The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Prerequisites
There are no official prerequisites, although it is convenient that the student has passed the subjects of Morphology I and Structure and Function of the Nervous System, which are taught in the second semester of the first year of the Veterinary Degree. The contents of Morphology II are complemented with those of the subject of Physiology, which is taught simultaneously in the second year of the degree.

Objectives and Contextualisation
Morphology II is a basic subject of the second year of the Veterinary Degree that contributes to getting the student to know the structure, organization, and function of the
organs, apparatuses, and systems that compose the animal organism, both throughout the development of the individual as in his adult stage. In particular, the subject of Morphology II focuses on the study of the circulatory system and the respiratory, digestive, urinary and genital apparatuses, in addition to the endocrine glands. It is explained from the development of the different organs until its anatomy in the adult. The subjects of Morphology I, Structure and Function of the Nervous System and Physiology complement the contents of the structure and function of the set of apparatuses and systems of the body of the animal.

The formative objectives of the subject are:

- To understand the development of the circulatory system, the respiratory, digestive and urogenital apparatuses, and the endocrine glands, the basic concepts of the mechanisms that control their embryonic development as well as the etiology and the meaning of developmental anomalies.

- To understand the form, the macroscopic structure, the disposition and function of the organs that make up the circulatory system, the respiratory, digestive and urogenital apparatuses, and the endocrine glands, in the different species of veterinary interest.

- To understand the microscopic structure of the different organs that compose the circulatory system, the respiratory, digestive and urogenital systems, and the endocrine glands, in the different species of veterinary interest.

- To use the embryological, histological and anatomical terminology correctly and appropriately.

- To use embryological, anatomical and histological knowledge as a basis for the study of other preclinical and clinical subjects. This knowledge will form the basis for the correct understanding of physiology and pathology.

- To access and to use critically information sources on embryology, anatomy, and histology in an autonomously and adequately.

**Competences**

- Comunicar la informació obtinguda durant l'exercici professional de manera fluïda, oralment i per escrit, amb altres col·legues, autoritats i la societat en general.
- Demonstar knowledge and understanding of structural and functional disorders of the animal organism.
- Demonstar knowledge and understanding of the structure and functions of healthy animals.
- Work effectively in single or multidisciplinary teams and show respect, appreciation and sensitivity for the work of others.

**Learning Outcomes**

1. Communicate information obtained during professional exercise in a fluid manner, orally and in writing, with other colleagues, authorities and society in general.
2. Construct different animal organs by selecting and relating basic tissues.
3. Describe changes to tissue components of organs and relate them with the functionality of the organ.
4. Explain the basic concepts of the mechanisms that control the embryonic processes.
5. Explain the etiology and meaning of developmental anomalies.
6. Microscopically identify animal tissues and organs.
7. Recognise and explain the form, structure, layout and relationships of the organs, apparatus and systems of animals of veterinary interest.
8. Recognise and explain the origin and organisation of the structure of animals during their development.
9. Relate the composition and the structure of tissues with their functions.
10. Use anatomical and embryologic knowledge to solve problems of a veterinary nature.
11. Use the correct and suitable embryologic and anatomical terminology.
12. Work effectively in single or multidisciplinary teams and show respect, appreciation and sensitivity for the work of others.

Content

The theoretical and practical contents are detailed below:

Circulatory System


• Adult heart. Pericardium. The microscopic structure of the heart: fibrous and membranous structures, myocardium. Cardiac morphology. Compartments, openings, and valves. Relationships of the heart inside the thorax. Microscopic structure.

• Vascularization and innervation of the heart. Conducting autonomic system of the heart.


• Lymphatic organs. Nodules and lymphatic vessels. Lymphatic centers. Thoracic duct, spleen, and thymus: development, morphology and microscopic structure; Comparative anatomy.

General splanchnology


• Vascularization of the head. Lymphatic centers. Motor and sensory innervation of the head.

Endocrine glands

• Hypophysis: morphology, microscopic structure, anatomical relationships; vascularization and innervation.

• Thyroid and parathyroid: morphology, microscopic structure, anatomical relationships; vascularization and innervation.
• Adrenal glands: development, morphology, microscopic structure, anatomical relationships; vascularization and innervation. Other endocrine tissues.

Respiratory apparatus


Digestive tract


• Oral cavity. Lips, gums, hard palate, and soft palate. Microscopic structure. Intrinsic and extrinsic muscles of the tongue; vascularization and innervation.

• Salivary glands. Classification, morphology, microscopic structure and anatomical relationships. Vascularization and innervation. Comparative anatomy.
• Pharynx. Parts, microscopic structure, anatomical relationships, vascularization, and innervation. Tonsils and other lymphoid formations.

• Derivatives of the caudal portion of the anterior primitive intestine. Esophagus: development, microscopic structure, parts, relationships, vascularization and innervation, comparative anatomy. Abdominal cavity. Peritoneum: development, microscopic structure and disposition; greater omentum and minor omentum, omental bursa and omental orifice.

• The stomach of ruminants. Development, morphology, microscopic structure and anatomical relationships. Vascularization and innervation.


• Large intestine: cecum, colon, and rectum. Morphology, microscopic structure, and
• Vascularization, lymphocenters and intestinal innervation. Comparative anatomy.

Urogenital apparatus


• Development of the gonads and genital ducts. Undifferentiated period and evolution in the male and female. Congenital malformations.


• Mammary glands: development and comparative anatomy. Description of the breast of the cow: morphology and microscopic structure. Vascularization and innervation.

Birds

• Anatomy of birds. Comparative osteology. Organs of the body cavity. Microscopic structure

Methodology

Throughout this course the teaching methodology will follow a semi-face-to-face format. The methodology used during the teaching and learning process is based on the student efficiency analysing the information that our team made available through different means. The main role of the teacher is to help the student, not only giving information, but also directing and supervising the learning process. The course is based on the following activities:
Masterclasses: The student acquires the scientific knowledge of the discipline. The student must complete this knowledge with the personal and autonomous study of the topics explained. Classes will be taught in a non-face-to-face format. For the resolution of doubts the "Campus Virtual" Forum will be used. In addition, synchronous sessions will be held using the Teams application on scheduled dates and times.

Practical sessions: Practical sessions approach the theoretical models to reality and reinforce, complete and allow applying the knowledge acquired in masterclasses. At the beginning of the course, the student will receive a practical guide describing the contents studied in each session. In practical sessions, the students grouped in small groups will study dissections, bones, preparations of isolated organs, models, x-rays, histological preparations, etc. Throughout the observation of these specimens, the student will acquire a three-dimensional concept of the structural disposition, required to understand, for example, the relationships among the different organs inside the body cavities, or the distribution of vessels and nerves. In practical sessions, the student will also develop manual dexterity and skills, such as curiosity and observation.

Throughout this course, practical activities will be developed following a mixed face-to-face / non-face-to-face learning model. Laboratorial sessions will be carried out in the dissection and microscope rooms. Several synchronous virtual sessions will be carried out through the Teams application on scheduled dates and times. For the resolution of doubts the "Campus Virtual" Forum will be used.

The student's learning will be monitored through different evaluative tests in continuous assessment that will take place in the dissection room. These tests will evaluate the understanding of practical sessions and the integration of theoretical contents acquired in master classes.

The materials used in the subject will be available on the Moodle platform.

The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Activities

<table>
<thead>
<tr>
<th>Title</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Directed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratorial sessions. A mixed face-to-face / non-face-to-face model will be used</td>
<td>78</td>
<td>3.12</td>
<td>1, 3, 6, 8, 7, 12, 11</td>
</tr>
<tr>
<td>Master classes. In non-face-to-face format</td>
<td>38</td>
<td>1.52</td>
<td>2, 3, 4, 5, 6, 8, 7, 9, 10, 11</td>
</tr>
<tr>
<td>Type: Supervised</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation of the subject</td>
<td>1</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Type: Autonomous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomous learning</td>
<td>103</td>
<td>4.12</td>
<td>2, 4, 6, 8, 7, 9, 12, 10, 11</td>
</tr>
</tbody>
</table>

Assessment

Continuous evaluation of the practices (Controls):
- Attendance at practical sessions will be controlled.
- There will be 3 controls or evaluation tests about Anatomy throughout the semester.
- The realization of these controls is mandatory.
- The marks obtained in these tests will represent 15% of the final grade of the subject.

Practical exams: The Anatomy practical exam will be performed in the dissection room, on the specimens used during the practical sessions (bones, isolated organs and viscera, dissected corpse). This practical exams will represent 35% of the final grade of the subject.

- The fluid, orderly and reasoned exposure of the answers will be positively valued.
- A minimum score of 4.5 points out of 10 will be needed to average with the rest of the grades and pass the course

The Histology practical exam will be held in the Microscope Room. It will consist of the identification of structures, cell types, and tissues of the different organs studied, shown in images.

- This exam will be 10% of the final grade of the subject. A minimum score of 4.5 points out of 10 is required to average with the rest of the marks and pass the course.

Written exam: The written exam will allow evaluating the integration of the theoretical knowledge with those acquired in the practical sessions, and the ability to analyze and relate concepts.

- This exam will worth 35% of the final grade of the subject.
- A minimum score of 4.5 points out of 10 is required to average with the rest of the marks and pass the course.

Students who do not pass any of the practical or written exams will have the opportunity to retrieve them during the exam recovery period at the end of the semester. Controls along the course on dissection are not recoverable.

Non-evaluable students: The student who has not been made any exam, including theoretical or practical ones, will be considered as Non-evaluable. The student who made one exam but not further exams will be considered Failed.

Student’s assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

### Assessment Activities

<table>
<thead>
<tr>
<th>Title</th>
<th>Weighting</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual controls along the course on dissection</td>
<td>15%</td>
<td>1</td>
<td>0.04</td>
<td>6, 7, 12, 11</td>
</tr>
<tr>
<td>Practical exam in the dissection room</td>
<td>35%</td>
<td>1</td>
<td>0.04</td>
<td>1, 7, 11</td>
</tr>
<tr>
<td>Practical exam in the microscopy room</td>
<td>10%</td>
<td>1</td>
<td>0.04</td>
<td>2, 3, 6, 9</td>
</tr>
<tr>
<td>Written exam</td>
<td>35%</td>
<td>2</td>
<td>0.08</td>
<td>2, 3, 4, 5, 6, 8, 7, 9, 10, 11</td>
</tr>
</tbody>
</table>

### Bibliography
Textbooks of Anatomy


Textbooks of Embryology


Textbooks of Histology


Atlas of Anatomy


Atlas of Histology


Cd's of Histology

- Digital Microscopy Lab (DML): Histologia Bàsica i Organografia Microscòpica (Natura-Project)

- Weather's Functional Histology, 4ª Ed. (B. Young i J.H. Heath)

- Texto Atlas de Histologia, 2ª Ed., (L.P. Gartner i J.L. Hiatt)

- Color Textbook of Histology 3ª Ed. (Gartner L.P. y Hiatt J.L. Saunders/Elsevier Ed.

- El microscopi virtual a Histología sobre bases biomoleculares, (Genesser)

- Di Fiore's Atlas of Histology, 12ª Ed. (V.P. Eroschenko, Lippincott Williams & Wilkins)

Links to webs of Anatomy


- Web de neuroanatomia: www.neuroanatomyofthedog.com


Links to webs of Histology


- http://zyx.freeservers.com/histo/histo.htm. Histology World It is a website where you can find all kinds of information related to Histology: books, journals, publications, collections, laboratories, etc. as well as links to all other websites.
