1. OVERVIEW

Subject Area	Structure and Function I
Degree	Bachelor's Degree in Veterinary Medicine
School/Faculty	Faculty of Biomedical and Health Sciences
Year	First
ECTS	12ECTS
Type	Core
Language(s)	Spanish
Delivery Mode	On-Campus
Semester	First semester

2. INTRODUCTION

Structure and Function I is part of the broader subject of Structure and Function: Biology, Biochemistry, Anatomy and Physiology, and is the first of three parts of the topic. It is a core subject area. This subject area, worth 12 ECTS, is taught in the first semester of the first year of the Bachelor's Degree in Veterinary Medicine.

The overall aim of this subject area is to introduce students to comparative anatomy, physiology and histology, and to acquaint them with the major biochemical and cell biology processes in animal physiology.

The subject area is divided into four units as follows:

- **UNIT 1.** The Basics of Cell Biology, Histology and Biochemistry.
- **UNIT 2.** The Basics of Veterinary Immunology.
- **UNIT 3.** Animal Embryology.
- **UNIT 4.** The Nervous System and Sense Organs.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by its acronym in Spanish):

- CB1 – Show knowledge and understanding of an area of study, building on the foundation of general secondary school education. At this level, and perhaps with the

support of more advanced textbooks, students should be able to demonstrate awareness of the latest developments in their field of study (Knowledge Acquisition).

Cross-curricular skills (CT, by their acronym in Spanish):

- CT2 – Independent learning. Employ appropriate strategies needed to search for, analyse, evaluate and manage information from different sources, and to learn and put into practice what has been learnt independently.
- CT3 – Teamwork. Collaborate actively with other people, departments and/or organisations to reach common goals, value and incorporate contributions from the rest of the group members and create a good working environment.

Specific skills (CE, by their acronym in Spanish):

- CE1b – Knowledge and application of the principles and foundations of: b) the physics, chemistry and biochemistry of biological processes and their applications in veterinary science.
- CE2a – Knowledge and application of the principles and foundations of: a) the structure of eukaryotic cells and their organisation in tissues and organs.
- CE2b – Knowledge and application of the principles and foundations of: b) the morphology, topography and structure of organs and systems.
- Ce2c – Knowledge and application of the principles and foundations of: c) cell excitability and communication.
- CE2d – Knowledge and application of the principles and foundations of: d) the functioning and regulation of body systems and apparatuses.
- CE2e – Knowledge and application of the principles and foundations of: e) homeostasis.
- CE2f – Knowledge and application of the principles and foundations of: f) ontogenetic development, congenital anomalies and applications of embryology.
- CE2g – Knowledge and application of: g) the molecular and genetic principles and foundations of biological processes.

General skills (CG, by their acronym in Spanish):

- CG2 – Prevent, diagnose and treat animal diseases, particularly zoonoses, both individually and as part of a team.

Learning outcomes (RA, by their acronym in Spanish):

- RA1 – Identify the basic processes and mechanisms involved in gametogenesis, fertilisation and the first stages of ontogenic development.
- RA2 – Describe the morphology and molecular structure of the elements that make up eukaryotic cells, and the biochemical basis of biological processes.

- RA3 – Explain the metabolic pathways common to all domestic animals (Krebs cycle, oxidative metabolism and energy production, glycolysis, pentose phosphate pathway, beta-oxidation, transamination and the metabolism of the nitrogenous bases of nucleotides).
- RA4 – Distinguish the microscopic structure of the four basic types of tissue (epithelial, connective, muscle and nervous).
- RA5 – Identify the transport mechanisms and function of body fluids, and the cellular and molecular basis of the immune response.
- RA6 – Define the function of neurons (action potential and signal transmission) and muscle cells (excitation and contraction).
- RA7 – Study the different regions and functions of the central nervous system, the core nuclei and tracts contained within it, and the sense organs.
- RA8 – Identify the bone anatomy, muscles and major vessels and nerves in the head of animal species of veterinary interest, as well as their relationships and functional significance.

The following table shows how the skills developed in the subject area relate to the intended learning outcomes:

Skills (CE)	Learning outcomes (RA, by their acronym in Spanish)
CE2a, CE2f	**RA1**
CE1b, CE2a, CE2b, CE2g	**RA2**
CE1b, CE2g	**RA3**
CE2a, CE2b	**RA4**
CE2c, CE2e	**RA5**
CE2b, CE2c, CE2d	**RA6**
CE2b, CE2d	**RA7**
CE2a, CE2d	**RA8**

4. CONTENT

The subject area has been divided into four major units that will be taught by means of lectures ("Topic, T"), practicals (labs, workshops; "Practical, P"), theory and practical lessons (TP) and working groups (case studies and cooperative learning; "Working Groups, WG"). The duration of T will be 1h; of P, 1h; and of WG, 2h. To ensure alignment between theory and practice,

students will apply theoretical content in various practicals. This will be the method of working for the entire subject area, with Structure and Function lessons taking place in the lab.

UNIT 1. THE BASICS OF CELL BIOLOGY, HISTOLOGY AND BIOCHEMISTRY

The aim of this unit is to: describe the morphology and molecular structure of the elements that make up eukaryotic cells; describe the biochemical basis of biological processes; identify the transport mechanisms and function of bodily fluids; distinguish the microscopic structure of the basic types of tissue; and explain the metabolic pathways common to all domestic animals.

UNIT 2. THE BASICS OF VETERINARY IMMUNOLOGY

The aim of this unit is to identify the cellular and molecular basis of the immune response.

UNIT 3. ANIMAL EMBRYOLOGY

The aim of this unit is to identify the basic processes and mechanisms involved in gametogenesis, fertilisation and the first stages of ontogenic development.

UNIT 4. THE NERVOUS SYSTEM AND SENSE ORGANS

The aim of this unit is to: define the function of neurons (action potential and signal transmission); study the different regions and functions of the central nervous system, the core nuclei and tracts contained within it, and the sense organs; and to identify the bone anatomy of animal species of veterinary interest, as well as their relationships and functional significance.

5. TEACHING/LEARNING METHODS (MD, by their Spanish acronym)

The types of teaching/learning methods are as follows:

- MD1: Lecture / Web conference.
- MD2: Case studies.
- MD5: Collaborative learning.
- MD6: Learning through workshops/labs.
- MD7: Simulation environments.

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

Learning activity	Number of total hours	Number of hours on campus
AF1: Master lectures	36	36

AF2: Group work (seminars, forums, debates and talks)	14	3.5
AF4: Oral presentations	3	3
AF5: Independent working	130	0
AF6: Workshops and/or labs and/or simulation	68	68
AF8: Drafting reports or concept maps	32.5	0
AF10: Tutorials	14	7
AF11: Assessment tests	2.5	2.5
TOTAL	**300**	**120**

7. ASSESSMENT

The assessment methods, plus their weighting in the final grade for the course, are as follows:

Assessment system	Weighting
Activity 1. Partial Theory Exam 1 (October)	20%
Activity 2. Partial Theory Exam 2 (November)	20%
Activity 3. Partial Theory Exam 3 (January)	20%
Activity 4. Partial Practical Exam 1 (October)	12.5%
Activity 5. Partial Theory Exam 2 (January)	12.5%
Activity 6. Working Groups and Online Simulation Workshops	10%
Activity 7. Oral presentation	5%

On Canvas, the virtual campus, when you open the subject area, you can see all the details of your assessment tasks, including the deadlines and assessment procedures for each task.
Lab work, synchronous workshops, complex simulations, case studies and theory exams take place on campus and attendance is compulsory.
To pass the subject area, you must achieve a grade equal to or above 5.0 in each partial theory exam and partial practical exam, and must also have submitted Activities 6 and 7 as indicated in the table. Additionally, you must have completed all online lab assignments (Labster) in order to pass the subject area (Activity 6).
At the professor's discretion, an oral exam may be arranged to make up for the justified absence of an exam.

8. BIBLIOGRAPHY

The recommended bibliography is indicated below:

- ✓ Anatomy
  - Atlas en color de anatomía veterinaria. El perro y el gato. Done *et al.*

- Embriología y anatomía veterinaria volumen I y II. Climet *et al.*
- Anatomía de los animales domésticos: texto y atlas en color. König *et al.*

✓ Physiology
- Fisiología veterinaria. García Sacristán *et al.*
- Fisiología veterinaria. Cunningham.
- Fisiología de los animales domésticos. Dukes *et al.*
- Veterinary hematology: a diagnosis guide and color atlas. Harvey. Elsevier

✓ Cytology and Histology
- Biología celular y molecular. Lodish *et al.*
- Biología molecular de la célula. Alberts *et al.*
- Textbook of veterinary histology. Dellmann's *et al.*
- Biología celular e histología. Gartner *et al.*
- Diagnostic cytology and hematology of the dog and cat. Tyler *et al.*

✓ Biochemistry:
- Bioquímica. Conceptos esenciales. Feduchi *et al.*
- Clinical biochemistry of domestic animals. Kaneko *et al.* Burlington.

✓ Diagnostic Imaging:
- Small animal radiographic techniques and positioning. Ayers *et al.*
- Small animal diagnostic ultrasound. Thomas G. Nyland *et al.* Elsevier.
- Small animal diagnostic ultrasound. Nyland & Mattoon. Saunders.
- Textbook of veterinary diagnostic radiology. Thrall. Saunders.
- Diagnostic imaging of exotic pets: birds - small mammals – reptiles. Krautwald-Junghanns *et al.*