



Universitat de Lleida

DEGREE CURRICULUM  
**ANIMAL PHYSIOLOGY II**

Coordination: SERRANO PÉREZ, BEATRIZ

Academic year 2021-22

## Subject's general information

<b>Subject name</b>	ANIMAL PHYSIOLOGY II		
<b>Code</b>	100305		
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION		
<b>Typology</b>	Degree	Course	Character
	Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production	1	COMMON
			Modality Attendance-based
<b>Course number of credits (ECTS)</b>	6		
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	TEORIA
	<b>Number of credits</b>	2	4
	<b>Number of groups</b>	4	1
<b>Coordination</b>	SERRANO PÉREZ, BEATRIZ		
<b>Department</b>	ANIMAL HUSBANDRY		
<b>Teaching load distribution between lectures and independent student work</b>	Hores presencials: 60 Hores no presencials: 90		
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.		
<b>Language</b>	Catalan: 50% Spanish: 50%		

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GARCIA ISPIERTO, IRINA	irina.garcia@udl.cat	1,4	
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MARTIN ALONSO, MARIA JOSE	mariajose.martin@udl.cat	5,6	
SERRANO PÉREZ, BEATRIZ	beatriz.serrano@udl.cat	2,6	
TOR NAUDI, MARC	marc.tor@udl.cat	2	

## Learning objectives

### Learning objectives

The student who passes the subject must:

The student who passes the subject must know the bases of the physiology of reproduction, lactation, digestion and stress mechanisms of domestic mammals of zootechnical interest, and anatomo-physiological bases of birds.

### Capacity objectives

The student who passes the subject must be able to:

The student who passes the subject must understand the knowledge previously indicated as the basis for the regulation of the production process (reproduction, lactation, digestion, laying, etc.) and its economic implications

## Competences

## **BASIC COMPETENCES**

To 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 your field of study

To apply their knowledge to their work or vocation in a professional manner 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.

Ability to collect and interpret relevant data (usually within your area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.

To be able to transmit information, ideas, problems and solutions to a specialized and non-specialized public).

To know how to develop those learning skills necessary to undertake further studies with a high degree of autonomy.

To recognize the fundamentals of the main physiological processes and understand their role in the production process, as well as foresee and evaluate their effects on the final product.

## **GENERAL COMPETENCES**

The prevention, diagnosis and individual or collective treatment, as well as the fight against animal diseases, whether they are considered individually or in groups, particularly zoonoses.

Identify animals and animal products, as well as their importance in society and in the food chain.

Use knowledge of basic sciences (biology, physics, biochemistry, physiology, mathematics, statistics, economics, ...) to understand animal processes and their involvement in the agro-livestock system.

Analyze the strategies of animal production as a whole (facilities, behavior, well-being, nutrition, improvement, production, reproduction, environment, economy, marketing and product quality) with the aim of optimizing production.

## **SPECIFIC COMPETENCES**

To identify and apply the physical and chemical principles of biological processes and their applications to veterinary sciences.

To identify and know the principles and bases of homeostasis, excitability and cellular communication.

To know the ethical principles of the veterinary profession, apply its regulations and regulations and apply the principles and bases of welfare, animal protection and bioethics.

To know the principles of reproduction, childbirth, puerperium and assisted reproduction: Care and diseases.

To 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 foresee and evaluate their effects on the final product.

## **TRANSVERSAL COMPETENCES**

To acquire an adequate understanding and oral and written expression of Catalan and Spanish.

To acquire a significant command of a foreign language, especially English.

To acquire training in the use of new technologies and information and communication technologies.

To acquire basic knowledge of entrepreneurship and professional environments.

To acquire essential notions of scientific thought.

To analyze concrete situations, define problems, make decisions and implement action plans in search of solutions.

To apply acquired knowledge to real situations, appropriately managing available resources.

To interpret studies, reports, data and analyze them numerically.

To select and manage the available written and computerized information sources related to the professional activity.

To manage individual and team work

To acquire a comprehensive training.

To maintain ethical behavior in the exercise of their responsibilities to the profession and society

To know and apply the scientific method in professional practice.

## Subject contents

### CONTENTS

Unit 1. Sex biology and reproductive life cycles. Sexuality. Development of the genital organs of the male and female. Life cycles of sexual life: fetal, neonatal, puberty, sexual maturity and aging

Unit 2. General and comparative functional anatomy of the male genital apparatus. Histophysiology. Organization and function. Testicles Epididymis. Spermatic cord Scrotum. Accessory glands: blister, vesicular, prostate and bulbourethral.

Unit 3. Male endocrinology and spermatogenesis. Hypothalamic and pituitary regulation of the testis. Spermatogenesis: spermatocytogenesis, meiosis, spermiogenesis and spermiation. Sperm Cycle of seminiferous epithelia and spermatogenic waves.

Unit 4. General and comparative functional anatomy of the female genital apparatus. Histophysiology. Organization and function. Ovaries Tubular Genital Organs Vulva and clitoris. Postnatal changes of the female genital organs. Placentation and gravid uterus.

Unit 5. Endocrinology of the female, folliculogenesis and ovulation. Hypothalamic and pituitary regulation of the ovary. Folliculogenesis and ovulation. Endocrinology of the estric cycles.

Unit 6. Transport of gametes, fertilization and recognition of pregnancy. Female genital tract: path and barrier. Mechanisms associated with fertilization and maternal recognition of pregnancy.

Unit 7. Placentation, endocrinology of pregnancy and childbirth. Formation of the placenta. Endocrinology of pregnancy and childbirth.

Unit 8. General and comparative functional anatomy of the mammary gland. Organization and function. Morphogenesis, development and structure of the mammary gland.

Unit 9. Lactation. Secretion and ejection of milk. Colostrum Start and maintenance of lactation. Regression of the mammary gland. Metabolic cost of lactation.

Unit 10. Digestion in non-ruminant animals. Histophysiology. Pre-tention and chewing. Swallowing and motility of the gastrointestinal tract. Digestive secretions and their regulation. Gastric and intestinal digestion. Particularities of digestion in the rabbit. Particularities of the digestion of the newborn.

Unit 11. Digestion in ruminant animals. Histophysiology. Mechanical functions in the gastric compartment. Biochemical phenomena in the reticulum-rumen. Eructation and rumination. Digestion in the abomasum.

Unit 12. Nutrient absorption. Places and mechanisms of absorption. Absorption of carbohydrates and proteins. Absorption and transit of fats in the enterocyte. Absorption of water and mineral salts.

Unit 13. The internal environment. Nutrient utilization after absorption. Homeostasis and homeorresis: productive status and tissue flow of nutrients. Gluconeogenesis in ruminants.

Unit 14. Stress. Endocrine aspects of stress. Stress and the immune system. Effect of stressful actions on organic structures. Stress and behavior. The behavior in physiology.

Unit 15.- Introduction. Importance of poultry production worldwide, European, national and regional.

Unit 16.- Anatomy and physiology of laying. Introduction. Physiology of the ovary. Oogenesis Egg wrap formation.

Unit 17.- Shell formation. Introduction. Absorption and transport of calcium. Storage of calcium in the bones. Acid-basic balance. Theories about the mechanisms of calcium deposition. Shell structure. Oviposition.

Unit 18.- Physiology of the setting. Rhythms of setting. Ovulation control. Formation of the laying series. Distribution of ovipositions.

Unit 19.- Lighting programs. Bases of lighting in chickens. Importance of the time of birth. Types of classic lighting programs in breeding. Programs in rearing depending on the type of accommodation. Intensity of light in breeding. Classic lighting programs in the laying phase. Light intensity in lay. Other lighting programs.

Unit 20.- Reproduction. Description of the male reproductive system. Reproductive particularities in birds. Sex hormones in males. Male reproduction management. Reproduction systems in birds.

## PRACTICE SYLLABUS

Practice 1. Vital sperm staining.

Practice 2. Male reproductive system anatomy.

Practice 3. Female reproductive system anatomy.

Practice 4. Histology reproductive system.

Practice 5. Histology digestive system.

Practice 6. Examination of ruminal activity in ruminants.

Practice 7. Assessment of hematological parameters.

Practice 8. Determination of the allometry coefficient

Practice 9. Growth modeling

Practice 10. Avian histology.

Practice 11. Dissection of birds.

## Methodology

The subject will be developed in sessions of 3 to 5 hours a week, either theory or practice.

Material will be given in the form of schemes or summaries of the different topics, as well as "links" of interest for self-learning, through the electronic files of the ETSEA library. Students' participation in the preparation and presentation of an individual work related to the subject will be scheduled.

Due to current circumstances, the theory may be blended (half the group in the classroom-half the group by

videoconference) or if the situation requires it, virtual. The session will be recorded so that the student can access.

The practices will be carried out in small groups of 15 students. After each practice there will be an exam with the socrative tool or the CV test tool.

## Development plan

The subject is structured in four blocks of knowledge that include theoretical and practical activities. The calendar developed by the Directorate of Studies will be strictly followed.

The **calendar of activities** available in the Resources section indicates the day, time, space and teacher responsible for each activity.

- Regular classroom: ETSEA, building 3, floor 0, classroom 01 (3.0.01)
- Dissection room and Histophysiology Laboratory: ETSEA, building 1, floor 0, laboratory 1 (1.0.01)
- Microscope classroom: ETSEA, SHV building, floor 2, classroom 02 (2.2.02)

NOTE - Please be aware of changes regarding schedules in the presence or virtualization of the activities to adapt to any change in the health situation.

## Evaluation

The evaluations will be carried out on

- Two examinations of the theoretical-practical syllabus (35% Part Reproduction and Digestion + 35% Internal media Part, Growth and Avian Physiology)

- The presentation of the work, small practice exams throughout the course (9% Part 1 Reproduction + 8% Part 2 Digestive and internal environment + 6.5% Part 3 Growth and 6.5% Part 4 Avian physiology)

To pass the evaluation it is essential to obtain at least 4/10 in the value of each individual test and 45% in the set of the two tests. Exams with less than 4 will be recovered in the final exam.

In the case of confinement, face-to-face exams can be substituted for online exams.

## Bibliography

BRODI S. 1945. Bioenergetics and growth, with special reference to the efficiency complex in domestic animals. New York, Reinhold.

BUTTERI et al. 1986. Control and manipulation of animal growth. Ed. Butterworths.

CUNNINGHAM JG. 2013. Fisiología Veterinaria. Elsevier, Cunningham. 5ª edición

DE DUVE C. 1988. La célula viva. Ed Labor. Barcelona: Prensa Científica. Barcelona.

FRANDSON RD. 1984. Anatomía i Fisiología de los Animales Domésticos. Ed. Interamericana.

GANONG WF. 2006. Fisiología Médica. 20a. Ed. Panamericana.

GANONG WF. 2005. Review of Medical Physiology. 22a Ed. McGraw-Hill/Appleton & Lange.

GARCÍA SACRISTÁN, A. Fisiología Veterinaria. 2018. Ed. Tébar Flores. (Ebook)

GUITON AC, HALL JE. 2006. Tratado de Fisiología Médica. 11a Ed. Elsevier-Saunders.

HAMMOND, J. 1966. Principios de la explotación animal reproducción, crecimiento i herencia. Ed. Acribia.

HOLLIS G.R. 1993. Growth of the Pig. Ed. CAB International.

LAWRENCE T.L.J. 1980. Growth in Animals. Ed Butterworths.

NICKEL R, SCHUMMER A, SEIFERLE E. 1979. The viscera of the domestic animals. Berlin: Ed Paul Parei.

POND K, POND K, 2000. Introduction to Animal Science. John Wiley & Sons.

ROSENFELD R.G. AND ROBERTS C.T. 1999. The IGF system. Humana Press.

SENGER PL. 2015. Pathways to pregnancy and parturition. Current Conceptions, Inc. Washington State University Research & Technology Park, Pullman, WA.

YOUNG B, Woodford G, O'Dowd P. 2014. Wheater. Histología funcional: Texto y Atlas en color, 6ª edición.