

## 28405 - Embryology and Anatomy I

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28405 - Embryology and Anatomy I

**Faculty / School:** 105 - Facultad de Veterinaria

**Degree:** 451 - Degree in Veterinary Science

**ECTS:** 7.0

**Year:** 1

**Semester:** First semester

**Subject type:** Basic Education

**Module:**

### 1. General information

The main objective of this subject, together with Embryology and Anatomy II of the second semester of the first year, is to provide basic training in the knowledge of the anatomical structure and embryonic development of domestic animals.

This goal is aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>): Goal 2: Zero Hunger; Goal 3: Health and Wellness; Goal 4: Quality Education; Goal 8: Decent Work and Economic Growth; Goal 9: Industry, Innovation and infrastructure; Goal 11: Sustainable Cities and Communities; Goal 12: Responsible Production and Consumption; Goal 15: Life of terrestrial ecosystems.

### 2. Learning results

The subject, together with Embryology and Anatomy II, provides the basic knowledge of embryology and anatomy of domestic animals, which allows the acquisition of the following competences contemplated in the Veterinary Degree Memory: "FB05-Morphology, topography and structure of organs and systems", "FB07-Functioning and regulation of the body apparatus and systems" and in "FB09-Ontogenetic development, congenital anomalies and applications of embryology".

In particular, in this subject the student will acquire knowledge of:

- 1- General embryology
- 2- Anatomy of the locomotor system

This subject will also serve as a support for the acquisition and exercise of information competencies (IC), through the virtual course BASIC DIGITAL COMPETENCE: LEARN TO INFORM, CREATE AND COMMUNICATE DIGITALLY (basic level).

### 3. Syllabus

Theoretical classes:

- 1 INTRODUCTION. Concept, object and content of Veterinary Anatomy. Division of anatomy and study techniques. Organs, apparatus and systems. GENERAL EMBRYOLOGY. Concept, object and content of Veterinary Embryology. Stages of prenatal development: germinal, embryonic and foetal periods.
- 2 Gametogenesis. General concepts. Spermatogenesis: phases. Multiplication, maturation, transformation and release of spermatozoa. Comparative spermatozoa morphology and abnormal forms. Oogenesis: phases. Types of eggs. Bird's egg.
- 3 Fertilization. Main phenomena and consequences of fertilization. Polyspermia. Parthenogenesis. Fertilization in birds. Segmentation, morulation and blastulation in mammals and birds. Hatching of the blastocyst
- 4 Gastrulation in mammals and birds. Embryonic or organogenetic period. Germinative leaf derivatives: ectoblast, mesoblast and endoblast. Neurulation and formation of anlagen or primary organs. Appearance of the body shape.
- 5 Introduction to the development and constitution of the Central and Peripheral Nervous Systems.
- 6 Cardiovascular system. Development of the heart and vascular system. Description of foetal circulation and modifications occurring at birth. Congenital malformations
- 7 Splacnology. General concepts. Anterior, middle and posterior intestine. Pharyngeal derivatives: pharyngeal pouches. Gill slits
- 8 Visceral arches. Development of the tongue and thyroid gland. Development and formation of the lungs and pleurae. Congenital malformations

9 Respiratory system. Development of the skull and face. Development of the palate and formation of the oral and nasal cavities. Congenital malformations.

10 Concepts and mechanisms of development: differentiation, growth, cell emigration, morphogenetic movements, adhesiveness and cell affinity. Cell death.

11 Genetic control and regulation of embryonic development. Transgenesis. In vitro fertilization. Embryo transfer. Blastocyst manipulation. Cloning.

12 Nesting or implantation. Embryonic appendages: vitelline vesicle, amnion, allantois and chorion. Embryonic and extraembryonic blood circulation.

13 Placentation. Anatomical and histological classification of placentas. Deciduous and adeciduous placentas. Umbilical cord and chorionic sac. Evolution and characteristics of the chorionic sac in the different domestic species.

14 LOCOMOTOR SYSTEM. Definition and parts. Phylogeny and ontogeny. Osteology: osteogenesis and its types. Bone structural organization. Bone biomechanics.

15 Arthrology: arthrogenesis. Types of joints and their constituent elements . Ligaments. Joint biomechanics.

16 Myology: myogenesis. Muscles: types and classification. Structural organization of skeletal striated muscle . Auxiliary structures of the locomotor system: fasciae, fibrous sheaths and trochleae muscle, synovial bursae and sheaths, adipose bodies.

17 Axillary region. Embryonic development. Congenital deformities and anomalies Regionalization and vertebral formulas. Joints of the spine. Comparative anatomy: biomechanics and overall study.

18 Autonomic muscles of the spine: classification. Muscles of the medial and lateral tracts: comparative study. Tail muscles. Ventral muscles of the neck: classification and compared study. Neck fasciae.

19 Thorax: comparative study of the thorax walls. Joints and muscles of the thorax: classification and biomechanics. Diaphragm muscle: development, description and comparative study

20 Abdominal muscles: development and classification. Linea alba, prepubic tendon and inguinal ligament. Inguinal tract. Comparative study.

21 Composition of a spinal nerve. Regional differences between spinal nerves. Sensory and motor innervation of the neck, trunk and tail.

22 Vascularization of the neck, trunk and tail. Great vessels: aorta, caval veins and their parietal branches. Azygos vein and its branches. Lymphatic system: ontogeny. Lymphocenters and lymphatic vessels of the axillary region: thoracic duct and cistern of the chyle.

23 Thoracic member. Phylogeny and ontogeny of limbs: causal analysis. Congenital anomalies

24 Fixator muscles of the scapula: classification. Location, relationships and movements of the scapula. Shoulder joint: articular surfaces, ligaments and movements. Motor muscles of the humerus: classification and comparative study.

25 Elbow joint: articular surfaces, ligaments and movements. Motor muscles of the elbow: functional classification and comparative study. Carpal and phalangeal joints: a compared survey of articular surfaces, ligaments and movements

26 Forearm muscles: functional classification and comparative study. Muscles of the hand: functional classification and comparative study.

27 Innervation of the thoracic limb: a comparative study of the brachial plexus and its collateral branches and terminals.

28 Arterial, venous, and lymphatic vascularization of the thoracic limb: a comparative study. Fascia and subcutaneous synovium of the thoracic limb: a comparative study.

29 Elastic, shock-absorbing and horny structures of the extremities. Nail, unguicula and ungula. The hoof of ruminants and swine: morphology and functional organization. The equine hoof: morphology and functional organization

30 Pelvic limb. General concepts. Pelvic girdle: comparative study. Articulation of the hip: articular surfaces, ligaments and movements. Motor muscles of the femur: classification .

31 Motor muscles of the femur: comparative study of the anterior and medial muscles. Comparative study

of the caudal and lateral muscles.

32 Knee and proximal tibioperoneal joints: articular surfaces, ligaments and movements.

Motor muscles of the knee joint: classification and comparative study.

33 Comparative study of the joints of the foot: articular surfaces, ligaments and movements.

Muscles of the leg and foot: a comparative study

34 Innervation of the pelvic limb: comparative study of the lumbosacral plexus and its collateral branches and terminals.

35 Arterial, venous and lymphatic vascularization of the pelvic limb: a comparative study. Fascia and subcutaneous synovium of the pelvic limb: a comparative study.

Practical classes:

1 Anatomical plans. Nomenclature. Types of bones and basic structure. Joints: types.

Spine, type vertebra. Vertebral formulas.

2 Cervical vertebrae: a comparative study. Nuchal face of the skull. Hyoid. Neck X-rays.

3 Thoracic vertebrae. Ribs and sternum. Lumbar vertebrae. Sacrum and caudal vertebrae.

Introduction to the pelvis. X-rays of the thorax, abdomen and pelvis.

4 Scapula and humerus. Comparative study. X-rays of the back and arm.

5 Surface anatomy and body regions. Lifting of the skin of the neck, back, arm, thorax and abdomen. Recognition of superficial structures: superficial fascia.

6 Dissection of the lateral aspect of the neck: superficial, middle and deep planes.

7 Dissection of the ventral aspect of the neck: superficial and deep planes. Visceral cavity of the neck: limits and content. Deep fascia of the neck.

8 Lateral planes of the thorax and abdomen I (disinsertion of the latissimus dorsi and thoracic trapezius muscles). Muscles erectors of the spine (epiaxial). Intercostal muscles

9 Lateral planes of the thorax and abdomen II (disinsertion of the external and internal oblique muscles of the thorax and abdomen)

. Superficial plane of the back and arm. Superficial dissection of pectoral muscles

10 Ulna and radius. Carpus. Metacarpus. Radiographic study

11 Phalanges. Hoof and hooves. Anatomical study Radiographic study.

12 Dissection of the lateral aspect of the back, shoulder and arm. Pectoral muscles

13 Dissection of the hollow of the axilla and medial aspect of the arm: brachial plexus and arterial and venous branches.

14 Dissection of the dorsal aspect of the forearm and hand

15 Dissection of the caudal aspect of the forearm and hand

16 Coxal, femur and patella. Recognition of details in AP and lateral radiographs.

17 Tibia, fibula and tarsus. Recognition of details in DV, lateral and oblique radiographs

18 Rump and hip dissection. Recognition of important details for surgical

procedures in the region.

19 Dissection of the lateral and medial aspect of the thigh. Recognition of the important details for the surgical interventions in the region.

20 Dissection of the knee and lateral aspect of the leg. Recognition of the important details for the surgical interventions in the region.

21 Dissection of the caudal aspect of the leg and foot. Recognition of the important details for the surgical interventions in the region.

#### 4. Academic activities

Master classes: 35 classroom sessions with the teacher, in which the theoretical syllabus will be explained.

Practical classes: 21 two-hour sessions, in dissection room, in which the topics of osteology and systematic dissection of the locomotor system will be addressed.

Rotating classes of Head of Practice: 2 two-hour sessions, in which a group of students are prepared as instructors or assistants for the realization of each practice.

#### 5. Assessment system

## 1 Assessment Activities

Theoretical Exam (50% of the overall grade).

Design: written examination in the classroom. It includes multiple-choice, short-answer, development questions, and images. At least 50% of the maximum grade is required to pass.

Practical Exam (40% of the overall grade).

Design: In the dissection room with the osteological material and the animals studied during the practices. At least 60% of the maximum grade is required to pass.

Digital radiographic interpretation test (10% of the overall grade)

Design: test implemented in the ADD Moodle platform.

In order to pass the subject, it is required to pass both the theoretical and practical exams.

## 2. Global test.

Theoretical Exam (50% of the final grade).

Practical Exam (50% of the final grade).

The design, criteria and grading system will be the same as in the conventional assessment.