FACULTAD DE VETERINARIA

GRADO DE VETERINARIA

2024/25 YEAR

EMBRIOLOGÍA

Course details

Course name: EMBRIOLOGÍA
Code: 101454
Degree/Master: GRADO DE VETERINARIA **Year:** 1
Name of the module to which it belongs: FORMACIÓN BÁSICA COMÚN
Field: ANATOMÍA Y EMBRIOLOGÍA VETERINARIAS
Character: BASICA **Duration:** FIRST TERM
ECTS Credits: 3.0 **Classroom hours:** 30
Face-to-face classroom percentage: 40.0% **Study hours:** 45
Online platform: https://moodle.uco.es/

Coordinating teacher

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Brief description of the contents

The subject "Embryology" describes the normal development of mammalian and avian embryos and foetuses, including the study of the main developmental anomalies.

Prerequisites

Prerequisites established in the study plan

Those specific to the degree.

Recommendations

Those specific to the degree.
This subject is taught in Spanish and English. All activities will be scheduled in accordance with the groups and timetables organised by the Faculty of Veterinary Medicine. Teaching in English will comply with the requirements of the bilingual programme of the University of Córdoba.

Study programme

1. Theory contents

Topic 1: Introduction, history and generalities.

Definition and objectives of embryology in the veterinary curriculum. Historical overview. Basic concepts and stages of prenatal development. Taxonomic framework of animals of veterinary interest. Anatomical terminology.

Topic 2: Gametogenesis and fertilisation.

Spermatogenesis and ovogenesis. The formation of the zygote. The egg or zygote: components and classification. Fertilisation in mammals and birds.

Topic 3: Cleavage.

Morula and blastula. Characteristics of cleavage in mammals and birds. Chimeras, mosaics and twins.

Topic 4: Gastrulation.

Gastrula: concept and mechanisms. Establishment of germ layers. Early congenital malformations.

Topic 5: Cell differentiation. Body plan.

Control of embryonic development. Genetics and epigenetics. Specification, determination and differentiation. Morphogenetic field. Regulatory development. Induction and competence. Body plan.

Topic 6: Primitive derivatives of germ layers.

Delimitation of body shape. Ectoderm-derived primitive formations: amnion, neural tube and neural crest. Primitive formations derived from the mesoderm: axial, paraxial and lateral mesoderm. Embryonic metamerism. Endoderm-derived primitive formations: primitive gut and allantois. Most frequent developmental abnormalities.

Topic 7: Embryonic appendages and placentation.

Extra-embryonic membranes in the egg of birds and mammals of veterinary interest. The umbilical cord. Implantation. Placentation. Fundamentals and types of placentas in animals of veterinary interest.

Topic 8: Cardiovascular system I.

Formation of blood, blood vessels and lymphatics. Development of the heart. Most common developmental abnormalities.

Topic 9: Cardiovascular system II.

Establishment and development of circulatory circuits: vitelline, allantoic and placental circulation. Evolution of the embryonic arterial, venous and lymphatic systems. Changes at birth. Most frequent developmental abnormalities.

Topic 10: Pharyngeal arches.

Development of the pharyngeal arches and derived structures. Most frequent developmental abnormalities.

Topic 11: Respiratory system. Body cavities.

Development of the respiratory system. Formation of body cavities. Most frequent developmental abnormalities.

Topic 12: Digestive system.

Development of the digestive system. Most frequent developmental abnormalities.

Topic 13: Urinary system.

Development of the urinary organs. Adrenal glands. Most frequent developmental abnormalities.

Topic 14: Reproductive system. Mammary gland.

Development of the gonads and genital organs. Mammary gland development. Most frequent developmental abnormalities.

Topic 15: Skeletal and muscular systems.

Formation of muscles, bones and joints. Development of trunk, neck and tail. Development of the limbs. Development of the head. Formation of the face and nasal cavity. Palatogenesis. Paranasal sinuses. Tongue. Salivary glands. Teeth. Most frequent developmental abnormalities.

Topic 16: Nervous systems.

Development of the central and peripheral nervous system. Spinal cord. Formation and derivatives of the encephalic vesicles. Spinal and cranial nerves. Most frequent developmental abnormalities.

Topic 17: Special sense organs and common integument.

Ectodermal placodes. Development of the organs of taste, smell, hearing and sight. Development of the skin and adnexa. Most common developmental abnormalities.

Topic 18: Methods and research lines in embryology.

New research lines applied to embryology. Embryoids.

2. Practical contents

The practical content is structured in 6 laboratory practicals that include identifying the main morphological characteristics in avian and mammalian embryos. Study the details of embryonic membranes and the morphological characteristics of the placenta in different domestic animals. Identify key morphological features in the development of organs through the embryonic and foetal periods, and identify some developmental abnormalities in preserved samples.

The practical syllabus corresponds to each of the theoretical topics.

Bibliography

1. Basic bibliography:

Gilbert SF & Barresi MJF (2016). Developmental Biology. 11 ed. Sinauer Associates Inc.

Hyttel P, Sinowatz F & Vejlsted M (2010). Essentials of Domestic Animal Embryology. Saunders, LTD.

McGeady TA, Quinn PJ, Fitzpatrick ES & Ryan MT (2017). Veterinary Embriology. Blackwell Publishing.

Monterde JG & Gil F (2012). Embriología para estudiantes de Veterinaria. Editorial Intermédica.

Morales JL (2018). Fundamentos de Embriología Veterinaria. Ediciones DF.

Wolpert L, Tivkle C & Martínez-Arias A (2015). Principles of development. 5 ed. OUP.

2. Further reading:

It will appear in each section of the corresponding topic on the Moodle platform.

Methodology

Methodological adaptations for part-time students and students with disabilities and special educational needs

Individual methodological adaptations will be taken into account.

Face-to-face activities

Activity	Large group	Medium group	Total
Assessment activities	1	1	2
Information processing activities	15	5	20
Reading comprehension, listening, visual, etc. activities	2	6	8
Total hours:	***18***	***12***	***30***

Off-site activities

Activity	Total
Exercise and problem solving activities	10
Information processing activities	25
Information search activities	10
Total hours	***45***

Results of the training and learning process

Knowledge, competencies and skills

CE6 Ontogenetic development, birth defects and applications of embryology.

Assessment methods and instruments

Intended learning outcomes	Examination	Means of practical execution	Oral means
CE6	X	X	X
Total (100%)	***50%***	***35%***	***15%***
Minimum grade (*)	***5***	***5***	***5***

(*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

General clarifications on instruments for evaluation:

Two methods of assessment are proposed, which are mutually exclusive, to be chosen voluntarily by the student:

Final exam: the final exam is mandatory in order to pass this subject and without the continuous evaluation is 100% worth of the final grade.

Continuous evaluation: it is optative and it will be carried out throughout the course. It consists of weekly tests, quizzes, and assignments and oral presentations. The global score achieved by continuous evaluation can be up to 50% worth of the final grade. Thereby, the final exam worth can be reduced from 100% to 50%, according to the score achieved in the continuous evaluation.

The grades obtained by the different assessment methods will be valid for the academic year in which they are obtained.

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

The particular considerations of part-time students and students with special educational needs will be taken into account.

Clarifications on the evaluation of the extraordinary call and extra-ordinary call for completion studies:

A final multiple-choice exam on all the contents of the syllabus will be held.

Qualifying criteria for obtaining honors:

Final grade above 9 and complementary test.

Sustainable development goals

Good health and well-being
Quality education
Gender equality
Reduced inequalities
Climate action

The methodological strategies and the evaluation system contemplated in this Teaching Guide will respond to the principles of equality and non-discrimination and must be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required. Students must be informed of the risks and measures that affect them, especially those that may have serious or very serious consequences (article 6 of the Safety, Health and Welfare Policy; BOUCO 23-02-23).