Universidad de Navarra

Functional Histology (F. Ciencias)

Teaching guide 2025-26

In the first semester the students had the opportunity to study the cells and main characteristics of the four basic types of tissues: epithelial, connective, muscle and nervous tissues. This previous course laid the necessary foundations of knowledge to undertake the present course: **Functional Histology**. The present course focuses on the organs, which are composed of different tissues organized in structural units to play a coordinated role in organs.

The students enrolled in the Biology Degree and the Double Degree in Biology and Environmental Sciences will also study plant histology. In this subject the students will have the opportunity to learn about plant tissues at microscopic level.

The students enrolled in the Degree in Biochemistry and the Double Degree in Chemistry and Biochemistry will study instead the histology and anatomy of the central nervous system.

Lecturers:

Diego Serrano (coordinator): dserrano@unav.es

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General information:

Number of credits: 6 ECTS

Coordinator: Dr. Diego Serrano

Semester: Second semester

Department: Pathology, Anatomy and Physiology. School of Medicine and School of Sciences

Office: 3450. Research Building (Edificio de Investigación)

Language: English

Degree in Biology and Double Degree in Biology and Environmental Sciences

Name of the course: Animal and plant organography

Type of course: Required

Module II: Development, Structure and Function of living beings

Subject: Cell Biology and Histology

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Year: 1st

Biochemistry Degree and Double Degree in Chemistry and Biochemistry

Name of the course: Functional Histology

Type of course: Basic

Module II: Fundamentals of Biology, Microbiology and Genetics

Subject: Human Anatomy

Year: 1st (Biochemistry Degree) and 3rd (Double Degree in Chemistry and Biochemistry)

EVALUATION

Attendance to practical classes is mandatory. If a student misses 2 practical classes without a serious and justifiable reason, he/she will not be able to take the final exam.

Assessments are outlined below.

FINAL GRADE	MIDTERM EXAM	FINAL EXAM
PRACTICAL PART	15%	25%
THEORETICAL PART	20%	30%
CONTINUOUS EVALUATION (WOOCLAP, SOCRATIVES...)	10%	

Midterm theoretical exam will include multiple choice questions (25) and short writing questions (2). Practical midterm will consist on image / structure / organ identification (10 questions). Both midterm parts will be liberatory if your mark is equal or greater than 5 (in each part). If you pass, in may you only have to take the exam of the topics after the midterm

Final exams will consist of multiple choice questions and/or short answer questions. To pass the course, **students must achieve a minimum of 4 out of 10 points in both the practical and theoretical parts. If this condition is met, the Final grade (calculated based on the wighted percentages outlined in the previous table) must be greater than 5 to pass.** Students who do not pass the course in May will have the opportunity retake the exam in June, which will follow the rules previously explained for the regular exam. **In the June exam, students will be required to retake the entire content**, including both the theoretical and practical parts.

Students will be able to review the final exams in an interview with the professor, after online publication of the grades, in a day and place that will be announced.

Those students who were previously enrolled in this course (formerly known as **ORGANOGRAPHY**) should contact the coordinator, because they may skip some of the general rules for the regular course (i.e. attendance to practical classes). In addition, because those students might face difficulties to attend the the lectures, the percentage of the continuous evaluation will be distributed among the rest of the parts (+2,5%).

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Accommodation will be provided for students with special learning needs, either regarding the methodology and/or evaluation of the course, but they will be expected to fulfill all course objectives.

PROGRAM

BIOCHEMISTRY DEGREE AND DOUBLE DEGREE IN CHEMISTRY AND BIOCHEMISTRY SYLLABUS

Theory syllabus

1. The central nervous system. Basic concepts, orientation and axis. Regions of the central nervous system. Cerebral cortex, gyrus and sulci. Neuroimagen. Spinal cord. Cerebellum. Cerebral cortex.
2. Cardiovascular system: Introduction. Structure of the blood vessels. Arterial system. Micro-vessels system. Venous system. Micro-vessels models. Vascular innervation. Lymphoid system. Heart
3. Urinary system: Kidney and nephron general structure. Kidney and urinary tract.
4. Respiratory system: Respiratory mucous layer. Upper respiratory airways. Lung.
5. Lymphoid system: General description. Thymus. Lymph nodes. Spleen.
6. Digestive system: oral cavity and tongue. General structure of the digestive tract. Oesophagus. Stomach. Intestines. Salivary glands. Pancreas. Liver and gall bladder.
7. Endocrine System: General description. Hypophysis. Pineal gland. Thyroid gland. Parathyroid. Gland. Suprarenal Glands.
8. Male reproductive system: Testicles. Seminiferous tubules. Male sexual glands. Penis.
9. Female reproductive system: Ovary, Fallopian tubes. Uterus, Vagina. Mammary glands.
10. Eye: Cornea, sclera, uvea. Retina. Crystalline lens. Eyelid and conjunctiva.
11. Ear: External ear. Middle ear. Internal ear.

Laboratory practical syllabus

1. Central Nervous System: Macroscopic and microscopic neuromorphology
2. Cardiovascular system.
3. Urinary system
4. Respiratory system
5. Lymphoid system
6. Digestive system 1: oral cavity and digestive tract
7. Digestive system 2: Digestive glands
8. Endocrine system
9. Skin
10. Male reproductive system
11. Female reproductive system

BIOLOGY DEGREE AND DOUBLE DEGREE IN BIOLOGY AND ENVIRONMENTAL SCIENCE SYLLABUS

Theory Syllabus

1. Plant organography. Structural support tissues: Primary insulation tissues: epidermis and endodermis. Vascular tissue: xylem and phloem. Vascular bundles. Secondary growth. Cambium, pericambium.

2. Cardiovascular system: Introduction. Structure of the blood vessels. Arterial system. Micro-vessels system. Venous system. Micro-vessels models. Vascular innervation. Lymphoid system. Heart
3. Urinary system: Kidney and nephron general structure. Kidney and urinary tract.
4. Respiratory system: Respiratory mucous layer. Upper respiratory airways. Lung.
5. Lymphoid system: General description. Thymus. Lymph nodes. Spleen.
6. Digestive system: oral cavity and tongue. General structure of the digestive tract. Oesophagus. Stomach. Intestines. Salivary glands. Pancreas. Liver and gall bladder.
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10. Eye: Cornea, sclera, uvea. Retina. Crystalline lens. Eyelid and conjunctiva.
11. Ear: External ear. Middle ear. Internal ear.

Laboratory practical syllabus

1. Plant histology
2. Cardiovascular system.
3. Urinary system
4. Respiratory system
5. Lymphoid system
6. Digestive system 1: oral cavity and digestive tract
7. Digestive system 2: Digestive glands
8. Endocrine system
9. Skin
10. Male reproductive system
11. Female reproductive system

BIBLIOGRAPHY

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

-Junqueira's Basic Histology: Text and Atlas. Mc Graw-Hill, 2016. Wolters Kluwer, 2015. Find it in the library (e-book)

-Abraham L Kierszenbaum. Histology and Cell Biology: An Introduction to Pathology. Elsevier, 2016. Find it in the library

LEARNING OUTCOMES (Competencies)

Biology degree

The course aims to give students the knowledge and skills to:

- Specific competences (SC):

CE1 Demonstrate the ability to formulate and solve qualitative and quantitative problems in the biology field using scientific hypothesis that can be studied empirically and must be also based on actual knowledge and current scientific theories.

CE2 Plan, develop and discuss critically experiments; and use techniques and instruments of experimentation in biology.

CE5 Apply knowledge, biological concepts and theories to practical cases.

CE11 Understand the events during the embryonic period and the biology of development of living beings.

- Basic competences (CB) and General competences (CG):

CB1 Demonstrate and understand basic knowledge in an area of study acquired in secondary education, and reach a level that allows them not only to rely on advanced textbooks, but also to incorporate knowledge at the forefront of their field of study.

CB2 Apply knowledge to their work or vocation in a professional way and have the appropriate capabilities that are usually demonstrated through the elaboration and defense of arguments and problem solving within their area of study.

CB3 Understand and critically analyze, discuss, write and present scientific argumentation and make consistent and reasoned judgments on social, scientific or ethical issues of importance.

CG1 Plan and organize their time, managing the continuous training, updating the knowledge of the scientific innovations and analyze the future trends.

CG3 Work in a team, selecting and choosing the correct work methodology, and establishing an appropriate distribution of functions. Know how to listen and speak with positive and constructive interventions.

Biochemistry Degree

The course aims to give students the knowledge and skills to:

- Specific competences (CE):

CE2 Apply experimental methods to investigate areas of biology.

CE7 Identify the differences between the main kinds of living organism, from unicellular to the most complex multicellular organism. Learn the main cell structures and functions of the prokaryotic and eukaryotic cell, as well as the human and animal tissues and systems. Understand the structure, variation, function and transmission of the hereditary material.

- Basic competences (CB) and General competences (CG):

CB1 Demonstrate possession and understanding of a basic knowledge in an area of study acquired in secondary education, and reach a level that allows them to not only rely on advanced textbooks, but also to incorporate knowledge at the forefront of their field of study.

CG1 To be able to plan and organize their time and manage their continuous training, updating the knowledge of the scientific innovations and analyze future trends.

CG2. Holistic thinking, being able to tackle problems from different approaches. Development of critical thinking and providing solutions to scientific problems.

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CG3 To be able to work in a team. Selecting and choosing the correct work methodology, and establishing an appropriate distribution of functions. Know how to listen and speak out with positive and constructive interventions.