Course Unit	Anatomohistophysiology			Field of study	Biology and Biochemistry								
Bachelor in	Dietetics and Nutrition			School	School of Health								
Academic Year	2023/2024	Year of study	1	Level	1-1	ECTS credits	7.0						
Type	Semestral	Semester	1	Code	8149-807-1101-00-23								
Workload (hours)	189	Contact hours	T -	TP 90	PL -	TC -	S -	E -	OT 30	O -			

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s): Claudio Jose Correia Alves, Raul Fernando Louro de Sousa

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. To identify topographical regions.
   To relate anatomical structures based on anatomic plans.
2. To describe microscopic and macroscopic structure of osteo-articular and integumentary systems.
   To describe hystology of muscle contraction and the attachments and actions of main skeletal muscles.
3. To describe histological, anatomical aspects of heart and blood vessels, physiological events of cardiac cycle and of hemodynamics.
4. To describe bood cells and their functions.
5. To describe anatomical and histological aspects of respiratory system components and physiological aspects of pulmonary ventilation, gas transport and exchange in pulmonary and systemic capillaries.
6. To describe anatomical, histological and physiological aspects of each gastrointestinal tract segment and of pancreas and liver, namely hepatic functions on bile secretion and metabolism.
7. Genito-urinary system: describe the location and function of each gender

   Endocrine System: to describe location and histology of constituents, action of chemical mediators on target cells
8. Nervous System: to describe organization, neurophysiology, levels of integration and sense organs

Prerequisites

Before the course unit the learner is expected to be able to:
Cell structure, plasma membrane, organelles, DNA replication, protein synthesis and secretion.

Course contents

1 Introduction: Topographic regions. Anatomical plans. 2 Osteo-Articular, Muscular and Integumentary Systems. Bone, cartilage and muscle tissues. Bones. Joints. Muscle physiology. 3 Cardiovascular System: AHF. 4 Hemolymphoid System. Immunity. 5 Respiratory System. AHF of the airways. 6 Digestive system. AHF of the digestive tract, pancreas and liver. 7 Genito-Urinary System. AHF of the genitourinary system. 8 Endocrine System. AHF of the endocrine system. 9. Central and Peripheral Nervous System

Course contents (extended version)

1. INTRODUCTION TO ANATOMY STUDY
   - Topographical regions
   - Anatomical position. Plans. Concepts: cranial/caudal, dorsal/ventral, medial/lateral.
2. OSTEOARTICULAR SYSTEM
   - Skeletal tissues: bone and cartilage. Histogenesis of bone. Growth plate.
   - Vertebral column: vertebrae, sacrum, coccyx. Main bone characteristics.
   - Skeleton of thorax: thoracic vertebrae, sternum and ribs.
   - Skull. Orbit and nasal cavity. Bony palate. Cranial bones.
   - Upper limb: scapula, clavicle, humerus, radius, ulna, carpal bones, metacarpal bones, phalanges.
   - Lower limb: innominate bone, femur, tibia, fibula, patella, tarsal and metatarsal bones, phalanges.
   - Concept of joint. Functional aspects.
   - Non-synovial joints: suture, synchondrosis, syndesmosis, symphysis and gomphosis.
   - Synovial joints: articular cartilages, fibrous capsule, articular disc or meniscus.
   - The movement. Rotation axes. The movements on synovial joints.
3. MUSCULAR SYSTEM
   - Cytological aspects of muscle fibre
   - Physiology of muscle contraction.
   - Attachments and actions of main skeletal muscles.
4. CARDIOVASCULAR SYSTEM
   - Histological aspects of blood vessels and their relation with functional aspects.
   - The heart anatomy: cardiac chambers and valvular complexes.
   - Myocardium. Electrical events: depolarization and repolarization. Conducting system of myocardium.
   - Systole and diastole. Cardiac cycle.
   - Hemodynamics. Arterial pressure. Microcirculation.
   - Localization of main blood vessels of arterial and venous systems.
5. HAEMOLYMPHOID SYSTEM
   - Blood cells and their functions. Plasma
   - Haemopoiesis. Marrow bone. Physiological aspects of erythropoiesis.
   - Primary and secondary lymphoid tissue. Functions of B and T lymphocytes on immunological response.
   - Blood groups. AB0 and Rh systems. Others systems: Kell, Duffy, Kidd, Lutheran, Lewis, P.
   - Haemostasis
6. RESPIRATORY SYSTEM
   - Anatomical aspects: nasal cavity, pharynx, larynx, trachea, bronchi, bronchioles, lungs.
   - Histological aspects: respiratory epithelium, respiratory membrane.
   - Pulmonary ventilation, gas exchange and transport in the blood. Regulation
7. ALIMENTARY SYSTEM
   - Oral cavity and salivary glands. Oesophagus. Stomach: gastric mucosa. Small and large intestine.
   - Pancreas. Histological structure. Enzyme component and aqueous componente of pancreatic juice.
   - Liver. Structure of hepatic lobule. Blood circuitry in hepatic lobule. Hepatic function.
   - Physiolgy. Motility. Enzymatic activity. Absorption. Endocrine and paracrine mediators.
8. INTEGUMENTARY SYSTEM
   - Epidermis and dermis. Hair follicles. Sweat and sebaceous glands. Nails.
9. URINARY SYSTEM
   - Anatomical and histological aspects.
     - Shape and location of the kidney, ureter and bladder.
   - - Histological aspects of the renal parenchyma. Urinary tubule.
   - - Physiological aspects of the renal parenchyma. Glomerular filtration rate and its determinants.

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Course contents (extended version)

- - Regulation of acid-base balance and volume and osmolality of extracellular fluid.
10. MALE AND FEMALE REPRODUCTIVE SYSTEM
- Perineum and external genitalia.
- Anatomical and histological aspects
11. ENDOCRINE SYSTEM
- Homeostasis and coordination system. Chemical mediators.
- Endocrine, neuro-endocrine, neurocrine, paracrine and intracrine function.
- Hypothalamic-pituitary system. Adenopituitary hormones.
- Endocrine pancreas. Insulin and Glucagon. Regulation of glycemia and effects on metabolism
- Thyroid gland. Thyroid hormones, their synthesis and their effect on the body's metabolism.
- Parathyroid hormone. Calcitonin. Vitamin D. Hormones from the cortex of the adrenal gland.
- The Hypothalamus–Pituitary–Gonad axis
- Hormones during the sexual cycle, pregnancy and lactation.
12. NERVOUS SYSTEM
- Neurons and Neuroglia Neurophysiology. Resting membrane potential. Action potential.
- Synapses
- Anatomical aspects of the central nervous system. Spinal cord and brain.
- Sensory system. Sensitive receptors. Afferent neuron. Ascending pathways. Somatosensory area
- Ascending pathways related to noxious stimuli. The pain.
- Somatomotor area. Corticospinal bundle. Efferent neurons.
- Sympathetic and parasympathetic autonomic nervous system. Pre- and post-ganglionic efferent fibers.
- Effects of sympathetic and parasympathetic stimulation. Medulla of the adrenal gland.
- Spinal and cranial nerves.
- - Auditory and Vestibular System.
- Taste.
- Smell.

Recommended reading

1. Drake RL, Vogl AW, & AWM, Mitchell (Eds.). (2010). Gray's Anatomia para Estudantes (2ª ed.): Rio de Janeiro: Editora Elsevier.
2. Netter FH (Ed.). (1987). Anatomia y Fisiologia. Colección CIBA de Ilustraciones Médicas. : Barcelona: Salvat Editores.
3. Berne, R. M. , & Levy, M. N. (Eds.). (2004). Fisiologia. (5ª ed.): Rio de Janeiro: Mosby.
4. Hoffbrand, A. V. , Petit, J. E. , & Moss, P. A. H. (Eds.). (2004). Fundamentos de Hematologia. (4ª ed.): Porto Alegre: ARTMED.
5. Ovalle, W. K. , & Nahirney, P. C. (2008). Netter Bases da Histologia. São Paulo Brasil: Elsevier Editor, Ltda.

Teaching and learning methods

Theoretical-practical lessons are brief expositions of study subject based on images, followed by interaction between groups of pupils. Tutorial lessons are based on de search of answers for proposal questions oriented by the teacher, this search is based on bibliography. The individual work of the pupil is guided with resource at practical questions about study subject.

Assessment methods

1. Alternative 2 - (Regular, Student Worker) (Final)
- Final Written Exam - 100%
2. Alternative 3 - (Regular, Student Worker) (Supplementary)
- Final Written Exam - 100%
3. Alternative 4 - (Regular, Student Worker) (Special)
- Final Written Exam - 100%

Language of instruction

Portuguese

Electronic validation

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20-01-2024	01-02-2024	01-02-2024	07-02-2024

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