



COURSE DATA

DATA SUBJECT

Code: 34324
Name: Cellular and tissue biology
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1208 - Degree in Podiatry	Facultat d'Infermeria i Podologia	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1208 - Degree in Podiatry	Biology	BASIC

COORDINATION

MUÑOZ HIDALGO LISANDRA

SUMMARY

The subject "Cell and Tissue Biology" is a core, semester-long subject taught in the first year of the Bachelor's degree in Podiatry. It consists of two distinct parts handled by two different areas of knowledge: Cell Biology (50) and Histology (443), both integrated into the same University Department: Pathology (285) (academic year 25¿26).

The aim is for the student to delve deeper into and expand the study of the cell as the fundamental unit of living beings, where vital and unique functions are carried out and integrated, and where pathologies and the response of the living organism to environmental aggressions are reflected. Basic genetic mechanisms associated with cell dynamics and cytological concepts that lay the structural foundations of the cell and its processes of proliferation and differentiation are studied.

With this foundation, we will begin the study of its integration to form the different tissues of our body. And the integration of the different tissues will finally allow us to approach the study of the global structure of the human body at the level of organs and systems.

The knowledge, skills, and scientific language acquired will provide the essential foundations to later tackle the clinical teachings that a Podiatry professional must master.



PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Knowledge related to the subject acquired in the Health Sciences Bacallaureate (or COU).

COMPETENCES / LEARNING OUTCOMES

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Acquire knowledge of cell and tissue biology. Composition and organisation of the matter of living beings. Histology. Genetics.

Know the pathological anatomy. Cellular pathology. Tissue repair. Alterations in cell growth. Nomenclature and classification of neoplasms.

DESCRIPTION OF CONTENTS

1. Characteristics of living beings (TOPIC 1)

- 1.1 Concept of a living being.
- 1.2 Functions of living beings: self-preservation, self-regulation, and self-reproduction.
- 1.3 Structure of living beings: molecular and cellular level.
- 1.4 Prokaryotic and eukaryotic cells.

2. Cell membrane 1 (TOPIC 2)

- 2.1 General characteristics of the plasma membrane.
- 2.2 Morphological observation.
- 2.3 Chemical composition.
- 2.4 Molecular organization of the plasma membrane.
- 2.5 Biogenesis.

3. Cell membrane 2 (TOPIC 3)

- 3.1 Heterogeneity of the cell membrane.
- 3.2 Membrane specializations.
- 3.3 Junction complexes.

4. Cell membrane 3 (TOPIC 4)

- 4.1 Information exchange: signal-emitting and signal-receiving cells.



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- 4.2 Types of signal-emitting cells.
 - 4.3 Intracellular receptors.
 - 4.4 Surface receptors.
 - 4.5 Complexity of information exchange.
 - 4.6 Substance exchange: permeability.
 - 4.7 Endocytosis and exocytosis.
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5. Endoplasmic reticulum (TOPIC 5)

- 5.1 Morphological characteristics of the endoplasmic reticulum.
 - 5.2 Protein synthesis.
 - 5.3 Glycosylations.
 - 5.4 Lipid synthesis.
 - 5.5 Detoxification.
 - 5.6 Product accumulation.
 - 5.7 Calcium ion (Ca^{2+}) storage.
 - 5.8 Intracellular transport pathway.
 - 5.9 Biogenesis of the endoplasmic reticulum.
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6. Golgi apparatus (TOPIC 6)

- 6.1 Morphological characteristics of the Golgi apparatus.
 - 6.2 Protein modification.
 - 6.3 Protein secretion.
 - 6.4 Membrane recycling.
 - 6.5 Lysosome formation.
 - 6.6 Vesiculation and transport.
 - 6.7 Organizational models.
 - 6.8 Biogenesis of the Golgi apparatus.
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7. The lysosome (TOPIC 7)

- 7.1 General characteristics.
 - 7.2 Chemical composition.
 - 7.3 Intracellular digestion.
 - 7.4 Biogenesis.
 - 7.5 Biopathology.
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8. The mitochondrion (TOPIC 8)

- 8.1 General characteristics.
 - 8.2 Ultrastructural morphology.
 - 8.3 Chemical components.
 - 8.4 Respiratory oxidations.
 - 8.5 Precursor formation.
 - 8.6 Protein synthesis.
 - 8.7 Biogenesis.
 - 8.8 Biopathology.
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9. The cytoskeleton 1 (TOPIC 9)



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- 9.1 General characteristics.
 - 9.2 Morphology of microtubules: centriole, cilia, and flagella.
 - 9.3 Chemical components of microtubules.
 - 9.4 Molecular organization of microtubules.
 - 9.5 Biogenesis.
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10. The cytoskeleton 2 (TOPIC 10)

- 10.1 Actin filaments: morphology and arrangement in cells.
 - 10.2 Actin filaments: chemical components.
 - 10.3 Actin filaments: molecular organization.
 - 10.4 Intermediate filaments: types.
 - 10.5 Control of structural positioning.
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11. The cell nucleus (TOPIC 11)

- 11.1 General characteristics.
 - 11.2 Chemical components.
 - 11.3 Ultrastructure.
 - 11.4 Nuclear envelope: membranes, pore complex, nuclear dense lamina.
 - 11.5 Nucleus-cytoplasm transport.
 - 11.6 Chromatin.
 - 11.7 Genetic function of the nucleus.
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12. Nucleolus and ribosomes (TOPIC 12)

- 12.1 General characteristics of the nucleolus.
 - 12.2 Ultrastructure of the nucleolus.
 - 12.3 Chemical composition of the nucleolus.
 - 12.4 Extranucleolar RNPs.
 - 12.5 Nucleolus cycle.
 - 12.6 Structure of ribosomes.
 - 12.7 Chemical composition of ribosomes.
 - 12.8 Biogenesis of ribosomes.
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13. The chromosome (TOPIC 13)

- 13.1 General characteristics.
 - 13.2 Ultrastructure.
 - 13.3 Chemical composition.
 - 13.4 Molecular organization.
 - 13.5 Chromatin condensation.
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14. Cell division: Mitosis (TOPIC 14)

- 14.1 General characteristics of mitosis.
 - 14.2 Study methods.
 - 14.3 Phases of cell division: mitosis and cytokinesis.
 - 14.4 Phases of mitosis: prophase, prometaphase, metaphase, anaphase, and telophase.
 - 14.5 Physiology of mitosis.
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15. Cell division: Meiosis (TOPIC 15)

- 15.1 Sexual and asexual reproduction.
 - 15.2 Biological cycles.
 - 15.3 Phases of meiosis.
 - 15.4 Prophase of the first meiotic division: leptotene, zygotene, pachytene, diplotene, diakinesis.
 - 15.5 Origin of genetic variability in meiosis.
 - 15.6 Evolution of chromosome number and DNA amount during meiosis.
 - 15.7 Genetic consequences of meiosis.
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16. The cell cycle (TOPIC 16)

Concept of the cell cycle. Phases of the cell cycle. Synthesis activities during the cell cycle. Proliferation in multicellular organisms. Factors regulating cell proliferation. Cell cycle control.

17. Aging and cell death (TOPIC 17)

Senescence. Hayflick experiments. Genetic mechanisms of aging. Necrosis. Apoptosis. Molecular control of cell death.

18. The Human Genome (TOPIC 18)

*Introduction. Historical background. Structure and function of genetic material. Genome organization. Types of sequences in the human genome. Types of transcribed sequences in the human genome. Molecular concept of gene.

19. Genetic variation (TOPIC 19)

Mendelian genetics. Polymorphism and mutation. Types of mutations. Polymorphic inheritance. Multifactorial inheritance.

20. Monogenic diseases (TOPIC 20)

Genetic disorders. Monogenic diseases. Pedigrees. Autosomal dominant and recessive inheritance. Sex-linked inheritance. X-linked recessive diseases. X-linked dominant diseases. Y-linked inheritance.

21. Clinical Cytogenetics (TOPIC 21)

- 21.1. Karyotype.
 - 21.2. Chromosome banding.
 - 21.3. Chromosome classification.
 - 21.4. Chromosomal abnormalities: numerical and structural.
 - 21.5. Numerical abnormalities: aneuploidy, euploidy, and mixoploidy.
 - 21.6. Origin and types.
 - 21.7. Structural chromosomal abnormalities: unbalanced and balanced.
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22. Concept and Classification of Tissues. Epithelial Tissue. Covering Epithelium. Cytology of Covering Epithelium. (TOPIC 22)

Concept of Histology. Classification and general characteristics of tissues. Organization and histological



structure of tissues. Morphological criteria for the classification of epithelial tissues. Microscopic morphology of epithelial cells: intercellular junctions; polarity; cellular specializations; basement membrane; cytoskeleton.

Simple epithelia (squamous, cuboidal, columnar): structural characteristics, morphological varieties, and locations. Cytology of simple epithelia.

Pseudostratified epithelia: varieties, morphological characteristics, and locations. Transitional epithelium.

Cytology of pseudostratified epithelia. Stratified epithelia (keratinized and non-keratinized squamous, cuboidal, and columnar): morphological characteristics and locations.

Cytology of stratified epithelia.

23. Glandular Epithelium. Exocrine and Endocrine Glands. Cytology of Glandular Epithelium. (TOPIC 23)

Concept and morphological classification of glandular epithelium. Exocrine and endocrine glands. Morphological features of the secretion process: types of secretion; secretion granules. Morphological characteristics of exocrine glands based on architecture: intraepithelial and extraepithelial glands.

Extraepithelial glands: morphology of the excretory duct (simple and compound) and the secretory unit (tubular, acinar, alveolar).

Morphological characteristics of glandular cells according to the nature of the secreted product (mucous, serous, ions, electrolytes, lipids, etc.).

Morphological varieties of glands based on the extrusion mechanism (merocrine, apocrine, holocrine).

Endocrine glands: varieties according to histological organization (solid, follicular, diffuse). Mixed glands: morphological characteristics and varieties according to secretory unit morphology, secretion nature, extrusion mechanism, exocrine-endocrine functions, and amphicrine glands.

24. Connective Tissue I: Generalities, Cells, and Matrix. (TOPIC 24)

Cells of connective tissue: optical and ultrastructural features (fibrocyte-fibroblast, pluripotent mesenchymal cell, reticular cell of mesenchymal origin, antigen-presenting cells, myofibroblast, and adipocyte).

Optical features and types of mobile cells (monocyte-macrophage, polymorphonuclear leukocytes, mast cells, and plasma cells).

Amorphous ground substance: proteoglycans, glycosaminoglycans, and adhesion glycoproteins. Collagen, reticular, and elastic fibers: staining characteristics, morphology under light microscopy, organization, and distribution.

25. Connective Tissue II: Fibers of Connective Tissue. Basement Membrane. (TOPIC 25)

Basement membrane: optical and ultrastructural characteristics.

Classification criteria for connective tissue: structured and unstructured.

Unstructured connective tissues: characteristics, structural organization, and distribution.

Cell-rich tissues (embryonic mesenchyme), ground substance-rich tissues (mucous), balanced tissues (loose connective tissue), collagen fiber-rich tissues (dense irregular and regular connective tissue), reticular fiber-rich tissues (reticular tissue), and elastic fiber-rich tissues.

Other varieties: characteristics and distribution of the pigmentary system; study of melanotic connective tissue. Optical and ultrastructural cytology of pigmentary system cells.

26. Connective Tissue III: Other Varieties & Adipose and Blood (TOPIC 26)

Concept and general characteristics of adipose tissue. Distribution, optical and ultrastructural morphology of common (yellow, adult, or unilocular) fat.

Origin and optical/ultrastructural characteristics of blood cells: erythrocytes, platelets (thrombocytes),



neutrophils, eosinophils, basophils, monocyte-macrophage system, and antigen-presenting cells.

27. Cartilage Tissue. Structure and Varieties. Bone Tissue. Structure. (TOPIC 27)

General structure of cartilage: morphological characteristics and composition, staining properties, optical and ultrastructural morphology.

Varieties: hyaline, elastic, and fibrocartilage.

Specific structural features and distribution. Cartilage formation and growth. Perichondrium.

Microscopic varieties of bone tissue: compact and spongy bone.

Structural components: cells, organic matrix, and inorganic component.

Microscopic characteristics of osteoprogenitor cells, osteoblasts, osteocytes, and bone surface cells.

Microscopic characteristics of bone-resorbing cells (osteoclasts).

28. Bone Matrix. Primary Bone: Endoconnective and Endochondral Ossification (TOPIC 28)

Components and microscopic distribution of the organic bone matrix.

Mineralization process. Concepts of periosteum and endosteum.

Concept and types of ossification.

Primary endoconnective (intramembranous or direct) ossification: microscopic features of spongy and compact primary bone formation.

Model of membranous bone formation.

Characteristics of endochondral (indirect) ossification: model of long bone formation.

29. Secondary Bone. Modeling and Remodeling (TOPIC 29)

Concept of secondary bone: lamellar systems.

Modeling of long and flat bones: structural description of apposition and resorption, involved cells, and topography.

Remodeling of compact and spongy bone.

Bone Remodeling Units (BRUs), involved cells, and distribution sequence.

30. Muscle Tissue. Concept and Classification. Striated Skeletal Muscle Tissue. (TOPIC 30)

Histological organization: types of muscle fibers and connective tissue (endomysium, perimysium, epimysium).

External (basal) lamina.

Extrafusal muscle fiber: optical microscopy study of nuclear and sarcoplasmic characteristics, myofibrils, and sarcomere.

Electron microscopy study of sarcoplasm. Sarcoplasmic reticulum and T system. Triads.

Concept of sarcomere.

Ultrastructural architecture: myofibrils and myofilaments.

Histological differences between red and white fibers.

Optical morphology of satellite cells.

31. Striated Cardiac Muscle Tissue. Smooth Muscle Tissue. Specialized Variants (TOPIC 31)

Striated cardiac muscle: optical and electron microscopy study of cardiomyocytes.

Smooth muscle: optical microscopy characteristics of common smooth muscle cells.

Specialized variants of smooth muscle fibers.



32. Nervous Tissue I: General Characteristics. Neuron. Synapse (TOPIC 32)

General morphological characteristics of nervous tissue and classification.

Neuron: characteristics and classification.

Neuronal soma: optical microscopy of nucleus and perikaryon.

Definition and histological features of dendrites and axon.

Synapse: definition, structural components, and morphological types.

33. Nervous Tissue II: Glia. Nerve Fiber (TOPIC 33)

Glia: general characteristics and classifications.

Optical microscopy of interstitial glia: astrocytes, oligodendrocytes, microglia.

Epithelial glia.

General characteristics and morphological classification of nerve fibers.

Optical and electron microscopy of myelinated fibers with Schwann cells; myelination.

Microscopy of myelinated fibers without Schwann cells and unmyelinated fibers with and without Schwann cells.

34. Nervous Tissue III: Peripheral Nervous System (TOPIC 34)

Study of the PNS: components and histological structure.

Peripheral nerve: concept and structural features.

Layers and structure: epineurium, perineurium, and endoneurium.

Types of nerve fibers.

General characteristics of nerve endings.

Motor endings: motor end plate, muscle spindle, endings on smooth muscle fibers and glands.

Sensory endings: free and encapsulated receptors.

35. Circulatory System (TOPIC 35)

General structure of blood and lymphatic vascular circuits.

General structure of blood vessels.

Capillary system: general features. Endothelial cell. Pericytes.

Types of capillaries: continuous, fenestrated (porous), and sinusoids.

Arterioles: general features.

Sphincters. Arteriovenous anastomoses.

Arteries:

- Muscular arteries: structure and distribution.
 - Elastic arteries: structure and distribution.
Veins: differential structure of venous wall.
Valvular systems.
Lymphatic vessels: types and differential structure.
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36. Hemolymphatic System (TOPIC 36)

General characteristics, histological structure, and structural variants of lymphoid tissue: diffuse and nodular lymphoid tissue.



Classification, location, and function of lymphoid organs: primary (central) and secondary (peripheral).
General and differential histological features of bone marrow, mucosa-associated lymphoid tissue (MALT), thymus, lymph node, and spleen.

37. Osteoarticular System (TOPIC 37)

Concept and components of the osteoarticular and musculoskeletal systems.
Osteochondral parts. Epiphysis, diaphysis, and metaphysis: structure and significance.
Articular cartilage. Periosteum.
Muscular system. Muscles. Tendons.
Joint complexes: concept, types of joints, and structural analysis of immobile joints (synarthroses): syndesmosis, synchondrosis, synostosis, and symphysis.
Movable joints (diarthroses).

38. Skin I (TOPIC 38)

General considerations and structural components of the skin.
Epidermis: histological structure.
Keratinocytes and other cell types: melanocytes, Langerhans cells, Merkel cells, and immigrant cells.
Epidermal proliferation units.
Pigmentary system of the skin.

39. Skin II (TOPIC 39)

Thick and thin skin: differential histological structure.
Dermo-epidermal junction.
Papillary and reticular dermis. Hypodermis.
Microvascularization.
Cutaneous receptors, sensory and motor: dermal and epidermal types.

40. Cutaneous Glands (TOPIC 40)

General considerations.
Histological organization of hair and root sheaths.
Hair bulb. Hair growth phases.
Sebaceous glands. Sweat glands: eccrine and apocrine.
Histological organization of the nail: nail plate, matrix, bed, and folds.

41. Tissue Formation, Renewal, and Aging. Tissue Engineering (TOPIC 41)

Tissue variations due to age: childhood-adolescence, adulthood-aging.
Tissue engineering: tissue reconstruction. General concepts and applications.

42. Practical 1. Handling and Use of the Microscope

Introduction. Use of different microscope components (sample movement, ocular adjustment, objective change, focusing, condenser, etc.) with a standard hematoxylin-eosin stained slide.
Processing biological material for microscopic observation.

43. Practical 2. Cell Types



- Human blood (Giemsa)
 - Eel blood (Giemsa)
 - Vaginal smear (Papanicolaou)
 - Explant culture (Giemsa)
 - Established cell line (Giemsa)
 - Sperm (Giemsa)
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44. Practical 3. Cell Division and Chromosomes

- Onion root (aceto-carmine)
 - Onion root (semi-thin section, toluidine blue)
 - Human karyotype (Giemsa)
 - Tumor cell karyotype (Giemsa)
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45. Practical 4. Epithelial and Connective Tissue

- Esophagus (hematoxylin-eosin)
 - Large intestine (hematoxylin-alcian blue)
 - Skin (Masson's trichrome)
 - Skin (orcein)
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46. Practical 5. Cartilage, Bone, Blood, Muscle, Nervous Tissue



- Demineralized long bone (Masson's trichrome)
- Bone diaphysis (ink)
- Blood vessels (hematoxylin-eosin)

47. Practical 6. Skin, Appendages, and Tissue Integration

- Thin skin (hematoxylin-eosin)
- Thick skin (hematoxylin-eosin)
- Nail (Masson's trichrome)
- Integration with previous preparations

48. Seminar 1. Study of Cell Ultrastructure Using Electron Microscopy

Basics of electron microscopy. Study and identification of organelles and cellular structures.

49. Seminar 2. Diagnostic Slides

Histological analysis of microscopic images. Tissue integration.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	2,00
Theory	42,00
Laboratory	12,00
Computer classroom practice	4,00
Total hours	60,00

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	90,00
Preparation of lessons	0,00



Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	90,00

TEACHING METHODOLOGY

- Theoretical classes
- On-site practical classes in the Microscopy Lab
- Seminars
- Seminars in the Computer Lab
- Tutorials
- Virtual classroom
- Various active teaching methodologies will be used in the classroom, such as: Aronson's jigsaw, Kahoot, Wooclap, glossary activities, cooperative learning, artificial intelligence, etc.
- A gender perspective, respect for diversity, and the Sustainable Development Goals (SDGs) will be incorporated into the teaching whenever possible.
- Web pages for the Cell Biology and Histology areas:
<http://www.uv.es/patobio>
<http://www.uv.es/histomed>

EVALUATION

The final grade for the course will be based on the evaluation of the content from the area of Cell Biology (5 points) and the evaluation of the content from the area of Histology (5 points). Total: 10 points.

In both areas, the final grade will be calculated with a weighting of 60% for the theoretical block and 40% for the practical block.

Theoretical Block: 6 points

For the theoretical evaluation, 3 points correspond to the Cell Biology area and 3 points to the Histology area. These will be evaluated as described below.

Cell Biology: Total 3 points

The theoretical exam for the Cell Biology section will consist of:



- 10 short-answer questions with limited space for responses and varied formats (essay, true/false, multiple choice, concept association, table completion, etc.), each graded between 0 and 0.25 points.
Weight: 2.5 points

Evaluable activities will be included as part of the continuous assessment for the theoretical grade (0.5 points corresponding to Cell Biology). This continuous theoretical assessment in Cell Biology will consist of 3 activities:

- An online test on topics 1¿12 (0.2 points)
- A summary of an activity using active methodologies on topics 13¿17 (0.2 points)
- Participation in the glossary for topics 18¿21 (0.1 points)
Weight: 0.5 points

Histology: Total 3 points

The theoretical exam for the Histology section will consist of:

- 40 multiple-choice questions (one correct answer out of four options), each worth 0.05 points. For every three incorrect answers, one correct answer (0.016 points) will be deducted. Blank answers will not affect the score.
Weight: 2 points
- 2 short-answer questions with limited response space, each graded between 0 and 0.125 points.
Weight: 0.25 points

Evaluable activities will be included as part of the continuous assessment for the theoretical grade (0.75 points corresponding to Histology). This continuous theoretical assessment in Histology will consist of 5 sessions throughout the semester, each involving:

- 10 multiple-choice questions on diagnostic slides and content from previous classes, conducted during the first 8 minutes of the lecture.
Weight: 0.15 points per session (total 0.75 points)



To pass the course, a minimum of **3 points in the theoretical block** (from both Cell Biology and Histology) is required.

The average between the two areas (Cell Biology and Histology) will only be calculated if a **minimum of 1.5 points** is obtained in each area.

Practical Block: 4 points

The practical evaluation is divided into the following assessable activities:

Cell Biology Area: 2 points

- **Practical exam:** Identification and description of Cell Biology slides (1 point), selected at random from those studied during the course. Recognition and identification of biology and histology images from light and electron microscope photos (diagnostic slides). (0.5 points)
Weight: 1.5 points
- **Lab notebook**
Weight: 0.5 points

Histology Area: 2 points

- **Practical exam:** Identification and description of histological preparations randomly chosen from those studied during the course.
Weight: 1 point
- **Lab notebook**
Weight: 0.5 points
- **Continuous practical assessment in Histology:** Identification of images from the practical session at the end of the session.
Weight: 0.5 points

At the end of the semester, on a date and time announced in advance, a **practical exam** will be held to assess the practical content of Cell Biology and Histology.

A **minimum of 2 points** in the practical block (1 point in Cell Biology and 1 point in Histology) is required to pass the course.



The score obtained in the practical exams (out of a maximum of 4 points) will be retained for the evaluation in subsequent exam sittings during the same academic year.

To pass the course, both the theoretical and practical blocks must be passed as specified for each area: Cell Biology and Histology.

If the practical part is failed, it can be **retaken during the second exam session**.

The **final grade** is determined by the overall assessment of activities and written tests related to the theoretical and practical content of both areas of the course.

REFERENCES

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 2. Alberts. Molecular Biology of the Cell. Garland, 6^a edición.
 3. Alberts. Introducción a la Biología Celular. 2^a edición.
 4. CALVO, A. (2023). Biología Celular Biomédica. 2^a edición. Ed. Elsevier.
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 1. Villaro, A. C., & Gumpert. (2021). Histología para estudiantes [Incluye ebook]. Editorial Médica Panamericana. ISBN 978¿84¿9835¿927¿5.
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Complementarias

- Biología Celular

1. Jorde, Carey, White. Genética Médica. Mosby. 4ª edición.
2. Solari. Genética Humana. Fundamentos y aplicaciones en Medicina. Panamericana. 3ª edición.
3. Griffiths, Wessler, Lewontin, Carroll. Genética. McGraw Hill. 9ª edición.
4. Watson. Biología Molecular del Gen. Panamericana. 5ª edición.
5. LARSEN, W.J. (2016). Embriología humana. 5ª edición. Ed. Elsevier.

- Histología

1. Kierszenbaum AL, Tres LL. (2016). Histología y Biología Celular. Editorial Elsevier España. 4ª edición.
2. Gartner LP. (2018). Histología: Atlas en Color y Texto. Editorial Wolters Kluwer. 7ª edición.
3. Junqueira LC, Carneiro J. (2015). Histología Básica: Texto y Atlas. Editorial Médica Panamericana. 12ª edición.
4. Stevens A, Lowe J. (2020). Histología Humana. Editorial Elsevier España. 5ª edición.
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6. Kühnel W. (2005). Atlas Color de Citología e Histología. Editorial Panamericana. 11ª edición.
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10. Martín-Lacave I, Utrilla J, Fernández-Santos Jm, Garcia-Caballero T. (2020). Atlas de Histología. Microscopía óptica y electrónica. Editorial Universidad de Sevilla.

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- Páginas web

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<http://www.facmed.unam.mx/deptos/biocetis/atlas2013A/>https://www.histologia.uchile.cl/atlas/atlas_odontologia.html

<http://wzar.unizar.es/acad/histologia/> <https://mmegias.webs.uvigo.es/> <http://www.ujaen.es/investiga/atlas/> <https://www.proteinatlas.org/>