



Syllabus Master's Degree Course in Medicine and Surgery

BODY ARCHITECTURE

First year, first and second semester (12 academic credits [CFU])

Teachers

Subject	Academic credits (CFU)	Lecturer
Histology, cytology, embryology and organogenesis	5	DI ROSA Michelino Daniele Antonio
Regional anatomy and gross neuroanatomy	7	D'AGATA Velia (4 CFU) PAVONE Vito (3 CFU)

Learning outcomes

Subject	Learning outcomes
Histology, cytology, embryology and organogenesis	<p>By the end of the course, students are expected to:</p> <ul style="list-style-type: none">• Develop a foundational understanding of Cytology and Histology, including the general organization of cells, their specializations, and interactions required for the functions of various tissues.• Acquire essential knowledge to identify the morphological characteristics of normal cells and tissues within the human body.• Gain a comprehensive understanding of human embryology, including detailed descriptions of prenatal development stages, from fertilization (zygote) to embryogenesis (embryo) to organogenesis (fetus) and birth.• Understand the control and regulation mechanisms associated with human prenatal development.
Regional anatomy and gross neuroanatomy	<p>By the end of the course, students are expected to:</p> <ul style="list-style-type: none">• describe the structures of the human body using the correct anatomical terminology.• Understand the organization of the tegumentary system.• Comprehend the organization of the musculoskeletal system.• Familiarize with the organization of the central and peripheral nervous system, nerve structure and course, organization of the main sensory and motor pathways, and sensory organs. <p>The course aims to provide a comprehensive understanding of the human body, spanning from microscopic cellular and histological foundations to macroscopic surface anatomy. Students will gain knowledge of the structural organization of the human body at</p>

	various levels, enabling them to establish connections between anatomical structures and functions. This knowledge serves as a foundational basis for practical applications in related disciplines such as physiology, pathological anatomy, internal medicine, general surgery, pharmacology, and human movement theories.
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Prerequisites

Subject	Prerequisites
Histology, cytology, embryology and organogenesis	Attainment of the educational objectives set by prerequisite courses, especially knowledge of cell biology.
Regional anatomy and gross neuroanatomy	Attainment of the educational objectives set by prerequisite courses.

Course contents

Subject	Course contents
Histology, cytology, embryology and organogenesis	<p>HUMAN HISTOLOGY</p> <ul style="list-style-type: none"> • Methods in cytology and histology: optical and electron microscopy techniques; preparation of tissues for microscopic examination; principles of histochemistry. • Epithelial tissues <ul style="list-style-type: none"> ○ Surfacing epithelium: Generalities - Classification - Description of the different types of epitheliums: simple squamous epithelium, simple cuboidal epithelium, simple columnar epithelium, stratified squamous epithelium, stratified cuboidal and stratified columnar epithelium, pseudostratified epithelium, transitional epithelium - Lateral surface specializations – Basal surface specializations – Apical surface specializations. ○ Glandular epithelium: Generalities - Exocrine glands: classification, structure and function - Endocrine glands: Hormones - Target cell - Hormone-receptor link - Classification - Structure and function of some endocrine glands: pituitary, thyroid, parathyroid, epiphysis, adrenal gland. • Connective tissues and specialized connective tissues <ul style="list-style-type: none"> ○ Embryonic derivation, general characteristics and functions. ○ Connective tissue: Generalities and functions, cells, extracellular matrix, amorphous matrix, fibers - Structural and functional characteristics of the different types of connective tissue: Loose connective tissue, Dense connective tissue, Adipose tissue. ○ Cartilage: Structural and functional characteristics, extracellular matrix, types of cartilage, histogenesis of cartilage, perichondrium. ○ Bone tissue: Cells and extracellular matrix, bone lamellae and lamellar systems; compact and trabecular bone, periosteum and endosteum, ossification, bone growth and remodeling, metabolic functions of bone tissue. ○ Blood: Generalities and functions - Plasma - Erythrocytes - Leukocytes: Neutrophils, Eosinophils,

	<p>Basophils, Lymphocytes, Monocytes – Platelets - Lymph - Hemopoiesis - General concepts on immunity.</p> <ul style="list-style-type: none"> • Muscle tissues <ul style="list-style-type: none"> ○ Embryonic derivation, general characteristics and functions. ○ Skeletal muscle: Structural and ultrastructural organization of muscle fibers; Structural organization of myofibrils; Molecular organization of myofibrils; Neuro-muscular junction, Molecular basis of muscle contraction, Control of contraction. ○ Cardiac muscle: Structure of myocardiocytes; Structural organization of the cardiac muscle; Intercalated disks, conducting system of the heart. ○ Smooth muscle: Structure of myocytes; Structural organization of smooth muscle; Smooth muscle contraction. • Nervous tissue <ul style="list-style-type: none"> ○ Generalities - Neuron: Shape and size, Cytoplasm, Cytoskeleton, Neural processes (axon and dendrites), Axonal transport, Nerve fiber, Myelin sheath, Impulse conduction - Synapse - Neuroglia. <p>EMBRIOLOGY</p> <ul style="list-style-type: none"> • General notions of embryonic development - Oogenesis - Spermatogenesis - Fertilization - I and II week of development - III week of development - IV week of development - Placenta. • Germ layer derivatives: <ul style="list-style-type: none"> ○ Ectoderm: epidermis, neural tube and encephalic vesicles. ○ Endoderm: primitive intestine; anterior intestine; pharyngeal intestine. ○ Mesoderm: paraxial mesoderm: somites and their derivatives; Neurocranium and splanchnocranium.
<p>Regional anatomy and gross neuroanatomy</p>	<p>General Anatomy</p> <ul style="list-style-type: none"> • Morphology of the human body • Systematic and Topographic Anatomy. • Clinical Anatomy terminology. • Functional and constituent bodies of the equipment and systems of the human body. • Cable organs and fill organs. • Topographical organization of the human body. <p>The Integument</p> <ul style="list-style-type: none"> • Structure of the skin and subcutaneous tissue (hair, nails, skin glands, mammary gland). <p>Locomotor system:</p> <ul style="list-style-type: none"> • General on the bones. • General and classification of joints. • Characteristics and classification of Sinartrosi and synovial joints. • Movement types of synovial joints. • General characteristics of skeletal muscles and the classification criteria. • Skull.

	<ul style="list-style-type: none"> • Cranium and splanchnocranium. • Surface front, side and back of the skull. • Inner and outer surface of the cranial vault. • Inner and outer surface of the skull base, with particular emphasis on nerve-holes. • Temporomandibular joint. • Muscles of the head: the masticatory muscles, hints on mimic muscles and their bands. • Hyoid bone. • Spine: structure of the vertebra type; regional characteristics of the vertebrae; spine as a whole and physiological curves. • Spinal joints. • Cranio-vertebral joints. • Muscles and fascia of the neck. • Rib Cage: ribs, sternum and joints. • Chest muscles: intrinsic muscles and thoracic appendage. • Back muscles: spinocerebellar appendicular, spinal-general on coastal and deep muscles of the back. • Pelvis: bones, joints, muscles and fascia of the wall of the abdomen and pelvis. • Upper limb: skeleton, joints and muscles. • Lower limb: skeleton, joints and muscles. <p>The Nervous System</p> <ul style="list-style-type: none"> • Organization of the nervous tissue. • Organization of the central and peripheral nervous system. • Organization and course of the spinal and cranial nerves. • Main sensory and motor pathways. • Organization of the autonomic nervous system (sympathetic division and parasympathetic division). • Structure of the sensory organs.
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Assessment methods

Subject	Assessment methods
Histology, cytology, embryology and organogenesis	<p>Since it is an annual course, the exam will be held in the second semester. Throughout the semester, interim tests may be conducted to assess learning.</p>
Regional anatomy and gross neuroanatomy	<p>The assessment commences with a single written exam comprising 120 multiple-choice questions in two parts, covering both the first and second modules. Each module consists of 60 multiple-choice questions. Correct answers yield 1 point, with no penalties for incorrect or unanswered questions. A passing score of 36 out of 60 is necessary for each module. Successful candidates advance to a final oral examination graded on a thirty-point scale, with potential for honors. Students failing to meet the passing criteria for one or both modules must retake the entire exam in the subsequent session.</p> <p>The oral examination consists of an interview during which questions will cover at least three different topics from the course curriculum. The assessments aim to evaluate: i) the level of knowledge of the course modules; ii) the clarity of presentation; iii) the property of medical-scientific language. The assessment of learning can also be conducted remotely if the conditions necessitate it.</p>

	<p>For the assignment of the final grade, the following parameters will be considered:</p> <ul style="list-style-type: none"> • Score 29-30 with honors: The student demonstrates an in-depth knowledge of the topics, promptly and correctly integrates and critically analyzes presented situations, independently solving even highly complex problems. They possess excellent communication skills and command medical-scientific language proficiently. • Score 26-28: The student has a good understanding of the topics, is able to integrate and critically and logically analyze presented situations, can fairly independently solve complex problems, and presents topics clearly using appropriate medical-scientific language. • Score 22-25: The student has a fair understanding of the topics, although it may be limited to the main areas. They can integrate and critically analyze presented situations, although not always in a linear fashion, and present topics fairly clearly with moderate language proficiency. • Score 18-21: The student has minimal knowledge of the topics, possesses modest ability to integrate and critically analyze presented situations, and presents topics sufficiently clearly, although their language proficiency may be underdeveloped. • Exam not passed: The student lacks the minimum required knowledge of the core content of the course. Their ability to use specific language is minimal or nonexistent, and they are unable to independently apply acquired knowledge.
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Examples of common questions and/or exercises

Subject	Examples of common questions and/or exercises
Histology, cytology, embryology and organogenesis	<ul style="list-style-type: none"> • What is the morphological organization of the heart muscle? • What is the classification of the exocrine glands? • What are the functions of leukocytes? • What shape do erythrocytes have and why? • Describe the implantation of the blastocyst. • Describe the events of the third week of development. • Characteristics and functions of the placenta. • Describe the development of the urogenital system.
Regional anatomy and gross neuroanatomy	<ul style="list-style-type: none"> • Describe a joint. • Describe a muscle (origin, insertion, function, vascularization, innervation). • Describe a bone. • Describe the difference between a hollow organ and a solid organ. • Describe the organization of the central nervous system. • Describe the organization of the peripheral nervous system. • Describe the organization of spinal nerves. • Describe the organization of cranial nerves.

Reference texts

Subject	Textbooks
Histology, cytology, embryology and organogenesis	Histology

	<ul style="list-style-type: none"> • Ross and Pawlina Histology A Text and Atlas - With Correlated Cell and Molecular Biology. Lippincott Williams & Wilkins. • Wheater's Functional Histology: A Text and Colour Atlas. Barbara Churchill Livingstone. <p>Embryology</p> <ul style="list-style-type: none"> • Langman's Medical Embryology. Lippincott Williams & Wilkins • Larsen's Human Embryology. Churchill Livingstone. • Moore, Persaud, Torchia The Developing Human: Clinically Oriented Embryology. Elsevier. <p>Other teaching material: pdf documents uploaded on the STUDIUM digital platform, relating to the topics presented during the lectures.</p>
Regional anatomy and gross neuroanatomy	<ul style="list-style-type: none"> • Human Anatomy. Authors: Anastasi et al. - Edi-Ermes • Gray's Anatomy for Students. Authors: Richard Drake A. Wayne Vogl Adam Mitchell - Elsevier. <p>Gray's Anatomy - The Anatomical Basis of Clinical Practice. Editor in Chief: Susan Standring - Elsevier.</p>

Course format

Subject	Textbooks
Histology, cytology, embryology and organogenesis	The teaching will primarily be conducted through in-person lectures with a blend of theory and practical exercises. In the event that teaching is delivered in a blended or remote mode, necessary adjustments may be introduced compared to what has been previously stated, in order to adhere to the planned program as outlined in the Syllabus.
Regional anatomy and gross neuroanatomy	

Attendance

Subject	Textbooks
Histology, cytology, embryology and organogenesis	Mandatory attendance.
Regional anatomy and gross neuroanatomy	

Course schedule

Subject	Course schedule
Histology, cytology, embryology and organogenesis	<ul style="list-style-type: none"> • HUMAN HISTOLOGY: Methods in cytology and histology: optical and electron microscopy techniques; preparation of tissues for microscopic examination; principles of histochemistry. <i>Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 1: Methods - Chapter 2: Cell Cytoplasm - Chapter 3: The cell nucleus - pages: 1-81</i> • EPITHELIAL TISSUES: Surfacing epithelium: Generalities - Classification - Description of the different types of epithelium: simple squamous epithelium, simple cuboidal epithelium, simple columnar epithelium, stratified squamous epithelium, stratified cuboidal and stratified columnar epithelium, pseudostratified epithelium, transitional epithelium - Lateral

surface specializations – Basal surface specializations – Apical surface specializations.

Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 4: Tissues: concept and classification - Chapter 5: Epithelial Tissue - pages: 98-103

- Glandular epithelium: Generalities. Exocrine glands: classification, structure and function.
Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 5: Epithelial Tissue - pages: 105-156

- Endocrine glands: Hormones - Target cell - Hormone-receptor link - Classification - Structure and function of some endocrine glands: pituitary, thyroid, parathyroid, epiphysis, adrenal gland.

Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 5: Epithelial Tissue - pages: 105-156

- CONNECTIVE TISSUES AND SPECIALIZED CONNECTIVE TISSUES: Embryonic derivation, general characteristics and functions.
Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 6: Connective tissue - Chapter 9: Adipose Tissue - pages: 158-196

- Connective tissue: Generalities and functions, cells, extracellular matrix, amorphous matrix, fibers - Structural and functional characteristics of the different types of connective tissue: Loose connective tissue, Dense connective tissue, Adipose tissue.
Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 7: Cartilage - pages: 198-216

- Cartilage: Structural and functional characteristics, extracellular matrix, types of cartilage, histogenesis of cartilage, perichondrium.
Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 8: Bone - pages: 218-252

- Bone tissue: Cells and extracellular matrix, bone lamellae and lamellar systems; compact and trabecular bone, periosteum and endosteum, ossification, bone growth and remodeling, metabolic functions of bone tissue.
Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 10: Blood - pages: 268-308 - Chapter 14: Lymphatic System - pages: 440-486

- Blood: Generalities and functions - Plasma - Erythrocytes - Leukocytes: Neutrophils, Eosinophils, Basophils, Lymphocytes, Monocytes – Platelets - Lymph - Hemopoiesis - General concepts on immunity. *Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 11: Muscle Tissue - pages: 310-350*

- MUSCLE TISSUES: Embryonic derivation, general characteristics and functions. Skeletal muscle: Structural and ultrastructural organization of muscle fibers; Structural

	<p>organization of myofibrils; Molecular organization of myofibrils; Neuro-muscular junction, Molecular basis of muscle contraction, Control of contraction. <i>Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 11: Muscle Tissue - pages: 310-350</i></p> <ul style="list-style-type: none"> • Cardiac muscle: Structure of myocardiocytes; Structural organization of the cardiac muscle; Intercalated disks, conducting system of the heart. Smooth muscle: Structure of myocytes; Structural organization of smooth muscle; Smooth muscle contraction. <i>Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 13: Muscle Tissue - pages: 400-438</i> • NERVOUS TISSUE: Generalities - Neuron: Shape and size, Cytoplasm, Cytoskeleton, Neural processes (axon and dendrites), Axonal transport, Nerve fiber, Myelin sheath, Impulse conduction - Synapse - Neuroglia. <i>Book: Histology A Text and Atlas - With Correlated Cell and Molecular Biology - Chapter 12: Nerve Tissue - pages: 352-398</i> • GENERAL NOTIONS OF EMBRYONIC DEVELOPMENT. <i>Book: The developing Human - Chapter 1: Introduction to Human Development - pages: 1-39</i> • Oogenesis - Spermatogenesis – Fertilization <i>Book: The developing Human - Chapter 1: Introduction to Human Development - pages: 1-39</i> • I and II week of development <i>Book: The developing Human - Chapter 2: First Week of Human Development - Chapter 3: Second Week of Human Development - pages: 1-51</i> • III week of development <i>Book: The developing Human -Chapter 4: Third Week of Human Development - pages: 51-69</i> • IV week of development <i>Book: The developing Human -Chapter 5: Fourth to Eighth Weeks of Human Development - pages: 69-107</i> • Placenta - Fetal period – Organogenesis <i>Book: The developing Human -Chapter 6: Fetal Period: Ninth Week to Birth - Chapter 7: Placenta and Fetal Membranes - Chapter 8: Body Cavities, Mesenteries, and Diaphragm - pages: 107-141 - pages: 195-209 - pages: 379-416</i>
<p>Regional anatomy and gross neuroanatomy</p>	<p>General Anatomy - Chapter 1 of Human Anatomy. Authors: Anastasi et al.; Edi-Ermes</p> <ul style="list-style-type: none"> • Morphology of the human body • Systematic and Topographic Anatomy. • Clinical Anatomy terminology. • Functional and constituent bodies of the equipment and systems of the human body. • Cable organs and fill organs.

- Topographical organization of the human body.

The Integument-Chapter 2 of Human Anatomy. Authors: Anastasi et al.; Edi-Ermes

- Structure of the skin and subcutaneous tissue (hair, nails, skin glands, mammary gland).

Locomotor system-Chapter 3 of Human Anatomy. Authors: Anastasi et al.; Edi-Ermes

- General on the bones.
- General and classification of joints.
- Characteristics and classification of Sinartrosi and synovial joints.
- Movement types of synovial joints.
- General characteristics of skeletal muscles and the classification criteria.
- Skull.
- Cranium and splanchnocranium.
- Surface front, side and back of the skull.
- Inner and outer surface of the cranial vault.
- Inner and outer surface of the skull base, with particular emphasis on nerve-holes.
- Temporomandibular joint.
- Muscles of the head: the masticatory muscles, hints on mimic muscles and their bands.
- Hyoid bone.
- Spine: structure of the vertebra type; regional characteristics of the vertebrae; spine as a whole, and physiological curves.
- Spinal joints.
- Cranio-vertebral joints.
- Muscles and fascia of the neck.
- Rib Cage: ribs, sternum and joints.
- Chest muscles: intrinsic muscles and thoracic appendage.
- Back muscles: spinocerebellar appendicular, spinal-general on coastal and deep muscles of the back.
- Pelvis: bones, joints, muscles and fascia of the wall of the abdomen and pelvis.
- Upper limb: skeleton, joints and muscles.
- Lower limb: skeleton, joints and muscles.

The Nervous System-Chapters 13, 14 and 15 of Human Anatomy. Authors: Anastasi et al.; Edi-Ermes

- Organization of the nervous tissue
- Organization of the central and peripheral nervous system
- Organization and course of the spinal and cranial nerves
- Main sensory and motor pathways
- Organization of the autonomic nervous system (sympathetic division and parasympathetic division)
- Structure of the sensory organs