
	<b>PROCESO PARA EL DESARROLLO DE LAS ENSEÑANZAS DE LA ESCUELA DE INGENIERÍAS AGRARIAS</b>		
		<b>CÓDIGO:</b> <b>P/CL009_EIA_D002</b>	

## ANIMAL SCIENCE AND TECHNOLOGY II

2017-2018

Identification and characteristics of the subject			
Code	501145	Credits ECTS	6
Denomination (Spanish)	<b>Tecnologías de la Producción Animal II</b>		
Denomination (English)	Animal Science and Technology II		
Degree	Agriculture and Livestock Engineering		
Center	Agricultural Engineering School		
Semester	Sixth (6th)	Character	Compulsory
Module	Agriculture and Livestock Technologies		
Materia	Animal Science and Technology		
Professor/s			
Name	Room	e-mail	Web link
<b>Paula Gáspar García</b>	D714 Edificio Valle del Jerte	pgaspar@unex.es	
<b>Antonio Rodríguez de Ledesma Vega</b>	D707 Edificio Valle del Jerte	rledesma@unex.es	
Field of knowledge	Animal Production		
Department	Animal Production and Food Science		
Coordinator (in case the is more than one professor )	<b>Antonio Rodríguez de Ledesma Vega</b>		
Specific skills of the subject:			
CETE1 – Animal Production Technology. Animal Anatomy, Animal Physiology, Animal Production Systems, Animal Production Techniques, Genetics and Animal Welfare			
Lessons and Content			
Short description of the content			
<p>The aim of the Agricultural Engineer in Animal Production is to produce food with a high-quality standard from farm animals. In addition, these foods have to be produced in a framework within the principle of sustainability, animal welfare, and an environment respect.</p> <p>In the subject of Animal Production Technologies II, only the main ruminants' species breed in animal farms are studied, specifically cattle, sheep and goats. Each one in its dairy and meat production.</p>			
Syllabus			
<b>BLOCK I: DAIRY CATTLE</b>			
<b>Theme1.- Bovine dairy breeds</b>			
<ul style="list-style-type: none"> <li>- Main bovine dairy breeds in Spain. Productive traits of the Holstein breed.</li> <li>Morphological rating of the dairy cow.</li> </ul>			
<b>Theme2.- Production systems</b>			

- Productive framework of the dairy systems. Dairy productions. Dairy production systems. Sizing a virtual farm.

**Theme 3.- Dairy cattle reproduction(I)**

- Reproductive cycle in a dairy cow. Analysis of the main reproductive phases.

**Theme 4.- Dairy cattle reproduction (II)**

- Artificial Insemination in dairy cows. Reproductive indicators.

**Theme5.- Milk production (I)**

- Milking function in dairy cows. Factors involved in the production and quality of cow's milk.

**Theme6.- Milk production (II)**

- Milking routines. Milk control procedures. Rutinas de ordeño en vacuno de leche. Control lechero. Official regulations.

**Theme 7.- Housing and facilities in dairy cattle**

- Housing and facilities requirements. Milking area: waiting room and parlor. Design and sizing.

**Theme8.- Dairy cattle nutrition**

- Nutritional requirements in dairy cattle. Mobilization of body reserves and associated pathologies. Body score.

**Theme9.- Dairy cattle feeding**

- Food in the different productive states. Feeding strategies. Feeding calf.

Developed Skills: CB1, CB2, CB3, CB4, CB5, CG1, CG6, CG8, CG9, CG10, CG11, CG12, CT1, CT2, CETE1

**BLOCK II: BEEF CATTLE**

**Theme10.- Beef cattle breeds**

- Main beef cattle breeds in extensive systems. Beef cattle traits. Heterosis and hybrid vigor. Crossbreeding strategies in beef cattle.

**Theme11.- Beef cattle production systems**

- Productive framework of the beef cattle farming systems in beef cattle. Beef cattle productions.

**Theme 12.- Beef cattle housing and facilities**

- Housing and facilities requirements. Cattle equipment. Sweep systems. Squeeze chutes.

**Theme13.- Reproduction in beef cattle**

- Cow and bull breed strategies in beef cattle. Reproductive planning. Reproductive cycle in beef cattle. Reproductive indicators.

**Theme 14.- Beef cattle nutrition (I)**

- Body score in beef cattle. Nutritional requirements in beef cattle.

**Theme 15.- Beef cattle feeding (II)**

- Stocking rate and grazing capabilities. Grazing systems in beef cattle.

**Theme16.- Beef production (I)**

- Body grow in beef cattle. Factors involved in the production and quality of beef. Classification of beef livestock. Beef production systems.

**Theme17.- Beef production (II)**

- SEUROP classification. Beef quality assessment. Official regulations.

Develop skills: CB1, CB2, CB3, CB4, CB5, CG1, CG6, CG8, CG9, CG10, CG11, CG12, CT1, CT2, CETE1

### BLOCK III: SHEEP and GOATS

#### Theme 18.- Sheep and goats breeds

- Main sheep and goats breeds in Spain. Useful traits in farming. Heterosis and hybrid vigor. Crossbreeding strategies.

#### Theme 19.- Productions systems in small ruminants

- Productive framework of the beef cattle systems. Farming systems in beef cattle. Beef cattle productions. Productive framework of sheep and goats for milk and meat.

#### Theme 20.- Housing and facilities in small ruminants

- Housing and facilities requirements. Small ruminants' parlors. Design and sizing.

#### Theme 21.- Reproduction in small ruminants (I)

- Reproductive cycle in a sheep. Analysis of the main reproductive phases. Reproductive planning. Indicators.

#### Theme 22.- Bioendocrine control in small ruminants' reproduction (II)

- Bioendocrine procedures in small ruminants farming.

#### Theme 23.- Small ruminant nutrition (I)

- Body score in sheep and goat. Nutritional requirements.

#### Theme 24.- Small ruminant feeding (II)

- Grazing and feeding in extensive systems.

#### Theme 25.- Dairy production in small ruminants (I)

- Milking function. Factors involved in the production and quality of small ruminants' milk.

#### Theme 26.- Dairy production in small ruminants (II)

- Milking routines. Indicators. Milking controls in breeding schemes. Official legislation.

#### Theme 27.- Meat production y small ruminants (I)

- Body grow function. Factors involved in the production and quality of lamb and kid meat. Milking lamb production. Fat-lamb production.

#### Theme 28.- Meat production y small ruminants (II)

- SEUROP classification. Meat quality assessment. Official regulations.

Develop Skills: CB1, CB2, CB3, CB4, CB5, CG1, CG6, CG8, CG9, CG10, CG11, CG12, CT1, CT2, CETE1

### PRACTICAL SYLLABUS

#### Practice 1.- Introduction to a prospective study

Structure of the final work, design and layout.

#### Practice 2.- Writings related to livestock farming

Paying special attention in farm grazing contracts.

#### Practice 3.- Accounting in livestock farming

Starting from and farm accounting database, the students obtain outputs of VAT and personal income tax returns.

#### Practice 4.- Rations in dairy farming

State of the art of the principles of intensive rations design.

#### Practice 5.- Feeding in extensive systems

State of the art of the principles of rations supply in extensive systems.

**Practice 6.- Housing designs and sizing**

Design and sizing of housing and parlors in dairy cows.

**Practice7.- Reproductive planning in small ruminants**

Design of the most important reproductive planning in s.r..

**Practice8.- Visit to a livestock cooperative**

Visit to the most important livestock cooperative in Caceres region. Lambs and calves feedlots.

**Practice9.- Visit to CENSYRA. Bovine**

Visit to CENSYRA in Badajoz. Research Center of livestock genetics and reproduction. Bovine.

**Practice10.- Visit to CENSYRA. Ovine**

Visit to CENSYRA in Badajoz. Research Center of livestock genetics and reproduction. Ovine.

**Practice10.- Prospective of a livestock farm**

Field practice made by groups of students. Visit and prospective study of a real farm. Only ruminants.

**Practice11.- Technical project**

Technical work made along the semester based on the day to day knowledge, taught in class. Virtual farms assigned to each student.

**Education Activities**

Student working hours		Attendance		Tutorial activities	Non attendance
Lesson	Total	GG	SL	TP	EP
Presentation	0,5	0,5			
Lesson 1	2,5	1			1,5
2	3,5	1,5			2
3	4	1,5		0,5	2
4	4	1,5		0,5	2
5	3	1			2
6	3	1			2
7	3	1			2
8	4,5	2		0,5	2
9	4	1,5		0,5	2
10	3	1			2
11	2,5	1			1,5
12	2,5	1			1,5
13	4	1,5		0,5	2
14	4,5	2		0,5	2
15	3,5	1,5			2
16	3	1			2
17	2,5	1			1,5
18	3	1			2
19	2,5	1			1,5
20	2,5	1			1,5
21	4	1,5		0,5	2

22	3	1		0,5	1,5
23	3,5	1,5			2
24	3,5	1,5			2
25	3	1			2
26	2,5	1			1,5
27	3	1			2
28	2,5	1			1,5
		<b>35</b>			<b>51,5</b>
<b>LABORATORY</b>					
1. Prospective study	4		2		2
2. Official writings	4		2		2
3. Accounting in livestock	4,5		2,5		2
4. Rations design	4,5		2,5		2
5. Feeding in extensive system	4,5		2,5		2
6. Reproductive planning	3,5		1,5		2
7. CENSYRA visit. Bovine	4		2		2
8. Livestock cooperative visit	4,5		2,5		2
9. CENSYRA visit. Ovine	4		2		2
10. Livestock farm prospective	13,5		3	3,5	7
11. Technical project	6				6
			<b>22,5</b>		<b>31,0</b>
<b>Exam</b>	2,5	2,5			
<b>Total Evaluation</b>	<b>150</b>	<b>37,5</b>	<b>22,5</b>	<b>7,5</b>	<b>82,5</b>

GG: big group (100 students).

SL: laboratory

TP: Tutorial class

EP: non attendance.



### Evaluation procedure

#### A) CONTINUOUS EVALUATION:

- Final Exam (70%)
- Continuous evaluation (attendance and participation) (15%)
- Livestock farm prospective (15%)

#### B) ALTERNATIVE SYSTEM

- Final exam (test) (70%)

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- Final exam (questions and problems) (30%)



### Bibliography

#### **GENERAL**

- Buxadé, C. (Dir.), 1993. Gestión de la producción ganadera. Ed. FESLAC, Madrid,
- Buxade, C. (Dir), 1995. Zootecnia: Bases de la producción animal. Colección en XIII tomos, Ed. Mundi Prensa, Madrid.
- Buxadé, C. (Dir.), 1997. Zootecnia, Bases de Producción Animal, Monografía I y II. Alojamientos e instalaciones. Ed. Mundi-Prensa, Madrid.
- Cañeque, V.; Sañudo, C. (coord.), 2001. Metodología para el estudio de la canal y de la carne en rumiantes. Ed. INIA, Madrid.
- Church, C.D., 1993. El rumiante, fisiología digestiva y nutrición de los ruminantes. Ed. Acribia, Zaragoza.
- De Blas, C.; González, G.; Argenteria, A., 1987. Nutrición y alimentación del ganado. Ed. Mundi Prensa, Madrid.
- Garcia-Sacristan, A. (Coord.), 1995. Fisiología veterinaria. Ed. McGraw Hill Interamericana, México,
- García-Vaquero, E., 1987. Diseño y construcción de alojamientos ganaderos. Ed. Mundi-Prensa, Madrid.
- INRA, 1990. Alimentación de bovinos, ovinos y caprinos. Ed. INRA, Mundi-prensa, Madrid.
- Sanz, E.; Buxadé, C. y Ovejero, I., 1988. Bases para el diseño de alojamientos e instalaciones ganaderas. Asociación de Ingenieros Agrónomos de Cataluña.
- Sañudo, C.; Forcada, F.; Cepero, R., Thos, J., 1986. Manual de identificación etnológica. Ed. Librería General, Zaragoza.
- Sotillo, J.L. y Serrano, V., 1985. Tomos I y II. Etnología y Zootecnia. Ed. Tebas. Albacete
- Torrent, M. 1982. Zootecnia básica aplicada. Ed. Aedos. Barcelona.

#### **BOVINE**

- Buxadé, C. (Coord). 1996. Tomo VII: Producción bovina de leche y carne. Colección Zootecnia: bases de la producción animal, Ed. Mundi-prensa, Madrid,
- Buxadé, C. (Coord).1997. Vacuno de carne: aspectos claves. Ed. Mundi-prensa, Madrid.
- Buxadé, C. (Coord.), 1997. Vacuno de leche: aspectos claves, Ed. Mundi-Prensa, Madrid,
- Buxadé, C., (Coord. y Dir). 1996. Control, gestión y contaminación en el vacuno lechero, Ed. FESLAC, Madrid,
- INRA, 1990. Alimentación de bovinos, ovinos y caprinos. Ed. INRA, Mundi-prensa, Madrid.
- Miller, W.J., 1988. Nutrición y alimentación del ganado vacuno lechero. Ed. Acribia, Zaragoza.
- N.R.C., 1996. Nutrient requirements of beef cattle. Ed. National Academy Press, Washington, D.C.
- Sanz Parejo, E., 1990. Los nuevos sistemas de alimentación en vacuno lechero. Ed. Aedos, Barcelona.

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- Schimidt, G.H., 1974. Biología de la Lactación. Ed. Acribia, Zaragoza.
- Torrent, M., 1991. La vaca de leche y el ternero de carne. Ed. AEDOS, Barcelona.

***OVINE AND CAPRINE***

- Buxadé, C. (Coord), 1997. Ovino de leche: aspectos claves. Ed. Mundi-Prensa, Madrid.
- Buxadé, C. (Coord), 1998. Ovino de carne: aspectos claves, Ed. Mundi-Prensa, Madrid,
- Buxadé, C. (Coord). 1996. Tomo IX: Producción caprina. Colección Zootecnia: bases de la producción animal, Ed. Mundi-prensa, Madrid.
- Buxadé, C. (Coord). 1996. Tomo VIII: Producción ovina, Colección Zootecnia: bases de la producción animal. Ed. Mundi-prensa, Madrid.
- Cañeque, V.; Ruíz, F.; Felipe, J.; Hernández, J.A., 1989. Producción de carne de cordero, Ed. MAPA, Madrid.
- Esteban Muñoz, C., 1997. El ganado ovino y caprino en el área de la Unión Europea y en el Mundo. Ed. MAPA, Madrid.
- Falles, I., 1994. Nuevas técnicas en producción ovina, Ed. Acribia, Zaragoza.
- INRA, 1990. Alimentación de bovinos, ovinos y caprinos, Ed. INRA, Mundi-prensa, Madrid.
- NRC, 1981. Nutrient requirements of goats (6th edición.). Ed. National academic press. Washington.
- NRC, 1985. Nutrient requirements of sheep (6th edición.). Ed. National academic press. Washington.
- SanchezBelda, A., 1986. Merinos precoces y razas afines en España. Ed. Asociación Española de Criadores de Ovinos Precoces, Madrid.
- Torrent, M., 1991. La oveja y sus producciones. Ed. AEDOS, Barcelona.
- VV. AA. 1998. Reproducción y mejora de pequeños rumiantes. Curso superior 4/98. Consejería de Agricultura y Pesca de la Junta de Andalucía, Sevilla.

**Tutorial timetable**

Scheduled tutorial:

See web EIA

[http://www.unex.es/conoce-la-uex/estructura-academica/centros/eia/info\\_academica\\_centro/directorio](http://www.unex.es/conoce-la-uex/estructura-academica/centros/eia/info_academica_centro/directorio)

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