

BASI MORFOLOGICHE E FUNZIONALI DELLA VITA (ITO003)

Integrated course

1. LANGUAGE

Italian

2. COURSE CONTENTS

Coordinator: Prof. Amelia Toesca

Academic Year: 2023/2024

Year course: I°

Semester: I° e II° (annual course)

CFU: 8

Modules and Lecturers:

Human Anatomy - TO000017 (SSD BIO/16) (4CFU): Prof.ssa Amelia Toesca

Human Physiology - ITO024 (SSD BIO/09) (3CFU): Prof.ssa Elisabetta Chiarot (1CFU)

Prof.ssa Cecilia Cracco (1CFU)

Prof.ssa Cristina Destefanis

(1CFU)

Histology - ITO022 (SSD BIO/17) (1CFU): Prof. Luca Tamagnone

3. BIBLIOGRAPHY

F.H. Martini "Fondamenti di Anatomia e Fisiologia", EdiSES
F.H. Martini et al. "Anatomia Umana", EdiSES
G.A. Thibodeau K.T. Patton "Anatomia e Fisiologia", Elsevier
G.J. Tortora "Principi di Anatomia e Fisiologia", Casa Editrice Ambrosiana
M. McKinley - V.D. O'Loughlin "Anatomia Umana", Ed. Piccin
A. Vercelli et al. "Anatomia umana funzionale", Ed. Minerva Medica
F.H. Netter "Atlante di Anatomia Umana - Infermieristica" Casa Ed. Edra
Hinchliff, Montagu, Watson "Fisiologia per la pratica infermieristica", Casa Editrice Ambrosiana
D. Bani et al. "Istologia per le lauree triennali e magistrali", Sorbona (2019)

The Histology lecturer will provide students with in-depth documentation on the early stages of embryonic development, histogenesis and stem cells.

It is necessary for the student to have a reference text of their choice from the recommended ones or another text, after approval by the lecturer, for each discipline. It is optional to choose an Anatomy and Physiology textbook or two separate texts, one for each discipline. It is optional to choose an Anatomy atlas.

4. LEARNING OBJECTIVES

The aim of the course is to provide the student with the basic knowledge prerequisite to the study of clinical disciplines necessary to ensure the correct application of diagnostic and therapeutic prescriptions. In particular, the Histology module aims to provide knowledge of differentiated cells and their organisation in tissues, the Anatomy module of the organisation of the different systems and organs of the human body, the Physiology module of the functions of the different organs and the general mechanisms of functional control under normal conditions in order to understand any pathological changes observed and to be aware of the health procedures required in the performance of the profession.

Knowledge and understanding - (Dublino 1) At the end of the course the student must demonstrate that he/she has acquired a full knowledge of differentiated cells, to establish a correlation between structure and function, and their organisation into tissues and the latter into organs. The student must also demonstrate to knowledge the organisation of the different systems of the human body, the microscopic and macroscopic organisation of the single organs with the main topographical relationships and the relationship between structure and function of the organ. The student must demonstrate that he/she has acquired the main knowledge of the vital functions of man, necessary for understanding the functioning of the various organs and systems, their regulatory mechanisms and the main processes of integration and homeostatic control.

Applying knowledge and understanding – (Dublino 2). At the end of the course, the student must be able to apply the acquired knowledge of the function of tissues and anatomical structures to recognize the requirements of the persons assisted at different ages and in different situations and to identify the most appropriate responses with professional competence in the healthcare field.

Making judgements - (Dublino 3) At the end of the course, the student must have developed autonomous abilities in integrating the knowledge and competences learned in order to recognize the differences between body organs and their function under physiological and non-physiological conditions.

Communication skills – (Dublino 4) At the end of the course, the student should be able to identify tissues and anatomical structures and describe their functional characteristics using the correct terminology; he/she should also be able to express him/herself clearly and unambiguously. He/she should be able to relate to medical doctors, colleagues, other health operators, patients and their relatives in order to transmit the acquired knowledge in the most appropriate and effective ways, autonomously and in a spirit of team collaboration.

Learning skills – (Dublino 5) At the end of the course, the students should be able to self-assess their skills, increase their knowledge and update themselves independently by using texts, scientific articles and online platforms.

5. prerequisiteS

It is necessary for the student to have knowledge of basic science subjects, especially chemistry, physics and biology.

6. TEACHING METHODS

The teaching of the course consists of lessons with the aid of projected images and films. The frontal teaching of the Anatomy course is supplemented by the use of anatomical models. Lessons are given by providing application perspectives for each individual discipline. In the lessons, all topics present in the program are covered, inserting, when possible, clinical information and giving particular emphasis to the most relevant and essential aspects for the formation of a future nurse

and in order to provide the student with a complete overview of the knowledge to be acquired and the correct method of study. During lectures, students are stimulated to actively participate through questions on the topics of the current or previous lectures and encouraged to express themselves using the correct terminology.

7. OTHER INFORMATION

The Morphological and Functional Bases of Life course takes place in the 1st and 2nd semester of the 1st year of the degree course with an exam at the end of the 2nd semester.

Teachers are available for information on the course and clarification of lessons at the end of the lectures e by e-mail.

8. METHODS FOR VERIFYING LEARNING AND FOR EVALUATION

The evaluation is focused to verify the full and correct knowledge of the content of the three modules and the ability to describe structures and functions using the correct terminology. There is a final written exam with multiple-choice questions for each discipline followed by an oral test if the written test is passed. The evaluation is expressed in thirtieths, the mark being the weighted average of the marks obtained in the three individual modules and a minimum mark of 18/30 is required to pass each test. Students with insufficient marks in all three modules or with a serious insufficiency in a single module will not be admitted to the oral examination and will have to repeat the exam. The student may obtain the maximum mark of 30/30 if the weighted average is at least 29.5/30. In order to obtain honours, the student must achieve a mark of 30/30 in the three modules of the course and in all the intermediate tests.

During the course there are optional and not propaedeutic written intermediate tests. For the Anatomy module, two intermediate written tests are scheduled, Locomotor System and Neuroendocrine System, with evaluation expressed in thirtieths and value 1/3 of the final evaluation of the Anatomy module. For the Physiology module, one intermediate written test on the cardiovascular and respiratory systems is scheduled with a value expressed in thirtieths and 1/3 of the final mark for the Physiology module. For the Histology module, an intermediate written test is scheduled, at the end of the lessons of the respective module, by means of multiple-choice questions covering the whole histology program with a grade expressed in thirtieths and whose positive result gives access to the oral examination, in which the student will have to answer at least one question concerning blood. Obtaining a positive assessment on the parts of the program covered by the written tests for the various disciplines (passed *in itinere* or during an examination session) is a prerequisite for the final oral exam. The mark obtained in the intermediate written tests is valid until the examination session in February 2025.

9. program

<HUMAN ANATOMY>

Organisation of the human body: anatomical position, reference planes, terms of direction, anatomical nomenclature, levels of organisation of the human body, body regions and cavities.

Skeletal system. Vertebral column, bones of the skull, thorax, pelvis, upper limb, lower limb.

General notes on joints: definition, fixed and mobile joints.

Muscular system. Main muscles of the head, neck, trunk, upper and lower limbs, diaphragm muscle, respiratory muscles, muscles of the abdominal wall, inguinal canal, general notes on the muscles of the pelvic floor.

Cardiovascular system. Heart: topography, relationships, external and internal conformation, conduction system, coronary arteries and veins. Pericardium. Systemic and pulmonary circulation; aorta and main branches (branches of the aortic arch, thoracic aorta, abdominal aorta), main arterial vessels of the head, neck, thorax, abdomen and limbs; main venous vessels of the head, thorax, abdomen, upper and lower limbs, portal vein and portal-cava anastomosis.

Lymphatic system. Generalities on lymph and lymphatic vessels, topography and structure of lymph Nods, spleen, thymus, tonsils.

Respiratory system. Relations, external and internal conformation, general notes on the

microscopic structure, vessels of nose and nasal cavities, nasopharynx, larynx, trachea, bronchi and bronchial tree, lungs. Pleura.

Digestive system. Relationship, external and internal conformation, outline of the microscopic structure, vessels of the oral cavity and its annexes (tongue, teeth), pharynx, esophagus, stomach, small intestine, large intestine. Major salivary glands, liver and biliary tract, pancreas (relationships, external and internal conformation, vessels).

Urinary apparatus. Relations, external and internal conformation, vascularisation of kidneys, ureters, bladder, male and female urethra.

Reproductive system. Relationships, structure, vessels of testis, epididymis, vas deferens, prostate, seminal vesicles, uterus, ovaries, tubes, vagina.

Peritoneum: general organisation and behaviour in the abdominal and pelvic cavity.

Endocrine glands. Relationship, structure, vessels of pituitary gland, thyroid, parathyroid, pancreas, epiphysis, adrenal glands.

Nervous system. Central nervous system: meninges and cerebrospinal fluid circulation, cerebral ventricles; organisation of spinal cord, brainstem, hypothalamus, thalamus, cerebellum, brain; main sensory and motor pathways. Peripheral nervous system: general organisation, cranial nerves, spinal nerves, main nerves of the limbs. Autonomic nervous system: general organisation.

Sense organs. Generalities on the eye and ear.

Notes on the skin.

Notes on the mammary gland.

<PHYSIOLOGY>

Introduction to physiology and the concept of homeostasis.

Nervous system. Excitability, electrogenesis, membrane potential. Ion channels. Action potential.

Propagation of the action potential. Synapses and synaptic transmission. Neurotransmitters.

Membrane receptors and signal transduction. Functional organisation of the central and peripheral nervous system. Notes on sensory systems and motor control. Functions of glial cells.

Neurotransmitters and functions of the autonomic nervous system.

Skeletal muscle physiology: motor unit, neuromuscular junction, excitation-contraction coupling, the mechanism of muscle contraction. Physiology of smooth muscle.

Physiology of the Cardiovascular System. Functional organisation of the cardiovascular system.

Electrical activity of the heart: pacemaker cells, conduction tissue, functional characteristics of myocardial cells. Electrocardiogram. Cardiac cycle. Cardiac valve function. Haemodynamics: blood flow, pressure, vessel resistances and their regulation. Blood pressure measurement. Exchange of water and solutes between capillaries and tissues. Blood functions and haemostasis.

Physiology of the Respiratory System. Functional organisation of the respiratory system. Functions of the pleura and surfactant. Ventilation and lung volumes. Gas exchange in the lungs: diffusion of O₂ and CO₂ across the respiratory membrane. O₂ and CO₂ transport in the blood.

Water compartments and the renal system. Renal function. Glomerular filtration and renal clearance. Active and passive tubular reabsorption and regulatory mechanisms. Excretion.

Homeostatic functions of the kidney. Micturition.

Functional organisation of the gastrointestinal system. Digestion, nutrient and water absorption.

Gastrointestinal secretion and its regulation. Gastrointestinal motility and its regulation. References to nutrition and metabolism.

Endocrine system. Hormones: classification and function. Hypothalamic-pituitary system and target glands.

<HISTOLOGY>

Cells, tissues, organs and systems. Cell differentiation. Stem cell concept. Importance of stem cells in tissue renewal, ageing and degenerative and tumour diseases.

Early stages of embryonic development. Embryological origin of tissues.

Epithelial tissue: morphological and functional classification. Intercellular junctions. Specialisations of the apical surface. Basal membrane. Exocrine and endocrine glands. Examples of specialised epithelial tissues.

Connective tissue: structure and function. Specialised connective tissues: bone and cartilage. Ossification.

Blood and Vessels. Plasma proteins. Haemopoiesis. Blood smear. Haemochrome. Red blood cells, white blood cells and platelets.

Striated, smooth and cardiac skeletal muscle tissue.

Nervous tissue. Neurons and glia. Axons and dendrites. Synapses. Myelin sheath. Nerves. Neuro-muscular junction.