



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2023/2024		
BACHELOR'S DEGREE (BSC)	NEUROPHYSIOPATHOLOGY TECHNIQUES		
INTEGRATED COURSE	HUMAN ANATOMY AND PHYSIOLOGY - INTEGRATED COURSE		
CODE	22356		
MODULES	Yes		
NUMBER OF MODULES	3		
SCIENTIFIC SECTOR(S)	BIO/16, BIO/17, BIO/09		
HEAD PROFESSOR(S)	LEONE ANGELO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	LEONE ANGELO	Professore Associato	Univ. di PALERMO
	GAMBINO GIUDITTA	Ricercatore a tempo determinato	Univ. di PALERMO
	VITALE ALESSANDRA MARIA	Professore a contratto	Univ. di PALERMO
CREDITS	8		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	GAMBINO GIUDITTA Tuesday 10:30 12:30 Istituto di Fisiologia Umana, corso Tukory 129 Thursday 10:30 12:30 Istituto di Fisiologia Umana, corso Tukory 129 LEONE ANGELO Wednesday 10:00 12:00 BiND, sezione di Anatomia e Istologia, piano 1°		

DOCENTE: Prof. ANGELO LEONE

PREREQUISITES	Knowledge related to the bioarchitecture of the cellular ecosystem, to the organization of the four main tissues; knowledge of the main systems of the human body with particular attention to the nervous system.
LEARNING OUTCOMES	Basic knowledge of tissue histology and cellular architecture, in particular in-depth knowledge of nervous tissue is required
ASSESSMENT METHODS	Oral Exam
TEACHING METHODS	In-presence lectures

MODULE HISTOLOGY

Prof. ANGELO LEONE

SUGGESTED BIBLIOGRAPHY

AAVV, Istologia per le lauree triennali e magistrali, Idelson Gnocchi, 2018, ISBN: 9788879476782

AMBIT	10338-Scienze biomediche
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INDIVIDUAL STUDY (Hrs)	30
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COURSE ACTIVITY (Hrs)	20
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EDUCATIONAL OBJECTIVES OF THE MODULE

Knowledge related to the bioarchitecture of the cellular ecosystem, to the organization of the four main tissues; knowledge of the main systems of the human body with particular attention to the nervous system.

SYLLABUS

Hrs	Frontal teaching
3	General information on the study of cells and tissues, histological techniques, cellular bio-architecture and stem cells.
3	Ultrastructure and morphofunctional aspects of the cell, the membrane-bounded organelles, the cytoskeleton, the nucleus.
2	Epithelial tissues
2	connective tissues
2	Muscular tissue, bone, cardiac muscle tissue: general characteristics
6	nervous tissue, morpho-functional characteristics of nervous tissue
2	Nervous tissue, characteristics and classification of glial cells.

MODULE ANATOMY

Prof.ssa ALESSANDRA MARIA VITALE

SUGGESTED BIBLIOGRAPHY

SEELEY e VANPUTTE
ANATOMIA UMANA con cenni di: Istologia – Fisiologia – Clinica 2018 5ta edizione ISBN8879477455
Idelson Gnocchi

AMBIT	10338-Scienze biomediche
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

The course has the following training objectives:
acquisition of knowledge about the main characteristics of the human body;
understanding and ability to use the language specific to this discipline;
use of the acquired knowledge in order to study the different organs and systems, with particular reference to the anatomical study of the central and peripheral nervous system.
Furthermore, at the end of the course, the student must have acquired the ability to evaluate the implications and results of studies aimed at clarifying the functioning of organs and systems. and to illustrate the concepts of Human Anatomy. He will also have to know the main morphofunctional characteristics of the human body systems, with particular regard to the structural aspects of the nervous system.

SYLLABUS

Hrs	Frontal teaching
3	human anatomy introductory aspects
3	The skeletal system, the bone tissue; bone development and growth; classification and general characteristics of the bones. Skull and bones associated with the skull; the vertebral column; the rib cage; the thoracic girdle and the free part of the upper limb; the pelvic girdle and the free part of the lower limb; the joints.
3	Muscular tissue and skeletal muscles
3	Cardio-vascular system: Heart and organization of the large and small circulation
2	Respiratory system: upper and lower respiratory tract. Lungs and hematosi mechanism
2	digestive system: study of the various organs that make up the digestive system and the related organs
3	Urinary system: kidneys, ureters, bladder. Generalities on the male and female reproductive system
2	Endocrine system, general aspects
7	Nervous system organization and characteristics of the nervous tissue; the spinal cord and spinal nerves; the brain and cranial nerves; nerve pathways and higher functions; autonomic nervous system general sensitivity.
2	The sense organs and the related neural pathways

MODULE PHYSIOLOGY

Prof.ssa GIUDITTA GAMBINO

SUGGESTED BIBLIOGRAPHY

"Fisiologia Umana: un approccio integrato, 8a edizione" Dee Silverthorn, Pearson Education, ISBN:8891909734
 "Neurofisiologia" di P. Battaglini, U. Faraguna, L. Fogassi, S. Rozzi, Edra Edizioni, ISBN:8821450783

AMBIT	10338-Scienze biomediche
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

Educational objectives of the course will provide students with the general knowledge necessary for the understanding of the physical, chemical and molecular mechanisms of physiological cellular processes such as the membrane electrical potential, the genesis of the action potential (excitability), the cellular communication by means of synapses, the muscle contraction, the signal transduction of physiological stimuli into electrical signals by sensory receptor cells. Students will acquire knowledge on the morphological and functional features of the blood; the physical basis of blood circulation and of respiration to study the physiology of the heart and circulatory systems, of respiratory and urinary systems. Furthermore, students will understand the mechanisms of nervous and humoral control of the aforementioned systems and their coordination in the execution of specific tasks such as

homeostasis of the internal medium, of osmolarity and of the extracellular fluid volume, of acid-base balance; of the regulation of cardiac output and blood pressure range; and the execution of muscle activity. Furthermore, students will know the functions of the nervous system, from the motor and perceptive functions to cognitive ones, with particular attention for neuro-muscle system. Lastly, the physiology of the endocrine and digestive systems.

SYLLABUS

Hrs	Frontal teaching
3	The concept of homeostatic systems. Biophysics of membranes. Water and solute transport across membranes. General electrophysiology: the ionic basis of membrane potentials. Cellular excitability and neurons: from the resting potential to action potential.
4	Skeletal and smooth muscle. The neuromuscular transmission. Motor Unit. Mechanisms of contraction.
7	Nervous system. Morpho-functional organization of the CNS, peripheral and vegetative nervous systems. Glial functions. The interactions between excitable cells. Synapse. Receptor cells and signal transduction. Physiology of the sensory systems. Physiology of the somato-visceral sensitivity: tactile, thermal, proprioceptive and pain. Physiology of special senses. Organization of the motor system. Spinal mechanisms of motor coordination: reflexes, locomotion, role of interneurons. Posture: brainstem mechanisms; postural reflexes; vestibular apparatus and vestibular reflexes. Neurophysiological tests in humans. Organization of voluntary movement. Motor control systems: cerebellum and basal ganglia. Cognitive nervous functions: language, memory, learning.
2	Electromyography, physiology of plastic changes in motor units
4	The heart system and circulation. Morphological and functional characteristics of blood. Morphological and functional characteristics of the heart and blood vessels. Excitability and pacemaker activity of the heart. The cardiac cycle. The cardiac output. Heart tones. Electrocardiogram. Physiology of the circulation system: arterial system, capillary, venous system. Determination of blood pressure. Regulatory mechanisms of cardiac output and blood pressure. Lymphatic circulation.
4	Respiratory system. Morphofunctional organization. Mechanics of pulmonary ventilation. Lung capacities and volumes. Alveolar ventilation. Spirometry. Respiratory membrane. Alveolar-capillary gas exchange. Transportation of respiratory gases in the blood. Hemoglobin dissociation curve. Mechanisms of chemical and nervous control of breathing. The role of breathing on blood pH.
3	Renal system. Morphofunctional organization of the kidneys. Role of the various components of the nephron in urine formation. Glomerular filtration. Reabsorption and tubular secretion. Excretion. Kidney contribution to the hydro-saline balance and blood pH. Contribution of the kidney to the blood volume and pressure. Regulation of micturition.
2	Endocrine system. Various types of activity of hormones. The hypothalamic and adeno-pituitary hormones. The endocrine glands controlled by the hypothalamus-pituitary axis. Hormonal control of blood glucose. The control of blood calcium levels: parathyroid glands. Endocrine function of thymus and epiphysis. Hormonal control of growth. Thyroid hormones

1	Gastro-intestinal system. Functional anatomy organization. Bioenergetics and basal metabolic rate. Bioelectric control of motility. Enteric nervous system. Cephalic, gastric and intestinal phases. Secretory functions of the GI. Pancreatic secretion, Role of liver. Function of the bile. Digestion and absorption of proteins, carbohydrates and lipids. Regulatory mechanisms of the GI system: nervous and hormonal control.
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