able to acquire a correct terminology and develop skills of interpretation and application that the graduate in physiotherapy will have to use in the planning and management of work activities.

LEARNING OUTCOMES

HUMAN ANATOMY

Knowledge and understanding

At the end of the course the student is required to know

- basic terminology of human anatomy
- basic organization of human anatomical structures (LOCOMOTOR SYSTEM, CARDIO-SPLANCHNOLOGY)
- basic organization of neuroanatomical structures
- the identification of specific component of the anatomical regions and their functional and physical interaction

Applying knowledge and understanding

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

Use the knowledge of human anatomy and neuroanatomy to better understand the human physiology and physiopathology, necessary knowledge equipment for professionals in the field of human health. The student will also use the knowledge collected to further study some specific topics required by its profession.

Communication skills

At the end of the course the student must know adequately the human anatomical structures and be able to use the specific anatomical terminology so as to be able to relate, within the care process, with patients of all ages and/or with other health professionals , in an appropriate verbal, non-verbal and written form.

Making judgements

The knowledge of human anatomy will help the student to develop a critical thinking in the ability to decide priorities and needs in response in relation to the complexity of the rehabilitation intervention.

PHYSIOLOGY

Knowledge and understanding:

- Having acquired knowledge of the anatomical and functional organization of the systems and systems that make up the human organism
- Having acquired knowledge of the anatomical and functional organization of the main systems for controlling the functions of organs and systems
- Having acquired the ability to interpret the anatomical and physiological mechanisms and phenomena.
- Having acquired the capacity for synthesis and correlation between the various topics

- Have deepened the knowledge of the mechanisms put in place by the control systems of the functions of the organs and systems

Ability to apply:

- Knowledge of cell physiology to understand the mechanisms underlying the maintenance of homeostasis
- Integrated knowledge of Anatomy and Physiology on integration and control systems that regulate the main phenomena of absorption and excretion of nutrients

At the end of the course, the student must be able to use the specific scientific terminology in an appropriate way.

At the end of the course, the student must be able to carry out rough evaluations relating to the topics covered.

HYSTOLOGY

Knowledge and understanding

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

- The knowledge of the structures of the various tissues that compose the human organism
- The knowledge of the histological organization of the various human organs
- The ability to identify the morphology of the tissues, the cells that compose them, from a morphological and functional point of view
- The ability to synthesize and correlate the various topics.

Applying knowledge and understanding

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

- The ability to apply the histology knowledge to understand other closely related branches of biology such as anatomy, cytology, physiology.

Communication skills

At the end of the course the student should:

- Use correct scientific terminology to identify, at a microscopic level, the different types of cells and tissues present in the human organism.

Making judgements

At the end of the course the student should:

- Carry out rough assessments of the topics covered.

COURSE SYLLABUS

HUMAN ANATOMY

LOCOMOTOR SYSTEM. (11hs) Skeleton: skull, vertebral column and main bones of the trunk, superior limb, inferior limb, pectoral and girdle and pelvis. Joints structure and classification, movements. Joints: Temporo-mandibular joint, shoulder joint, intervertebral joints, sterno-

clavicular joint, elbow joint, radioulnar joints, wrist and hand joints. Hip joint, joint of the knee, ankle. Muscular system. Axial musculature: main muscles of the head and neck, tongue, muscle of the pharynx of vertebral column, diaphragm, muscles of the perineum and pelvic diaphragm. Appendicular musculature: muscle of the pectoral girdle and upper limb, muscles that move the arms, muscles that move the elbow, pronators and supinators. Muscles of the pelvic girdle and lower limbs: muscles that move the thigh and leg.

CARDIOVASCULAR SYSTEM (3hs). Heart, thoracic aorta, aortic arch, abdominal aorta. The Willis's polygon. Coronary circulation. Main arteries of superior and inferior limbs. Venous system. Superior vena cava, inferior vena cava and their main branches in the thorax and abdomen. Main veins of the superior and inferior limbs. Portal circulation. Foetal circulation. Generalities on the lymphatic system.

SPLANCHNOLOGY (6hs). Systemic and microscopic anatomy of digestive, respiratory, urinary, reproductive and endocrine systems.

NEUROANATOMY (10hs). Spinal cord: segmental and internal organization: gray matter, ascending and descending tracts. Spinal nerves, plexuses and reflex arcs. Brainstem (Medulla oblongata, Pons, Mesencephalon): internal and external structure. Cranial nerves: nuclei and innervation. Diencephalon (Thalamus, Hypothalamus, Epithalamus): internal and external structure. Thalamic nuclei. Telencephalon: internal and external structure. Anatomical and functional organization of cerebral cortex. Allocortex. Basal Ganglia. Cerebellum: internal and external structure. Ventricular system. Meninges. Brain blood vessels and dural sinuses. Sensory system: spinothalamic, tactile, fasciculus gracilis and fasciculus cuneatus tracts, spinocerebellar tracts. Pain conduction. Visual, auditory, gustatory, olfactory and limbic system. Motor system: pyramidal and extrapyramidal tracts. Motor nuclei. Autonomic nervous system: sympathetic and parasympathetic system. Enteric nervous system.

PHYSIOLOGY

Physiology of the cell membrane:

- Transport of ions and molecules through the cell membrane
- Membrane potential and Action Potential

Muscle Physiology:

- Excitation and contraction of skeletal muscle tissue.
- Neuromuscular transmission and excitation-contraction coupling.
- Motor unit

Physiology of the Nervous System:

- The sensory system: decoding and processing of sensory information.
- The motor system: general characteristics of the motor system: involuntary, voluntary and automatic movements; spinal reflexes; the brain-encephalic control of the movement: posture and balance. Cortical control of voluntary movements. The cerebellum: general features, functions of the cerebellum. The basal ganglia: functional role.
- The autonomic nervous system.
- Supplementary functions of the nervous system.

Cardiovascular physiology:

- Myocardial physiology: functional myocardial anatomy, myocardial action potentials, contraction of the heart muscle.
- Cardiac cycle
- Nervous control of cardiac activity.

- General principles of hemodynamics.
- Adjustment of circulation, blood pressure and blood flow.
- Cardiac output: principles of regulation of cardiac output.
- Cardiac tones.

The Respiratory System:

- Pulmonary ventilation: respiratory mechanics, volumes and lung capacity. Respiratory tract
- Gaseous exchanges: diffusion of oxygen and carbon dioxide through the respiratory membrane.
- Transportation of oxygen and carbon dioxide in blood and body fluids ..
- Regulation of breathing: general principles.
- Regulation of acid-base balance: general principles.

Body fluids and renal function:

- Functional anatomy of the kidney, function of the nephron. Glomerular filtration: general principles.
- Elaboration of glomerular filtrate: resorption and tubular secretion,
- Control of osmolarity and sodium concentration of extracellular fluid: general principles.
- Renal regulation of blood volume: general principles

The endocrine system:

General principles of endocrinology: nature of a hormone; general picture of the endocrine glands and their hormones. Principles of general functioning of hormones.

HISTOLOGY

Preparation of tissues for histological analysis

Microscopy, preservation of biological structures, stainings.

Epithelial tissues

Classification of epithelia, polarity of epithelial cells, junctions, absorbent epithelia, glandular epithelia.

Connective tissues

Connective tissue proper: extracellular matrix and connective cells. The different types of connective tissue proper. Adipose tissue. Blood and hematopoietic tissues. Supportive connective: cartilage and bone.

Muscle tissue

Skeletal muscle: structure of muscle fibers, contraction mechanism, diversity of muscle fibers.

Cardiac muscle: structure of cardiomyocytes and myocardial conduction mechanism. The smooth muscle.

Nervous tissue

The neuron. Glial cells. Myelinated and unmyelinated nerve fibers. General structure of the nerves.

COURSE STRUCTURE

HUMAN ANATOMY

The course is taught by lectures (30 hours) and theoretical/practical exercises. During lectures, explanation of human anatomy will be performed by projecting images (Power-Point) and using Anatomical 3D Real-time Viewer tools (Complete anatomy tools) and anatomical modelling. During exercises, students will use anatomical modelling reproducing organs and anatomical system in a fully equipped exercitation room.

PHYSIOLOGY

The teaching is structured in 20 hours of frontal teaching divided into lessons of 2, 3 or 4 courses based on the academic calendar.

HISTOLOGY

The Histology course is structured in 10 hours of frontal teaching (divided into lessons of 2 or 4 hours according to the academic calendar) during which the Professor uses Power Point presentations and uses images of histological preparations obtained with an optical microscope and electronic and audiovisual media.

COURSE GRADE DETERMINATION

HUMAN ANATOMY

The assessment of learning takes place on the basis of a written test consisting of open and closed multiple choice answers, followed by an oral exam. For each written test, different grades are assigned to the answers depending on the difficulty of the question and according to the answers given (complete or partial) for a maximum of 30 points. In some cases, if the answer is clearly wrong, 0.5 points can be deducted from the final grade. Students who reach the minimum score of 18/30 in the written test are admitted to the oral exam. The laude is assigned only during the oral examination.

In the context of the integrated course, the grade earned by the student contributes to the final score in proportion to the credits.

PHYSIOLOGY

The intermediate test consists of 30 multiple choice questions.

The final evaluation consists of an interview that will take place on the scheduled available dates.

HISTOLOGY

The acquisition of the expected learning results is ascertained through the exam. The exam will be done in written form and will consist of about 30 multiple choice questions, for each correct answer a point will be awarded. The final score of the written test will be given by the sum of the partial scores assigned to each question answered correctly.

All the contents of the course are subject to evaluation.

The evaluation includes the identification of the achievement of the objectives set and in particular for each topic will be evaluated:

- the level of acquisition of knowledge of the topics covered
- the ability to synthesize and correlate the various topics.

OPTIONAL ACTIVITIES

HUMAN ANATOMY

Students will have opportunity to conduct theoretical/practical exercises and to attend seminars. Professors will provide constant support during and after the lessons.

PHYSIOLOGY

In addition to the didactic activity, the student will be given the opportunity to participate in seminars, research internships, department internships and monographic courses. The topics of the activities are not subject to examination. Acquisition of the hours allocated occurs only with a mandatory frequency of 100% and suitability is provided.

HISTOLOGY

In addition to the didactic activity, the student will be given the opportunity to take advantage of tutoring activities upon request.

READING MATERIALS

HUMAN ANATOMY

- 1) Martini, Timmons, Tallitsch: Human Anatomy,
- 2) Tortora: Human Anatomy,
- 4) Martini Nath: Anatomy & Physiology

Students are encouraged to use an Human Anatomy Atlas

FISIOLOGIA / PHYSIOLOGY

- “Berne & Levy Physiology”, Sixth Updated Edition
- “Sherwood” ninth edition
- “Guyton-Hall

HISTOLOGY

- “Bloom and Fawcett's Concise Histology”, Don W. Fawcett, Ronald P. Jensch, William Bloom
– 2nd Edition - Hodder Arnold.