



## DEGREE CURRICULUM

# **ANIMAL PRODUCTION BASES**

Coordination: SERRANO PEREZ, BEATRIZ

Academic year 2022-23

# ANIMAL PRODUCTION BASES 2022-23

## Subject's general information

Subject name	ANIMAL PRODUCTION BASES			
Code	102525			
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Agricultural and Food Engineering	2	COMPULSORY	Attendance-based
	Master's Degree in Agronomic Engineering		COMPLEMENTARY TRAINING	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRALAB	PRAULA	TEORIA
	Number of credits	1.8	0.6	3.6
	Number of groups	4	2	1
Coordination	SERRANO PEREZ, BEATRIZ			
Department	ANIMAL SCIENCE			
Teaching load distribution between lectures and independent student work	On-site hours: 60 Off-site hours: 90			
Important information on data processing	Consult <a href="#">this link</a> for more information.			
Language	Catalan: 25% Spanish: 75%			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BLANCO PENEDO, MARIA ISABEL	isabel.blancopenedo@udl.cat	,8	
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## Subject's extra information

Subject / subject in the whole curriculum

The discipline Bases of the Animal Production as a core subject, within the area of knowledge of Animal Production, in the studies of the Degree in Agricultural and Food Engineering, of the Technical School Superior of Agricultural Engineering of Lleida, is an essential subject for to the understanding and deepening of other subjects that are taught later throughout the same degree.

## Learning objectives

### Objectives and learning results

The student, after passing the subject, have to be able:

- To show some theoretical and applied knowledge about animal physiology, nutrition and animal genetics.
- To be able to use methodologies and basic instrumental in the laboratory of Anatomy, Physiology and Animal Nutrition.
- To acquire basic knowled in the Animal Genetics.
- To develop autonomus learning skills and transversals skills as integration ability, team work, through based-problem learning.

## Competences

### General competences

At least the following basic competences will be guaranteed:

CG1: That the students have demonstrated to possess and understand knowledge from the base of the general secondary education at a level that, although it is supported by advanced textbooks, also includes some aspects that imply knowledge coming from the vanguard of said area.

CG2: That students know how to apply their knowledge to their work or vocation in a professional way and possess the competences that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study

CG3: That students have the ability to collect and interpret relevant data to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature. CG4: That students can transmit information, ideas, problems and solutions to both a specialized and non-specialized audience

CG5: That the students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

Furthermore, the graduate must be able to:

CG6: Analyze concrete situations, define problems, make decisions and implement action plans in search of solutions.

CG9: Use existing computer and communication tools to support the development of your professional activity (UdL strategic competence)

CG11: Understand and express yourself with the appropriate terminology.

CG12: Present information correctly in oral and written form (UdL strategic competence)

## Specific competences

The graduate in Bachelor of Agricultural and Food Engineering after completing their studies will have acquired the following knowledge and skills:

CEMC3 The bases of animal production. Livestock facilities.

CEMC4 Applications of Biotechnology in Livestock Engineering

CG11 Capacity and mastery of information and communication technologies.

CE2 Knowledge and use of animal production technologies. Animal anatomy and physiology. Animal production, protection and exploitation systems. Genetics and animal improvement

CE14. Know the chemical composition of food and its chemical reactions.

## Subject contents

### SYLLABUS

#### SECTION 1: GENETICS (9h)

**Topic 1. Introduction to Genetics and Animal Breeding.** Genetic and Animal breeding improvement, objectives, characteristics, restrictions. Principles of Mendelian genetics applied to animal breeding. Individual genes of importance in animal production. The ryr gene (halothane) as an example. (2h)

**Topic 2. Principles of quantitative genetics applied to animal genetics.** Genetic model. Introduction to the polygenic model. Statistical model. Decomposition of phenotypic values. The parameters of the model. Heredability, description and estimation. (2h)

**Topic 3. Selection and crossings.** Concept of truncation selection. Use of the additive value and the potential value for selection and elimination. Heterosis and inbreeding. Types of crossings. (2h)

**Topic 4. The animal breeding schemes.** Prolific species. Low prolific species. Genetic management (3h)

#### SECTION 2: NUTRITION (9h)

**Topic 1. Foods for animal feed.** Classification, description, features and identification.

**Topic 2. Nutritional principles of food.** Weende system, Van Soest system.

**Topic 3. Efficiency of food for animals.** Main differences between the efficiency of monogastric and ruminant species.

**Topic 4. Analysis of food.** Sampling. Main analysis systems. Weende System and Scheme Van Soest. (4h)

#### SECTION 3: ANIMAL PHYSIOLOGY (9h)

**Topic 1. Introduction to Animal Anatomy and Physiology.** (2h)

**Topic 2. Endocrinology.** Endocrine glands: hypophysis, thyroid, parathyroid, adrenal glands, endocrine pancreas. Neuroendocrine integration (2h)

**Topic 3. General and comparative functional anatomy of the reproductive system.** Organization and function of the male genital tract: Testicles, epididymis, spermatic cord, scrotum, accessory glands, penis. Organization and function of the female genital system.

Ovaries. Tubular genital organs. Vulva and clitoris. (1h)

**Topic 4. Male endocrinology and spermatogenesis.** Hypothalamic and pituitary regulation of the testicle. Spermatogenesis: spermatocytogenesis, meiosis, spermiogenesis and sperm. The sperm. Cycle of seminiferous epithelia and spermatozoa waves. (2h)

**Topic 5. Endocrinology of the female, folliculogenesis and ovulation.** Hypothalamic and pituitary regulation of the ovary. Folliculogenesis and ovulation. Endocrinology of estral cycles. (2h)

**Topic 6. Gestation.** Transport of gametes, fertilization and pregnancy recognition. Embryonic development. Endocrinology of pregnancy and parturition. (1h)

**Topic 7. Lactation.** General and comparative functional anatomy of the mammary gland. Organization and function. Secretion and ejection of milk. The colostrum. Begging and maintenance of lactation. (1h)

**Topic 8. Digestion in non-ruminant animals.** Prehension and chewing. Deglutition and motility of the gastrointestinal tract. Digestive secretions and their regulation. Gastric and intestinal digestion. Particularities of the digestion in the rabbit. (2h)

**Topic 9. Digestion in ruminants.** Mechanical functions in the gastric compartment. Biochemical phenomena in the reticulum-rumen. Eructation and rumination. Digestion in the abomaso (2h)

**Topic 10. Absorption of nutrients.** Places and mechanisms of absorption. Absorption of carbohydrates and proteins. Absorption and transit of fats in the enterocyte. Absorption of water and mineral salts. (1h)

**Topic 11. Growth.** Regulation of growth. Measures of growth. Body composition. Placental and fetal growth. Postnatal growth Endocrine regulation (1h)

**Topic 12. Stress.** Endocrine aspects of stress. Stress and the immune system. Effect of stressful actions on organic structures. Stress and behavior. (1h)

## PRACTICAL ACTIVITIES

### PRACTICAL COMPUTER CLASS

- Simulation of selection processes. Answer observed and expected. (2h)
- Simulation of selection processes in a herd of cows (4h)

### LAB PRACTICES

- Histophysiology (2h)
- Anatomy of the male and female reproductive system (2h)
- Seminal dose evaluation (2h)
- Anatomy of the digestive tract monogastric and ruminants (2h)
- Assessment of stress by haematological parameters (2h) -
- Sampling, reception and preparation in laboratory (1h)
- Laboratory food analysis (5h)

### SEMINARIES

Use of genomic tools in animal science (2h)

## Methodology

Type of activity	Description	On-site activities		Off-site activities		Evaluation	Time	ECTS
		Objectives	Hours	Student task	Hours	Hours	Hours	Hours
Lectures	Class (Main Group)	Explanation of main concepts	32.5	Study of concepts	50	3.5	86	3.4

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<b>Seminar</b>	Participatory Class (Middle Group room)	Practical activities: understanding principles, taking measurements..	2	Learn to solve problems and case situations.			2	0.1
<b>Lab</b>	Practice (Small Group room)	Practical activities: understanding principles, taking measurements...	15.5	Study and write reports. Test through Virtual Campus or Kahoot.	15	0.5	15	1.8
<b>Informatic room</b>	Practice (Middle group room)	Practical activities: understanding principles, taking measurements..	6	Study and write reports. Test through Virtual Campus or Kahoot.	10		15	0.7
<b>Aimed activities</b>	Student task	To guide students about the development of a task (supervision in office hours)		Write bibliographic or practic reports	15		15	0.6
<b>Total</b>			56		90	4	150	6

## Development plan

The course is structured in four blocks of knowledge that include theoretical and practical activities in computer room, laboratory and seminars. The calendar developed by the Director of Studies will be strictly followed.

**Theoretical activities** are face-to-face at room 2.0.04.

The **practical activities** are face-to-face and compulsory:

- 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).
- Nutrition Laboratory: ETSEA, building 1, floor 1, laboratory 08 (1.1.08).
- Computer classroom

It is **MANDATORY** that students wear the following personal protective equipment (PPE) during the teaching practices:

- White lab coat.
- Chemical / biological protection gloves (Physiology block)

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

## Evaluation

Activity type	Grading System		Grading weight
	Procedure	Number	
Lecture	Written test on thery syllabus	4	70
Problems and cases	Delivery of reports or exams about cases	5	7.5
Lab	Delivery of reports. Written or test exams.	2	15
Computer room	Delivery of reports. Written or test exams.		7.5

Total			100
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## NOTES:

- In order to pass the evaluation it is necessary to obtain a minimum of a 45% in each block. The evaluation will be passed with a grade  $\geq 5$  (provided obtained 45% theory)
- Students who pass the practical part but not the theoretical part will not pass the subject, but they will keep the practical grade for the next course. Theory grades will not be saved.

## Bibliography

### Basic Bibliography

ALFONSO L, ESTANY J. 1996. Organización y esquemas de mejora animal. Universitat de Lleida

FALCONER DS, MACKAY TFC. 2001. Introducción a la genética cuantitativa. Editorial Acribia.

BOWMAN JC. 1982. Introducción a la mejora animal. Omega. Barcelona.

BLAS BEORLEGUI CD, MATEOS GC, REBOLLAR PG. 1999. Normas FEDNA para la formulación de piensos compuestos. Fundación Española para el Desarrollo de la Nutrición Animal.

BUXADÉ C. 1995. (Coord.). Zootecnia: bases de producción animal. Tomo II: Reproducción y Alimentación. Mundi-Prensa. Madrid.

BUXADÉ C. 1995. (Coord.). Zootecnia: bases de producción animal. Tomo III: Alimentos y Racionamiento. Mundi-Prensa. Madrid.

BUXADÉ C. 1995. (Coord.). Zootecnia: bases de producción animal. Tomo IV: Genética, patología higiene y residuos animales. Mundi-Prensa. Madrid.

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GRIFFITHS, AJ F, MILLER, JH, SUZUKI, DT, LEWONTIN, RC, GELBART WM. 2008. Genética. McGrawHill/Interamericana de España.

GONZALEZ G, ARGAMENTERIA A, 1987. Nutrición y alimentación del ganado. Mundi-Prensa.

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ROTHSCHILD, M F, RUVINSKY, A (Eds). 2011. The genetics of the pig. Wallingford: CAB Internacional

SENGER PL. 2015. Pathways to pregnancy and parturition. Current Conceptions, Inc. Washington State University Research & Technology Park, Pullman, WA. 3º edición.

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

### Complementary Bibliography

Federación Española para el Desarrollo de la Nutrición Animal (2003) Tablas FEDNA de composición y valor nutritivo de alimentos para la fabricación de piensos compuestos (2ª edición). Disponible a Internet: <http://www1.etsia.upm.es/fedna/tablas.htm>.

ANAPORC: Asociación Nacional de Porcinocultura Científica. <https://www.archivo-anaporc.com/>

FEDNA. Fundación española para el desarrollo de la nutrición animal. <http://www.fundacionfedna.org/>

Herramienta de autoaprendizaje de Histología a través del campus virtual de la UdL: <http://cv.udl.cat/cursos/100302/histologia/basicos/index.html>

Revista Frisona Española. <http://www.revistafrisona.com/>

SEOC. Sociedad española de ovinotecnia y caprinotecnia. <http://www.seoc.eu/site/>