Universitat de Lleida

DEGREE CURRICULUM

ANIMAL ANATOMY II

Coordination: LÓPEZ HELGUERA, IRENE

Academic year 2021-22

2021-22

Subject's general information

Subject name	ANIMAL ANATOMY II
Code	100303
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION
Typology	Degree: Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production; Course: 1; Character: COMMON; Modality: Attendance-based
Course number of credits (ECTS)	6
Type of activity, credits, and groups	
Coordination	LÓPEZ HELGUERA, IRENE
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

Activity type	PRACAMP	PRALAB	PRAULA	TEORIA
Number of credits	0.4	1.2	1.2	3.2
Number of groups	1	6	2	1

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
PROFESSOR PENDENT ASSIGNAR		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 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

General skills: strategic outcomes of the University of Lleida:

1. Command of a foreign language.

2. Respect for and development of human rights, democratic principles, the principles of equality between genders, and the values of a culture of peace and other democratic values.

Transversal skills of the degree:

1. Interpret studies, reports, data and analyze them numerically.

2. Work alone and in multidisciplinary teams.

3. Understand and express themselves with the proper terminology.

4. Discuss and argue in various debates.

5. Analyze and evaluate the social and ethical implications of the professional activity.

6. Have a critical and innovative spirit.

Specific competences: the course places a high priority on approaches to learning and teaching that enhance the student experience.

1	Describe the gross anatomical structures of the body systems covered in domestic species.
2	Describe normal anatomical functions of vertebrates with an emphasis on domestic species.
3	Demonstrate practical dissection skills.
4	Describe the anatomy processes of domestic species using proper terminology.

5 Apply theoretical knowledge of anatomy to clinical and productive scenarios.

6 Demonstrate interpersonal and communication skills and ability to work within a team.

7 Apply the scientific method and critical thinking as it relates to body system structure and function

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

Detaile programm will be detailed at the beginning of the semester. Changes can be introducedduring the course according to COVID-19 situation.

Successful work in Animal Anatomy II is dependent upon regular class attendance. All students are encouraged to attend classes and to participate in activities. Attendance is mandatory for all students in laboratories and seminars. Excessive absences may impact negatively on the evaluation of a student's performance. Students in the experiential programs may be permitted to leave the sites from time to time when returning to the college for special events, upon the approval of the supervising Animal Anatomy II Coordinator.

Tardiness, unexcused absences, leaving early, disrupting the class, improper PPE (personal protective equipment) when necessary, and/or a poor attitude can affect the final mark.

Evaluation

Competences achieved will be assessed on a total of 10 points base on 7 tests, exams. Their weighting is:

1. 60% for 3 individual theoretical exams at classroom or virtual, according to COVID situation (30, 15% and 15%, respectively); individually selective
2. 10% for 3 short individual online exams ratings at home; these are known as "continuous evaluation" CE; CEs are not selective
3. 30% for 1 practical exam (individual, on line); not selective.

Marks are to the 1st decimal on a 10 scala.

About online exams: they will be based on multi-optional answers and will take place in English, with a penalty for each erroneous answer.

Minimum requirements: a minimum of 50% for each of 3 theoretical exams **separately (mark is summative)**. No minimum requirements exist for the rest of test and activities.There will be tests of recovery only for those theoretical exams. In the case of students who choose to change the mark of a theoretical exam by doing the recovery one, it will take into account their second mark, not the first one. Theu must apply for it by email to the professor previously (at least 24h in advance).

Students who do not make a proof will be considered as "not evaluated", obtaining a 0 for the corresponding activity. The assistance to a practice or seminar to the non-appropriate group (without having previously requested the authorization to the professor) will have a penalty of 0.25 over the final mark of 10. Similarly, the unjustified delay in a presential exam will be penalized with a 0.25 of the final mark.

System review: the revision of the score of the exam will be done individually with the professor, who will propose a data previously. Students must confirm individually (day and hour) in advance their interest for reviewing. The rest of tutorials (those not related to exams) must be requested by email to the Professor. In any case, personal tutorials will constitue private classes.

Minimum mark for the course: students will approve the course with a total mark (added partial marks) equal or greater than 5.0 of 10 (with the minimum of 50% for theoretical exams separately, as stated prevously).

Final mark: fail, pass, outstanding, excellent, MH (maximum 5% over the total number of students enrolled), according to University scheme.

Students are reminded that in order to maintain the academic integrity, we have a zero-tolerance approach to students offering money or significant value goods or service. Students offering anything will be totally unacceptable, in any circumstances.

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.