



Universitat de Lleida

DEGREE CURRICULUM
**FARM EQUIPMENT AND
ENVIRONMENTAL COMFORT**

Coordination: MAYNEGRE SANTAULARIA, JORDI

Academic year 2023-24

Subject's general information

Subject name	FARM EQUIPMENT AND ENVIRONMENTAL COMFORT			
Code	100335			
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production	5	OPTIONAL	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRACAMP	PRAULA	TEORIA
	Number of credits	2	0.2	3.8
	Number of groups	1	1	1
Coordination	MAYNEGRE SANTAULARIA, JORDI			
Department	AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING			
Teaching load distribution between lectures and independent student work	Lectures: 60 Student work: 90			
Important information on data processing	Consult this link for more information.			
Language	Catalan: 70% Spanish: 30%			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
ESCOBET RIU, JUAN	juan.escobet@udl.cat	3	
LOPEZ ROMERO, PEDRO	pedro.lopez@udl.cat	1	
MAYNEGRE SANTAULARIA, JORDI	jordi.maynegre@udl.cat	1	
MENTABERRE GARCIA, GREGORIO	gregorio.mentaberre@udl.cat	1	

Subject's extra information

To take the subject it is advisable to have previous knowledge of the subjects of Production and Management of Ruminants, Poultry and Pigs. In the "Environment Control" part, there is a certain amount of **physical modelling** of inner environment conditions of livestock facilities and **numerical resolutions**.

Learning objectives

1. Know the livestock equipment necessary for the production of the different zootechnical species
2. Know the environmental and behavioral needs of production animals
3. Have design criteria and carry out a diagnosis in insulation, heating, ventilation and cooling of enclosed livestock housing

Competences

CE49. Design the accommodation, facilities and livestock equipment necessary for production

Subject contents

Block Ruminants

Unit 1. Environmental equipment in dairy cattle farms

Topic 1.1. Equipment for milking, refrigeration and preservation of milk. The role of electronics and computers in the equipment of milking parlors and milking robots. Equipment for energy saving in milking, refrigeration and preservation of milk: frequency inverters, plate exchangers, milk cooling tanks, etc. Topic 1.2. Equipment for accommodation. Orientation of the accommodations. Static ventilation. Dynamic ventilation. Ventilation-cooling of the cows in the accommodation and in the waiting room

Unit 2. Environmental equipment in small ruminant farms. Photoperiod control in milk goats (lighting programs).

Heating in accommodation for lambs

Visit to a farm of milk cows. Visit to a farm of small ruminants.

Block Swine

Unit 1. Type of equipment and accommodation for pig farms in the breeding phase (covering, pregnancy and maternity), in the piglet transition phase and in the final fattening phase. The importance of design and what are the latest trends

Unit 2. Needs. Natural, forced ventilation, insulation, heating and cooling in pig farms. Equipment for the control of these systems. Environmental control audit on pig farms and what are the latest trends

Visit to a very modern piglet transition farm

Block Poultry

Unit 1. Accommodation and equipment for birds. Electronics, computing, heating, cooling, purification and recycling

Unit 2. Accommodation and equipment for poultry. Electronics, computing, heating, cooling, recycled purification

Unit 3. Accommodation and Equipment for Small pets. Reception, stay and transport Visit to holdings of birds and hunting birds. Multi-specific and specific facilities.

Visits to a distribution and selection farm of company rabbits and other pets. Reception facilities, transitory, transport preparations. Selection and breeding facilities.

Block Environment control

Unit 1. Object of environmental control. Balance model of heat and humidity flows in stationary conditions. Diagnosis and design. Weather data. Setpoint temperatures, relative humidity. Psychrometric diagram Heat and humidity flow contributed by the animals. References

Unit 2. Isolation. Air and surface temperature. Thermometers and cameras. Heat flow through conduction and transmission Thermal conductivity, resistance and transmittance. Flow through layers and differentiated surfaces. Losses on deck, walls, corridors, through the sun. Coefficient of thermal transmission. Thermal bridges and surface condensations

Unit 3. Ventilation. Flow, temperature and humidity measurements, smokes. Ventilation management. Heat flow by ventilation. Air mechanics. Forced ventilation. Ventilation efficiency. Fans. Natural ventilation

Unit 4. Heating. Minimum ventilation. Underfloor heating, radiant pipes, air heaters

Unit 5. Refrigeration. Evaporative panels. Fogging nozzles.

Development plan

El reparto aproximado de las sesiones entre los diferentes bloques de contenido ordenados temporalmente será de:

BLOQUE RUMIANTES

BLOQUE CONTROL AMBIENTAL

BLOQUE AVÍCOLA

BLOQUE PORCINO

En cuanto al desarrollo general de la asignatura, se realizaran:

- **Clases de aula**, algunas de las cuales (sobretudo en el bloque de Control Ambiental) se pedirá una cierta habilidad de cálculo numérico
- **3 Salidas**, las fechas y lugares estaran supeditadas a la disponibilidad de las empresas;

The timing of the different blocks of the subject is:

Block RUMINANT, 2 sessions (1 visit), 10-17/2/2023

Block ENVIRONMENTAL CONTROL, 8 sessions, 24/2/2023 to 5/5/2023

Block POULTRY, 2 sessions (1 visit), 12-19/5/2023

Block SWINE, 2 sessions (1 visit), 26/5/2023 and 2/6/2023

The subject activities will be:

- **Lectures**, some of them (mainly in Environmental Control) will need calculus skill
- **3 visits**, date and place conditioned by firm availability; a first attempt of dates are: 2nd academic week (17/2/2023), 14th academic week (19/5/2023) and the last one (2/6/2023)
- Some **activities** (related to visits and lectures), **optional, no scoring weight**
- **Tests** (See Evaluation)
- **Partial exams** (See Evaluation)

Evaluation

- **1st partial exam** (See Schedule): with the contents of block "Ruminants" and the first part of block "Environmental Control", **rating score 50% weight**, compulsory passing or obtaining a **mínimum score of 4,0 to compensate**.
- **2nd partial exam** (See Schedule): with the content of the second part of the block "Environmental Control" and the block of "Swine" and "Poultry", **rating score 50% weight**, compulsory passing or obtaining a **mínimum score of 4,0 to compensate**.

The maximum subject result that can be obtained in a final exam never will be more than the lowest passed result obtained at first instance.

Bibliography

Basic references

Aland, A., Banhazi, T. (Eds.), 2013. Livestock housing. Modern managment to ensure optimal health and welfare of farm animals. Ed. Wageningen Academic Publishers, Países Bajos.

ASHRAE, 2009. 2009 ASHRAE Handbook, Fundamentals, SI Edition. Ed. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. USA.

Buxadé, C. (Ed.), 1997. Alojamientos e instalaciones (I). Ed. Mundi-Prensa, España.

Buxadé, C. (Ed.), 1998. Alojamientos e instalaciones (II). Ed. Mundi-Prensa, España.

Forcada, F., Babot, D., Vidal, A., Buxadé, C., 2009. Ganado porcino: diseño de alojamientos e instalaciones. Ed. Servet, España.

Sanz, E., Buxadé, C., Ovejero, I., 1988. Bases para el diseño de alojamientos e instalaciones ganaderas. Ed. Asociación de Ingenieros Agrónomos de Cataluña, España.

More references

Buxadé, C. (Ed.), 2002. La gestión en la explotación ganadera. Ed. Mundi-Prensa, España.

Caja, G., López, J. (Eds.), 2002. Ordeño robotizado. Ed. Agrícola Española, España.

García López, J., Ponce de León, J., Lucini, J., 1984. Manual de control de instalaciones de ordeño mecánico. Ed. MAPA-Mundi-Prensa, España.

Maroto, C., Ciria, J., Gallego, L., Torres, A., 1997. Gestión de la producción ganadera. Modelos, técnicas y aplicaciones informáticas. Ed. Mundi-Prensa-Caja Rural, España.

Smith, P., Crabtree, H., 2005. Pig environment problems. Ed. Nottingham University Press, UK.

Smith, P., Bird, N., Crabtree H.G., 2009. Perfecting the pig environment. Ed. Nottingham University Press, UK.