



Universitat de Lleida

# DEGREE CURRICULUM **ANIMAL ANATOMY II**

Coordination: GASSO GARCIA, DIANA

Academic year 2022-23

## Subject's general information

Subject name	ANIMAL ANATOMY II				
Code	100303				
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION				
Typology					
	Degree		Course	Typology	Modality
	Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production		1	COMMON	Attendance-based
Course number of credits (ECTS)	6				
Type of activity, credits, and groups	Activity type	PRACAMP	PRALAB	PRAULA	TEORIA
	Number of credits	0.4	1.2	1.2	3.2
	Number of groups	1	6	2	1
Coordination	GASSO GARCIA, DIANA				
Department	CIÈNCIA ANIMAL				
Teaching load distribution between lectures and independent student work	60 face-to-face hours 90 non-contact hours				
Important information on data processing	Consult <a href="#">this link</a> for more information.				
Language	Catalan / Spanish				
Distribution of credits	Theory: 3.2 Practices: 2.8				

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GASSO GARCIA, DIANA	diana.gasso@udl.cat	13,2	

## Subject's extra information

**This information is provided as a guide to assist students in engaging appropriately with the course requirements.**

Teaching and/or evaluation changes for all activities can be introduced according to COVID situation.

For laboratory practical classes ("PRALAB") students must wear required PPE (Personal Protective Equipment). Students with a negative attitude or not properly equipped will be excluded from the activity. Protective material is not supplied by the University. It is also compulsory that students are up-to-date with their tetanus booster. For disabled students, we recommend to contact professor prior to the start of the course in order to discuss needs and how we might be able to support them in their studies. Some outdoor practices will be organized ("PRACAMP").

All students have an UdL email account for all this related communication and will be held responsible for checking emails regularly. Unprofessionally written emails that do not follow the requirement above will NOT be answered. All email communication with course instructor must be carried out in a professional manner.

**Ultimate version is this English version.**

## Learning objectives

Anatomy II is a basic subject of the first year of the Degree that contributes to the student knowing the structure, organization and function of the organs, apparatus and systems that make up the animal organism. Specifically, it focuses on the study of locomotor, circulatory, respiratory, digestive, urinary and endocrine gland apparatus and systems, including everything from the development of the different organs to their anatomy in the adult animal.

This subject will allow the location of any organ of an animal, to be able to correlate any reaction from a precise anatomical area to a precise organ, choose the sites of auscultation, palpation, percussion, also choose precise places of diagnostic or therapeutic intervention and carry out any medical performance, in short, knowing how to use embryological, anatomical and histological knowledge as a basis for the study of other preclinical and clinical subjects. Understand the shape, structure, disposition and function of the organs that make up the apparatus and systems of animals in the different species of veterinary interest in a micro and macroscopic way. Use terminology correctly and appropriately. And finally, access and use autonomously and appropriately the sources of embryological, anatomical and histological information.

In practical classes students will develop skills in dissection and learn to appreciate variation in structure due to species, age, and sex.

## Competences

### **Competences of the degree of VETERINARY**

#### **Basic skills**

- CB1 Possess and understand knowledge in an area of study that is based on general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study

- CB2 Apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.
- CB3 Ability to gather and interpret relevant data (normally within their area of study) to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature.
- CB4 Being able to transmit information, ideas, problems and solutions to both a specialized and non-specialized audience)
- CB5 Know how to develop those learning skills necessary to undertake further studies with a high degree of autonomy.

## **Transversal skills**

CT 1-5

## **General skills**

- CG2 Prevention, diagnosis and individual or collective treatment, as well as the fight against animal diseases, whether considered individually or in groups, particularly zoonoses.
- CG6 Development of professional practice with respect to other health professionals, acquiring skills related to teamwork, the efficient use of resources and quality management.

## **Specific skills**

- CE4 Know the structure of the eukaryotic cell, its organization, topography, and its structure in tissues, organs, and systems, as well as identify the functioning and regulation of body apparatus and systems.
- CE6 Identify and know the ontogenic development, congenital anomalies and applications of embryology.

## **Competences of the degree of SCIENCE AND ANIMAL PRODUCTION**

### **Basic skills**

- CB1: Possess and understand knowledge in an area of study that is based on general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from at the forefront of their field of study
- CB2: Apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.
- CB3: Ability to gather and interpret relevant data (normally within their area of study) to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature.
- CB4: Being able to transmit information, ideas, problems and solutions to both a specialized and non-specialized audience)
- CB5: Know how to develop those learning skills necessary to undertake further studies with a high degree of autonomy.
- CB7 Recognize the structure and function of healthy animals.

### **Transversal skills**

CT 1-12 CT14

### **General skills**

- CG1 Identify animals and animal products, as well as their importance in society and in the food chain.
- CG2 Use the knowledge of the basic sciences (biology, physics, biochemistry, physiology, mathematics, statistics, economics,...) to understand animal processes and their implication in the agro-livestock system.
- CG3 Analyze the strategies of animal production as a whole (facilities, behavior, welfare, nutrition, improvement, production, reproduction, environment, economy, marketing and product quality) with the aim of optimizing production.

## Specific skills

- CE2 Describe the structure and function of healthy animals and be able to recognize the different tissues, organs, apparatus and systems of animals. Describe the fundamentals of the main physiological processes and understand their role in the production process, as well as anticipate and evaluate their effects on the final product.

## Subject contents

Skull. Osteology. Comparative anatomy. Clinical considerations. Jaw. hyoid apparatus. Temporomandibular joint and chewing muscles. Functional and comparative aspects. Facial myology. Oral cavity, tongue and palate.

### Musculoskeletal system

Generalities. Ontogenic and phylogenetic development of the musculoskeletal system. Arthrology. Classification and constituent elements of the joints. Joint biomechanics. Myology. Anatomical classification of muscles. Structural organization of skeletal muscles.

Axial myology, neck, back, tail, thorax, abdomen and head. Ontogenic development of the spine. Congenital anomalies. Vertebral column joints. Ligaments. Medial and lateral muscles. Tail muscles. Joints and muscles of the chest. Diaphragm: ontogeny, description and anatomical relationships. Biomechanics of breathing. Muscles and fasciae of the abdomen. Inguinal canal.

Thoracic member. Joints and muscles of the thoracic limb. Innervation. Surface anatomy: identification of limb regions and palpable bony points.

Pelvic limb. Joints and muscles of the pelvic limb. Limb biomechanics. Innervation. Surface anatomy: identification of limb regions and palpable bony points.

Digestive system. Generalities. Teeth. Developing. Morphology and microscopic structure. Classification. dental formulas. Comparative anatomy. Salivary glands. Classification, morphology, microscopic structure and anatomical relationships. Comparative anatomy. Pharynx. Parts, microscopic structure, anatomical relationships, vascularization and innervation. Tonsils and other lymphoid formations. Derived from the caudal portion of the anterior primitive gut. Esophagus: development, microscopic structure, parts, relations, vascularization and innervation, comparative anatomy. Abdominal cavity. Peritoneum: development, microscopic structure and arrangement; greater and lesser omentum, omental bursa, omental foramen. Single chamber stomach. Development, morphology, microscopic structure and anatomical relationships. Comparative anatomy. Stomach of ruminants. Development, morphology, microscopic structure and anatomical relationships. Liver. Development, morphology, microscopic structure, location and anatomical relationships. biliary tract. Functional and nourishing blood vascularization. lymphocenters. Comparative anatomy. Pancreas. Development, morphology, microscopic structure, location and anatomical relationships. pancreatic pathways. Comparative anatomy. Congenital anomalies of the intestine. Small intestine: duodenum, jejunum and ileum. Morphology, microscopic structure and anatomical relationships. Comparative anatomy. Large intestine: cecum, colon and rectum. Morphology, microscopic structure and anatomical relationships. Comparative anatomy. Anal canal and paranal sacs. Comparative anatomy.

Respiratory system. Generalities. Development of the caudal portion of the anterior primitive intestine: tracheobronchial sketch. Nostrils. Vomeronasal organ. Paranasal sinus. Comparative anatomy. Nasopharynx. Haringo-tympanic tube and guttural bags. Larynx microscopic structure. Cartilage, ligaments and muscles. laryngeal cavity. microscopic structure. Biomechanics of phonation. Vascularization and innervation. Comparative anatomy. Windpipe. Lungs. Morphology and anatomical relationships. microscopic structure. Structural organization: bronchial tree and respiratory portion. bronchopulmonary segment. Comparative study. Functional and

nutritional vascularization of the lungs. lymph nodes and vessels. Innervation. Pleura. Mediastinum. Topography of the thoracic cavity.

Circulatory system. General features. Heart: ontogeny. Modifications at birth. congenital anomalies adult heart. Pericardium. Microscopic structure of the heart: fibrous and membranous structures, myocardium. cardiac morphology. Cavities, holes and valves. Relations of the heart within the thorax. microscopic structure. Vascularization and cardiac innervation. Autonomous driving system. Development of the intraembryonic circulatory system. Arterial and venous systems: aortic arches, dorsal aortas, cardinal, supracardinal and subcardinal veins. Circulatory changes at birth. congenital anomalies

Organs of the lymphatic system: lymph nodes and vessels. lymphocenters. Thoracic duct. Spleen and thymus: development, morphology and microscopic structure; Comparative anatomy. Lymphoid organs and endocrine glands. General concepts. Spleen, Tim, Endocrine, adrenal, thyroid and parathyroid glands. Development, macroscopic and microscopic structure, anatomical relationships and clinical considerations.

Urinary system: General considerations. Kidneys. Renal pelvis. Ureters. Urine buffet. Urethra. Development, macroscopic and microscopic structure, anatomical relationships and clinical considerations. Vascularization and innervation. Comparative anatomy. Differences between the sexes.

Integument: General considerations. Skin, hair, glands, pads, hoof, hooves, and claws. Development, macroscopic and microscopic structure, anatomical relationships and clinical considerations. Vascularization and innervation. Comparative anatomy.

In practical sessions, students should gain an appreciation for the normal structure, function, and relationships of clinically important anatomical structures using various domestic animals as anatomical models.

So hands-on anatomy learning involves dissecting various fresh animal species (or parts of them) including dogs, cats, rabbits, horses, ruminants, and pigs.

Lab coats/aprons and specific rubber footwear will be required

## Methodology

The teaching activity is structured in:

Theory sessions (master classes in large groups), seminars (in medium groups) and practices (in small groups).

Learning will be based on oral classes by the teacher, cooperative learning by students and practical dissections, which will be done in different species.

The student must work with the information that is made available to them by different means.

The content will be taught in sessions of two or three weekly theoretical hours. A rotation is established between theory and practice appropriate to the learning requirements of the students, as well as the logical evolution of the contents of the subject. To carry out the practices, it is the responsibility of the student to attend with the equipment (personal protection and work) required for each case, not allowing the presentation with clothing or other material that may represent a risk to people or animals.

Didactic material and links of interest will be offered to students throughout the course, which it is recommended that they read carefully to consolidate their learning and comprehension skills. New pedagogical resources that are considered interesting may be introduced throughout the course.

## Development plan

Theoretical classes: face-to-face

Practical classes: Dissection room, necropsy room, microscope room of the SHV building (SHV.2.02)

Classroom seminars: face-to-face

The calendar posted by the direction of studies will be strictly followed

## Evaluation

The evaluation of the competences will be based on a total of 10 points, distributed as follows:

1. 60% for two individual theoretical exams to be taken in class (each one will count 30% of the final grade). To pass the subject it is necessary to have at least a 5 out of 10 in both parts. If any of these exams is below this mark, the student will be able to recover that part on the date established for recovery.
2. 10% practice mark. At the end of each practice, the contents learned will be evaluated by means of a face-to-face or virtual written test by the campus. To be able to do this test it is necessary to have attended the practice. In case of not attending or not taking the test of a practice, said activity will have a 0. If a student misses more than two practices or does not take the exam of more than two activities, the global mark of the practices will be 0.
3. 30% for two practical exams. (15% first part + 15% second part). These two exams will be multiple choice and will be carried out in person. There will be no recovery of these exams.

These weighting coefficients for each part of the subject are public in the Teaching Guide and are only applicable in the calculation of the final grade. The final mark of the subject will be made public when the evaluation process of all the parts has concluded and will be the one that goes to the Minutes.

Minimum requirements to pass the subject: a minimum of 50% for each theoretical exam, separately. No minimum is established for the rest of the activities. In the event that a student wants to take a theoretical exam to raise a grade, the second grade will be taken into account, regardless of the one obtained in the previous one that it replaces.

The notes will be from 1 to 10, with a decimal.

Students who do not carry out a specific activity will be considered as "not evaluated" for the activity in question, obtaining a score of 0. Attendance at a practice or seminar in the group that does not correspond, without prior authorization by the teacher, will be penalized with 0.25 points on the final total. Likewise, late arrival at a face-to-face exam will be penalized with 0.25 of the final total of that exam.

Review system: the review of the notes for each test will be carried out individually by the teacher, who will previously communicate the date. The rest of the tutorials (that is, the visits of the student not related to the exam notes) must be requested via email to the professor involved in the part to be reviewed.

Minimum grade to pass the course: the student will pass the course if they obtain a global mark (that is, with all the marks added) equal to or greater than 5 out of 10, as long as they have passed with a minimum of 5 each of the two Separate theory exams.

## Bibliography

1. Singh, B. (2018). *Dyce, Sack, and Wensing's textbook of veterinary anatomy*, 5<sup>th</sup> ed. St. Louis, Missouri: Saunders.
2. Evans, H. and deLahunta, A. (2016). *Guide to the Dissection of the Dog*, 8<sup>th</sup> ed. St. Louis: W.B. Saunders Company.
3. König, H. E. and Liebich, H. G. (2005). *Anatomía de los animales domésticos*, 5<sup>th</sup> ed. Tomo 1: Aparato Locomotor. Ed. Médica Panamericana.
4. Climent, S., Sarasa, M., Muniesa, P., Terrado, J. and Climent, M. (2013). *Embriología y anatomía veterinaria*

(Vol. I y II). Zaragoza: Acribia.

5. Hermanson, J. W., and DeLahunta, A., (2020). *Miller and Evans' anatomy of the dog*, 5<sup>th</sup> ed, St. Louis, MO: Elsevier.

6. Gil, J., Gimeno, M., Laborda, J. and Nuviala, J. (2012). *Anatomía del perro: protocolos de disección*. 3<sup>th</sup>ed, Zaragoza: Grupo Asis.

7. Nomina Anatomica Veterinaria (NAV). 6<sup>th</sup> revised edition. 2017.

- Músculos de los miembros del perro. Atlas virtual [http://videosdigitals.uab.es/cr-vet/www/102679/atlas/Atlas\\_virtual/musculos\\_texto.htm](http://videosdigitals.uab.es/cr-vet/www/102679/atlas/Atlas_virtual/musculos_texto.htm)
- Músculos del perro: Cuello, tronco y cola. Atlas virtual [http://videosdigitals.uab.es/cr-vet/www/21197/AMCTC/atlas\\_virtual/primer.html](http://videosdigitals.uab.es/cr-vet/www/21197/AMCTC/atlas_virtual/primer.html)
- Inervación y vascularización de los miembros del perro. Atlas virtual <http://videosdigitals.uab.es/cr-vet/www/102679/AIVM/inicio.html>
- Iowa State University interactive horse limb anatomy <http://apps.cvm.iastate.edu/limbanatomy/horse.html>
- Virtual Radiography of the Horse <http://www.3d-it.vet.ed.ac.uk/xrayhandbook/webpages/horse.html>
- The Merck Veterinary Manual <https://www.msdvetmanual.com>