Universitat de Lleida

DEGREE CURRICULUM

ANIMAL ANATOMY II

Coordination: GARCIA ISPIERTO, IRINA

Academic year 2021-22

ANIMAL ANATOMY II 2021-22

Subject's general information

Subject name	ANIMAL ANATOMY II
Code	100303
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION
Typology	

Degree	Course	Character	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	GARCIA ISPIERTO, IRINA
Department	ANIMAL HUSBANDRY
Teaching load distribution between lectures and independent student work	60 face-to-face hours 90 non-contact hours
Important information on data processing	Consult this link for more information.
Language	English
Distribution of credits	Theory: 3.2 Practices: 2.8

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BENITO SEUMA, XAVIER	xavier.benito@udl.cat	,8	
GARCIA ISPIERTO, IRINA	irina.garcia@udl.cat	,4	
GASSO GARCIA, DIANA	diana.gasso@udl.cat	0	
GRACIA GIL, ALBA MARIA	alba.gracia@udl.cat	5	
MARTIN ALONSO, MARIA JOSE	mariajose.martin@udl.cat	1,1	
PALACIN CHAURI, ROGER JOAN	roger.palacin@udl.cat	4,8	
RAMÍREZ RIVERO, GUSTAVO ADOLFO	gustavo.ramirez@udl.cat	,7	
SERRANO PÉREZ, BEATRIZ	beatriz.serrano@udl.cat	,4	

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 equiped 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. Unrofessionally 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

The aim of the this course is to teach Animal Anatomy to future bachelors. Learning anatomy allows the student to fill the requirements of the professional medical and production animal actuations.

The course will introduce anatomical and physiological terminology and principles using a body systems approach in a comparative context, with an emphasis on **domestic ungulates, although other domestic species will be covered**. In practical classes students will develop skills in dissection and learn to recognize macroscopical structures and appreciate variation in structure due to species, and sometimes to 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

(chronological teaching order may be changed; each item does not necessarily correspond to a weekly session)

Unit 1. A review of topographical terms (sectional, directional, positional). External regions. Appendicular and axial parts. The value of *Nomina Anatomia Veterinaria*.

Unit 2. Angiology (I)

Item 2.1. Foetal intra-circulatory system and modifications to birth. Venous and arterial systems.

Item 2.2. Heart: development, morphology and structure. Blood flow and cardiac innervation. Anatomic differences between species.

Item 2.3. Pulmonary and systemic circulation.

Item 2.4. Veins. Cava veins and main tributaries branches. Veins of clinical interest. Portal systems.

Item 2.5. Arteries. Brachyocephalic trunk and aorta and main branches. Palpable arteries. Celiac trunk.

Singularities of encephalic irrigation.

Unit 3. Angiology (II)

Item 3.1. Lymph nodes and lymphatic vessels. The "inverted pattern" of swine. Thoracic duct. Lymphocentres and lymphonodes. Areas of drainage.

Item 3.2. Spleen and thymus: morphology and structure.

Unit 4. Splanchnology (I): digestive system.

Item 4.1. Generalities. Muscles of mastication. Functional and comparative aspects. Oral cavity. Lips. Gums. Hard and soft palates. Tongue: intrinsic and extrinsic muscles; blood supply and innervation.

Item 4.2. Salivary glands. Innervation. Pharynx. Tonsils.

Item 4.3. Oesophagus: structure, relationships, blood supply and innervation. Abdominal cavity. Peritoneum: structure and layout; greater and lesser omenta. Omental bag.

Item 4.4. Single-chambered stomachs. Differences between species.

Item 4.5. Multi-chambered stomachs. Differences between species. Post-birth development.

Item 4.6. Small and large intestines. Blood supply & drainage and intestinal lymphocentres.

Unit 5. Splanchnology (II): respiratory system

Item 5.1. Nasal fossae. Vomeronasal organ. Nasal sinuses. Nasopharynx. Guttural pouches.

Item 5.2. Larynx. Cartilages and muscles. Laryngeal cavity. Biomechanics of phonation. Innervation.

Item 5.3. Trachea. Lungs. Morphology and anatomical relations. Structural organization: bronchial tree and respiratory portion. Bronchopulmonary segment. Differences between species.

Unit 6. Splanchnology (III): urinary tract and udder

Item 6.1. Development of the urinary tract. Round ligaments.

Item 6.2. Kidneys: morphology, situation. Renal pelvis. Blood supply and innervation. Ureters: urine, bladder and urethra. Male and female urinary tract. Adrenal glands.

Item 6.3. Udder. Differences between species. Lymphatic drainage.

Unit 7. Cranial skeletum

Item 7.1. Neurocranium and splanchnocranium. Anatomical parts. Differences between species.

Item 7.2. Main foramina of clinical interest. Cranial nerves.

Item 7.3. Teeth. Morphology and structure. Topography. Brachydont and hypsodont teeth. Dental formulas for all species. Triadan system. Dental chronology.

Unit 8. Myology

Item 8.1. Anatomical classification of muscles. Structural organization of the skeletal muscles. Points of origin and insertion. Mechanical movements. General principles of arthrology. Spinal nerves.

Item 8.2. Thoracic Member: biomechanics. Muscles. Blood supply. Lymphocentres. Brachial plexus. Innervation areas. Surface anatomy: identification of the regions of the member and palpable bone points.

Item 8.3. Neck, back, chest and abdomen: epiaxial and hypoaxial muscles. Joints and muscles of the thorax. The diaphragm; Biomechanics of the breath. Fascias and muscles of the abdomen. The inguinal canal. Muscles of the tail. Blood supply of the neck, trunk and tail. Lymphocentres. Innervation.

Item 8.4. Pelvic Member: bomechanics. Muscles. Blood supply. Lymphocentres. Lumbosacral plexus. Innervation areas. Surface anatomy: identification of the regions of the member and palpable bone points.

Item 8.5. Digital flexor and extensor muscles. Distal tendons and ligaments.

Unit 9. Endocrinology

Item 9.1 Thyroid and parathyroid glands. Differences between species.

Item 9.2 Liver. Hepatic portal system. Gall bladder. Pancreas. Exocrine ducts.

Unit 10. Integuments

Item 10.1 Skin, subcutaneous layer, hair, skin glands.

Item 10.2 Corneal formations: *unguicula, unguis, ungula*. "Chestnuts", "spurs". Paradigita. Horns.

Item 10.3 Hooves.Surface anatomy: identification of the regions and palpable bone and soft points.

In practices, students are expected to integrate acquired knowledge and skills taught during the theory lessons and to be able to translate written instructions to active application (i.e. dissection), develop and improve their communication skills with their colleagues, develop a competency to utilize basic tools, and develop a competency of self-study and application of knowledge. Practices will be delivered as 1 x 2 hours practical per week with small groups (8 to 15 students, depending on each activity and safety requirements). Differential diagnosis and, when necessary, paradigms, will be introduced in each session.

In practices, students should gain appreciation for normal structure, function and relationships of clinically important anatomic structures. This practical anatomy training will involve dissecting several fresh corpses (or part of them). Laboratory coats/jackets and rubber-based, closed-toe shoes/sneakers will be required for each activity dealing with animals and/or visceras. Appropriate boots and clothing is also required in the anatomy and necropsy laboratories. It is mandatory to wear work boots and coveralls/scrubs during outdoor sessions dealing with large farm-type animals. No student will be permitted to attend the laboratory without this required attire as it presents a safety hazard. Photography and/or video recordings of animals or procedures during practices, are strictly prohibited.

The number of practical session will vary according to number of weeks, but they will include always:

1. Body terminology and principles of animal dissection; personal security; ethical principles
2. Skull, mandible and hyoid bones: gross anatomy, differences between species; dental chronology; main head muscles
3. Angiology: vessels (arteries, veins and thoracic duct); superficial lymphocentres
4. Splanchnology (I): heart: gross anatomy, differences between species
5. Splanchnology (II): monocavitarian gastro-intestinal system: gross anatomy, differences between species; liver: gross anatomy, differences between species; pancreas
6. Splanchnology (III): polycavitarian gastro-intestinal system; liver: gross anatomy, differences between species; kidneys and adrenal glands: gross anatomy, differences between species
7. Splanchnology (IV): upper and lower respiratory system; tongue; pharynx and larynx; thyroid and parathyrod glands: gross anatomy, differences between species; cervical nerves
8. Miology (I): cervical, shoulder and forelimb muscles
9. Miology (II): body, hip and hindlimb muscles
10. Limbs: terminology; digital extensor and flexor tendons; the hoof.

This course is focused mainly on domestic ungulates, although companion animals and rabbits are also included. No topics on birds will be done.

At present, no animals are sacrificed for core anatomy training of students. Animal Anatomy II teaching has moved away from conventional protocols in the use of euthanasied animals to alternative ones. We have

implemented client and farm (natural decesaes and culling) donations and use of offal material from abattoirs. There can be occasional training classes in which animals destined for euthanasia for other purposes (not related to the course) can be used.

Methodology

Teaching will based on oral lectures, seminars and practical dissection classes. The course will be held in weekly theory sessions (although some changes can be done). Non scheduled classes and practices as well as alternative pedagogical resources can be introduced during the course according to COVID-19 situation. Virtual activites, if done, will be shown only once during programmed session. It is totally forbidden the registering or unauthorized downloading of teaching activities.

Veterinary medicine and Animal Production Science are professions in which you will be judged by your appearance and attitude. Failure to adhere to appropriate attitude codes can seriously affect your grade. Actions such as inappropriate language, mistreating animals , or corpsesand bullying fellow students, cheating on exams, and graffiti, will not be tolerated.

I apply to learn to reflect a high degree of professionalism displayed in the classroom and lab, and during off-campus activities.

Development plan

El programa detallado se detallará al comienzo del semestre. Se pueden introducir cambios durante el curso según la situación del COVID-19.

El trabajo exitoso en Animal Anatomy II depende de la asistencia regular a clase. Se alienta a todos los estudiantes a asistir a clases ya participar en las actividades. La asistencia es obligatoria para todos los alumnos a los laboratorios y seminarios. Las ausencias excesivas pueden tener un impacto negativo en la evaluación del desempeño de un estudiante. A los estudiantes en los programas experimentales se les puede permitir abandonar los sitios de vez en cuando cuando regresan a la universidad para eventos especiales, con la aprobación del Coordinador supervisor de Anatomía Animal II.

Las llegadas tarde, las ausencias injustificadas, la salida anticipada, la interrupción de la clase, el EPP (equipo de protección personal) inadecuado cuando sea necesario y/o una mala actitud pueden afectar la nota final.

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

Some interesting proposed books are:

1. Dyce, KM, W.O. Sack, C.J.G. Wensing. (2018). Textbook of Veterinary Anatomy, 5th ed. W.B Saunders Company.

2. Evans, H., A. deLahunta. (2017). Guide to the Dissection of the Dog, 8th ed. St. Louis: W.B. Saunders Company.

3. König and Liebich (2004). Anatomía de los animales domésticos. Tomo 1: Aparato Locomotor. Ed. Médica Panamericana.

4. Nickel, R., Schummer, A., Seiferle, E. The Anatomy of the Domestic Animals (vols. 1-5). Verlag Paul Parey.

5. Schaller (1996). Nomenclatura anatómica veterinaria ilustrada. Ed. Acribia S.A., Zaragoza.

6. Evans, H., A. deLahunta. (2013). Miller's Anatomy of the Dog, 4th ed. W.B. Saunders.

7. Studdert, V.P., C.C. Gay, D.C. Blood. (2012). Saunders Comprehensive Veterinary Dictionary, 4th ed. W.B Saunders.

Some virtual proposed sources are:

- Músculos de los miembros del perro. Atlas virtual
- 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/primera.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://vetmed.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/

Other sources will be proposed during the course. Nomina Anatomica Veterinaria and Goody's horse atlas can be uploaded as PDF files at the beginning of the course. They will serve as "work guides" for most of activities.