Universidad de Navarra

Functional Histology

Teaching guide 2026-27

PRESENTATION

1.- COURSE DESCRIPTION:

In this course, the various organs of the human body will be studied at both macroscopic and microscopic levels from a morpho-functional perspective.

2.- GENERAL COURSE INFORMATION:

Biology Degree

- **MODULE 2:** DEVELOPMENT, STRUCTURE AND FUNCTION OF LIVING BEINGS
- **SUBJECT 2.1:** Development and structure of living beings

Biochemistry Degree

- **MODULE 2:** CELL BIOLOGY, GENETICS AND MICROBIOLOGY
- **SUBJECT 2.1:** Cell biology and tissue organization

Credits: 6 ECTS

Academic Schedule: Year 1, Semester 2 (S2)

Languaje: English

Classroom: Room 17, *Edificio Bioblioteca de Ciencias*

Class Schedule: Mondays (10:00 AM), Thursdays (8:00 AM), and Fridays (9:00 AM)

Department and Faculties: Dept. of Pathology, Anatomy, and Physiology; Faculties of Medicine and Science

PROFESSORS:

Course Coordinator: Dr. Diego Serrano Tejero (dserrano@unav.es)

Dr. Alfonso Calvo González (acalvo@unav.es)

Dra. Arantxa González Miqueo (amiqueo@unav.es)

Dra. Marta Larráyoz Ilundáin (mlarrayoz@unav.es)

Dra. Beatriz Tavira Iglesias (btavirai@unav.es)

Course Details: Degree in Biology and Dual Degree in Biology and Environmental Sciences

Year: 1st Year

Module: 2 Development, structure and function of living beings.

Subject: Development and structure of living beings.

Course Type: Compulsory

Universidad de Navarra

Course Details: Degree in Biochemistry and Dual Degree in Chemistry and Biochemistry

Year: 1st Year (Bachelor's Degree in Biochemistry) and 3rd Year (Dual Degree in Chemistry and Biochemistry)

Module: 2 Cell biology, genetics and microbiology.

Subject: Cell biology and tissue organization

Course Type: Compulsory

LEARNING OUTCOMES

Degree in Biology and Dual Degree in Biology and Environmental Sciences

- RA1: Describe the principles of scientific methodology in Biology.
- RA3: Explain the basic fundamentals of the structure and function of living beings: Developmental Biology, Cell Biology, Histology, Botany, Zoology, Plant and Animal Physiology, Virology, Microbiology, and Immunology.
- RA10: Manipulate biological samples in the field and in the laboratory, including safety, waste disposal, annotated record of activities, and interpretation of results.
- RA16: Interpret the structural and functional organization at the level of biomolecules, cells, tissues, and organs in living beings.
- RA20: Efficiently manage resources and facilities, ensuring compliance with established protocols for waste management.
- RA23: Collaborate actively and inclusively in academic environments, respecting diversity and contributing to constructive coexistence.

Degree in Biochemistry and Dual Degree in Chemistry and Biochemistry

- RA6: Explain the structure and function of animal and human tissues, organs, and systems, understanding the regulation and integration of various body functions for application in Biomedicine.
- RA12: Manipulate chemical and/or biological material, including safety, waste disposal, annotated record of activities, and interpretation of results.
- RA23: Interpret in a critical and reflective manner the assumptions, methodologies, and problems of the discipline itself in its connection with the rest of knowledge.

COURSE CONTENT

Theoretical

1. **Neuroanatomy:** Introduction to the nervous system. Anatomy, function, histology, and pathologies of the spinal cord and brain. Autonomic nervous system.
2. **Skin**: Epidermis, dermis, skin appendages (cutaneous appendages).
3. **Eye**: Cornea, lens, iris, ciliary body, and retina.
4. **Cardiovascular system:** General structure of blood vessels. Arterial system. Exchange vessels. Venous system. Microvascular models. Vascular innervation. Lymphatic system. Heart.
5. **Lymphoid system**: Overview. Thymus. Lymph nodes. Spleen.
6. **Respiratory system**: Respiratory and olfactory mucosa. Upper respiratory tract. Lung.
7. **Urinary system**: General structure of the kidney. Nephron. Urinary tract.
8. **Digestive system**: Oral cavity and tongue. General structure of the digestive tract. Esophagus. Stomach. Intestines. Salivary glands. Pancreas. Liver and gallbladder.
9. **Endocrine system**: Pituitary gland. Pineal gland. Thyroid gland. Parathyroid glands. Adrenal glands.

10. **Male reproductive system**: Testes. Spermatic ducts / Seminiferous pathways. Sex glands. Penis.
11. **Female reproductive system**: Ovaries. Uterine tubes (Fallopian tubes). Uterus. Vagina. Mammary glands.

Practical

1. **Skin**
2. **Eye**
3. **Neuroanatomy**
4. **Cardiovascular System 1**
5. **Cardiovascular System 2**
6. **Lymphoid System**
7. **Respiratory System**
8. **Urinary System**
9. **Digestive System 1**
10. **Digestive System 2**
11. **Endocrine System**
12. **Female Reproductive System**
13. **Male Reproductive System**

LEARNING ACTIVITIES

In-Person Activities (60 hours)

1. LECTURES (37 hours)

In these lectures, the most important aspects of the theoretical syllabus will be explained, aiming to integrate the knowledge acquired in the theoretical part with that of the practical sessions. The professor will encourage a participatory methodology by asking questions to help students practice scientific reasoning.

2. MANDATORY PRACTICAL SESSIONS (21 hours)

To make the most of the practical sessions, students must arrive having reviewed all the materials posted in the "Practical Sessions" folder on the Adi Virtual Campus. In each session, electron micrographs and/or histological slides will be observed to learn how to identify the different organs of the human body. Students are advised to keep a notebook during practical sessions to record all observations made.

3. EXAMS (2 hours)

Out-of-Class Activities (90 hours)

1. GRADED ACTIVITIES (5 hours)

This will consist of watching explanatory videos and completing exercises required to make the most of the practical sessions. During practical sessions, student attitude as well as the responsible use of resources and facilities will be taken into account. In-person quizzes may be conducted and, additionally, multiple-choice tests for each topic must be completed through the ADI Virtual Campus.

2. INDEPENDENT STUDY (85 hours)

Time dedicated to studying the course content and preparing for the various learning activities.

EVALUATION

Universidad de Navarra

ORDINARY EXAM

The overall evaluation of the course will be based on the following components:

1. Practical Exams (20% of the final grade) Students who have not attended the practical sessions will not be eligible to sit for the regular exam session and will be listed on the official grade sheet as "Not Attended" (NP - *No Presentado*).

The practical exams will consist of diagnosing 10 images corresponding to the content of the practical sessions.

Two practical exams will be conducted:

- **Midterm practical exam (10%):** Students will pass and clear this material with a grade of 5 or higher, **provided they have also passed the midterm theoretical exam.**
- **Final practical exam (10% or 20%):** If the midterm was cleared, this exam accounts for 10%. If the midterm was not cleared, the student will be examined on all practical session material, and this final exam will account for 20%.

2. Continuous assessment (20% of the final grade) :The score obtained from activities completed throughout the term accounts for 20% of the course's final grade.

3. Theoretical Exams (60% of the final grade): Two theoretical exams will be conducted:

- **Midterm theoretical exam (30%):** Consists of 25 multiple-choice questions (4 options; every 4 incorrect answers subtract 1 correct answer) and 2 short-answer questions. Students pass and clear this material with a grade of 5 or higher, **provided they have also passed the midterm practical exam.**
- **Final theoretical exam (30% for students who cleared the midterm):** Same format as the midterm exam (25 multiple-choice questions with penalties for wrong answers and 2 short-answer questions). Students who do not clear the midterm (<5) must be tested on all course material during the May final exam. Their exam will consist of 50 multiple-choice questions (with the same penalty for wrong answers) and 4 short-answer questions. In this case, the final exam will represent 60% of the final grade.

Multiple-choice questions may include content from both theoretical lectures and practical sessions. Additionally, the final exam will feature an optional extra question that can add up to a maximum of 0.5 points directly to the overall course grade.

Students who do not sit for either the May final theoretical or practical exam will receive a grade of "Not Attended" (NP – *No presentado*).

Averaging Condition: It is essential to obtain a minimum grade of 4 on both the final theoretical exam and the final practical exam in May to calculate the final average score.

EXTRAORDINARY EXAM

The criteria for the extraordinary exam session are as follows:

Format and content: All students must be tested on all course material, taking both the practical and theoretical exams.

Characteristics: The exams will maintain the same structure and penalties as in the regular exam session.

Weighting: The theoretical exam will account for 60% and the practical exam 20%.

Continuous assessment: The grade obtained from the graded activities (20%) completed during the term will be retained.

NOTE: Students who are unable to sit for an exam due to justified personal reasons or an exam conflict must contact the coordinator. An alternative exam date will be offered where applicable.

Repeating Students

At the beginning of the semester, repeating students must contact the course coordinator.

Students with Special Educational Needs

For students with special educational needs, exceptions regarding the course methodology and /or assessment will be permitted. Possible alternatives will be evaluated to ensure the effective acquisition of all required learning outcomes.

ATTENTION: Any attempt at fraud, copying, plagiarism, or other irregular behavior constitutes a serious infraction, as set out in Title IV, "Academic Discipline Rules for Students," within the System of Rules on Coexistence at the University of Navarra

BIBLIOGRAPHY

Textbooks:

Ross. **Histology: A Text and Atlas**. Wolters Kluwer, 2016 Find it in the library

Junqueira's **Basic Histology: Text and Atlas**. Mc Graw-Hill, 2021 Find it in the library (full e-book available)

A.C. Villaro. "Histología para estudiantes". Ed. Médica Panamericana (2021). Find it in the library (in spanish)

Virtual microscopy:

Histology Guide https://histologyguide.com/

Digital Microscope http://www.histology.be/

Histology atlas (Universidad de Zaragoza) http://wzar.unizar.es/acad/histologia/

Histology atlas (Universidad de Vigo) https://mmegias.webs.uvigo.es/inicio.html