

Degree in Nursing

Teaching: Anatomy and Physiology

SSD Insegnamento: Bio 09, Bio 16, Bio 17

Numero di CFU: 6

Coordinator's name: Micol Massimiani email: micol.massimiani@unicamillus.org

Module Human Anatomy

SSD: BIO 16

CFU: 3

Professor: Marco Barchi

e-mail: marco.barchi@unicamillus.org

Professor: Giuseppe Sciamanna

e-mail: giuseppe.sciamanna@unicamillus.org

Module PHYSIOLOGY

SSD: Bio/09

CFU: 2

Professor: Prof.Pallone:

email: gabriele.pallone@unicamillus.org

Module: Histology

Scientific disciplinary sector: BIO/17

Number CFU: 1

Professor: Massimiani Micol

e-mail: micol.massimiani@unicamillus.org

PREREQUISITES

Mandatory preparatory knowledges are not required, however basic knowledge about biology, histology and cytology are necessary.

LEARNING OBJECTIVES

Aim of the teaching is : 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, to provide students with knowledge on the basic concepts and the normal quantitative parameters of the bodily functions and their variations in the different conditions of dynamic engagement, to develop in the student the ability to understand the principles of the functioning of the human body. The cellular mechanisms and the integrated functions of the main organs and apparatuses aimed at the maintenance of body homeostasis will also be analyzed in the context of environmental modifications. The student will need to be able to acquire correct terminology and develop those skills of interpretation and application that, the graduate in nursing, will then have to use in the planning and management of work activities.

LEARNING OUTCOMES

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-SPLANCHOLOGY)
- basic organization of neuroanatomical structures
- the identification of specific component of the anatomical regions and their functional and physical interaction
- the anatomical and functional organization of the apparatuses and systems that make up the human organism
- the anatomical and functional organization of the main control systems of the functions of the organs and apparatuses
- how to interpret mechanisms and anatomical-physiological phenomena.
- the mechanisms implemented by the control systems of the functions of the organs and apparatuses
- the structures of the various tissues that compose the human organism
- the histological organization of the various human organs
- how to identify the morphology of the tissues, the cells that compose them, from a morphological and functional point of view
- how to synthesize and correlate the various topics.

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 pathophysiology, necessary knowledge equipment for professionals in the field of human health.

Use the knowledge of cell physiology to understand the mechanisms underlying the maintenance of homeostasis. Use the integrated knowledge of Anatomy and Physiology on the integration and control systems that regulate the main phenomena of absorption and excretion of nutrients. To apply the histology knowledge to understand other closely related branches of biology such as anatomy, cytology, physiology.

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. Use correct scientific terminology to identify the microscopic and macroscopic characteristics of the organs and to describe the physiological processes underlying their functioning. Use correct scientific terminology to identify, at a microscopic level, the different types of cells and tissues present in the human organism.

Making judgements

The knowledge of anatomy and physiology will help the student in nursing to develop a critical

thinking in the ability to decide priorities in response to the needs of nursing care in relation to the different levels of care complexity.

COURSE SYLLABUS

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, sternoclavicular joint, elbow joint, radioulnar joints, wrist and hand joints. Hip joint, joint of the knee, ankle. Skeletal Muscular System: masticatory muscles (masseter, temporal, pterygoid). Motor muscles of the humerus (rotator cuff muscles, deltoid, teres major, pectoralis major, latissimus dorsi, brachial, coracobrachial), flexor and extensor muscles of the elbow (biceps brachialis, brachioradialis, triceps brachialis, anconus). Respiratory muscles (diaphragm, intercostal muscles, sternocleidomastoid, serratus posterior and anterior muscles, pectoralis minor, scalene, quadratus lumborum, external / internal oblique muscle, transversus abdominus, rectus of the abdomen).

CARDIOVASCULAR SYSTEM (6hs). 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 (11hs). Systemic and microscopy anatomy of digestive, respiratory, urinary, reproductive and endocrine Systems.

NEUROANATOMY (14hs). 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, tacts, 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 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.

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

The module is taught by lectures (42 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. The module of Physiology is 28 Hours of frontal lessons according to academic calendar. The Histology module is structured in 14 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.

OPTIONAL ACTIVITIES

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

READING MATERIALS

- Martini, Timmons, Tallitsch: Human Anatomy,
- Tortora: Human Anatomy,
- Martini Nath: Anatomy & Physiology
- "Berne & Levy Physiology", Sixth Updated Edition
- "Sherwood" ninth edition
- "Guyton-Hall"
 - "Bloom and Fawcett's Concise Histology", Don W. Fawcett, Ronald P. Jensch, William Bloom – 2nd Edition - Hodder Arnold.

Students are encouraged to use an Human Anatomy Atlas.

COURSE GRADE DETERMINATION

The examination of the teaching of Anatomy and Physiology consists of an examination of the module of Human Anatomy, Physiology and Histology whose marks are an integral part of the evaluation of the examination of the teaching. In the context of teaching, the student's grade in each module contributes to the final score proportionally to the credits.

The knowledge and ability to understand, the ability to apply knowledge and understanding, the autonomy of judgment and the communication skills of the student will weigh in the final score as follows 30%, 30%, 30% and 10%, respectively.

HUMAN ANATOMY EXAM: The assessment of learning takes place on the basis of a written test consisting of open and closed multiple choice answers, and eventually 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 25 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 may request to be admitted to the oral exam. At the oral exam the student can be assigned 8 points, which will be added to that of the written test score, for a maximum of 30/30 cum laude (33/30). During the oral exam can be deducted from the written test grade, up to 8 points.

PHYSIOLOGY EXAM: The intermediate test consist in 30 multiple choice question.

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

HISTOLOGY 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.