

Academic Year/course: 2021/22

28942 - Ruminant production

Syllabus Information

Academic Year: 2021/22

Subject: 28942 - Producción de rumiantes

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 583 - Degree in Rural and Agri-Food Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: Optional

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process is based on providing to the student the concepts and the basic tools for further learning of the most relevant technological applications in animal science. Combining the fundamental approach of the theoretical classes with a set of practical activities will allow a better understanding of the technologies and at the same time show its applicability.

4.2. Learning tasks

The course includes the following learning tasks:

- Lectures,
- Visits to farms,
- Case studies and Lab practices

4.3. Syllabus

The course will address the following topics:
Theory program

Section I Beef cattle (9h)

Topic 1 - Description of the bovine sector (1h)

1. Historical background
2. Importance of production: Censuses, production, commerce and consumption on a global, European Union and Spanish level

3. The current structure of cattle farms in Spain

4. The environment and the exploitation system

5. Institutional assistance for cattle production

6. Applicable legislation

Topic 2 ? Beef cattle farming -1 (2h)

1. Introduction

2. Production systems: introduction, general characteristics of the extensive systems, the mountain system, the pasture

system, the humid Spain system

3. Replenishment
4. Reproduction management
5. Genetic base and improvement

Topic 3 - Beef cattle farming -2 (2h)

1. Feeding: Nutritional needs and ingestion capacity during the producing cycle, formulating rations, the importance of corporal conditions
2. Hygienic-sanitary handling in beef cattle farming
3. Beef cattle animal welfare
4. Shelter and installations for extensive cattle
5. Farm planning and technical-economical management

Topic 4 ? Rearing and fattening calves in an intensive regime (2h)

1. Introduction and genetic bases
2. Commercial categories in beef cattle
3. Handling and feeding suckling calves
4. Growth and finishing: Nutritional needs and ingestion capacities, food handling
5. Animal welfare in fattening calves
6. Installations for fattening cattle
7. Technical-economical management

Topic 5 ? Quality of the bovine carcass (2h)

1. Introduction and basic concepts
2. Definition of carcass
3. Quality of the carcass
4. Classification of the carcasses
5. Factors affecting the quality of the carcass and the carcass yield
6. Spanish and European legislation and brands of quality

Section II ? Dairy cattle (12h)

Topic 6 ? Dairy cattle farming (2h)

1. Introduction and recap on the animal basis
2. Description of the productive cycle
3. Dairy cattle livestock breeding and raising
4. Hygienic-sanitary handling in the dairy cattle farm
5. Animal welfare in dairy cattle

Topic 7 ? Reproductive handling and genetic improvement in dairy cattle (2h)

1. Introduction
2. Handling the reproduction: Importance and objectives, reproductive rates, strategies of reproductive intensification, management during delivery and postpartum, voluntary waiting period, implementation of reproductive control, factors influencing reproductive failure.
3. Genetic improvements in dairy cattle

Topic 8 ? Dairy cattle feeding (2h)

1. Introduction
2. Importance and objectives
3. Evaluation of the nutritional needs and ingestion capacity during the reproductive cycle
4. Formulating rations for each phase of the reproductive cycle
5. Feeding systems
6. Evaluating the corporal condition and weight

Topic 9 - Lactation and milking (2h)

1. Introduction
2. Study of lactation curves
3. Parameters of milk quality
4. Factors affecting the quality and quantity of cow's milk
5. Milk testing
6. Mastitis and its prevention
7. Milking: Phases and velocity of milking; yield and work organization (milking routine and milking hygiene); milking frequency; mechanical milking (sanitation of the milking installations; possibilities for checking the milk)
8. Drying

Topic 10 ? Dairy cattle livestock installations (2h)

1. Introduction: General criteria of livestock installations, factors affecting the dairy cattle installations
2. Example of the general layout of a medium-sized dairy farm
3. Classical free stabling vs. free stabling with cubicles
4. Machines and equipment associated with feeding in free stabling
5. Heat protection systems
6. Stabling suckling calves
7. Stabling growing calves
8. Welfare regulations for calves
9. Installations for wastewater and livestock excrement

Topic 11 ? Technical-economic management of the dairy cattle business (2h)

1. Introduction to technical-economic management
2. Gathering, recording and preparing data
3. Monitoring the results according to technical and economical indices
4. Profitability study
5. IT and management
6. Specific case study: Analysis, interpretation, diagnosis and decision making

Section III ? Sheep and goat production (19h)

Topic 12 - Description of the sheep and goat sector (2h)

1. Historical background
2. Importance of the production: Censuses, productions, commerce and consumption on a global level, in the European Union and in Spain
3. Current structure of the sheep and goat farms in Spain
4. The environment and the farming system

5. Institutional assistance for sheep and goat production
 6. Applicable legislation
- Topic 13 ? Meat sheep farming -1 (2h)
1. Introduction
 2. Reproduction: The importance of reproduction in sheep production: Limitations and possibilities, reproductive control, intensive reproduction, organizing and handling reproduction
 3. Genetic improvements in meat sheep
- Topic 14 ? Meat sheep farming-2 (2h)
1. Handling sheep livestock: General, general farm handling, shearing, handling lambs
 2. Hygienic-sanitary handling
 3. The environment and animal welfare
 4. Sheep carcass quality
 5. Skin and wool production
- Topic 15 ? Milk sheep farming (3h)
1. Introduction and recap of the animal base
 2. Reproductive handling and genetic improvement
 3. Lactation curves
 4. Factors affecting the quality and quantity of the milk
 5. Milking: Manual milking and mechanical milking, milking phases and the milking velocity, handling the milking
 6. Drying
- Topic 16 ? Sheep feeding (2h)
1. Introduction
 2. Nutritional needs and ingestion capacity during the production cycle
 3. Formulating rations
 4. Importance of corporal condition. The use of sub-products
 5. Handling the flock in the pasture
- Topic 17 ? Goat farming (2h)
1. Introduction
 2. Differentiating characteristics from the sheep species
 3. Reproduction and genetic improvement
 4. Meat production
 5. Goat's milk production
 6. General running of goat farms
 7. Hygienic-sanitary handling
- Topic 18 ? Goat feeding (2h)
1. Introduction
 2. Nutritional needs and ingestion capacity during the production cycle
 3. Formulating rations
 4. Importance of corporal condition
 5. Handling the flock in the pasture
- Topic 19 ? Technical-economic small ruminant farming (2h)
1. Introduction
 2. Gathering, recording and preparing data
 3. Monitoring the results according to technical and economical indices
 4. Profitability study
 5. IT and management
 6. Specific case study: Analysis, interpretation, diagnosis and decision making
- Topic 20 - Installations for small ruminants (2h)
1. Installations for sheep livestock
 2. Extensive and intensive systems
 3. Feedlots
 4. Milking rooms and dairies
 5. Diverse material and tools
 6. Installations for goat livestock
 7. Environmental issues of sheep and goat farming
 8. Hygiene of the installations
 9. The welfare of small ruminants

Practical Program

- Practical 1: Visit a beef cattle farm
- Practical 2: Meat quality in ruminants. Importance of meat quality. pH. Colour. Water retention capacity. Firmness. Colour and fat consistency. Smell and flavor.
- Practical 3: Visit a dairy cattle farm
- Practical 4: Formulating cattle rations. Formulating rations for beef cattle, veal calves, and dairy cattle
- Practical 5: Visit a sheep meat farm
- Practical 6: Formulation of feedstuffs for small ruminants. Formulating rations for sheep and goats in different physiological phases and for lambs and kids
- Practical 7: Technical-economical management of ruminants. Handling and interpreting technical-economical management programs for ruminants

4.4. Course planning and calendar

Week	Theoretical class (2 h)	Practical class (2 h)	Independent work	Total

1	Unit 1 Unit 2		(2 h)	6
2	Unit 3 Unit 4	Práctica 1	(4 h)	13
3	Unit 5 Unit 6		(4 h)	8
4	Unit 7 Unit 8		(4 h)	8
5	Unit 9 Unit 10	Práctica 2	(4 h)	13
6	Unit 11		(2 h)	4
7	Unit 12		(2 h)	4
8	Unit 13		(2 h)	4
9	Unit 14	Práctica 3	(2 h)	9
10	Unit 15	Práctica 4	(2 h)	9
11	Unit 16		(4 h)	6
12	Unit 17		(4 h)	6
13			(8 h)	8
14			(8 h)	8
15			(8 h)	8
16	Unit 18		(4 h)	6
17	Unit 19		(4 h)	6
18	Unit 20		(4 h)	6
19			(8 h)	8
20	Evaluation		(6 h)	10
Hours	44	20	86	150

4.5. Bibliography and recommended resources

- BB** Blas Beorlegui, Carlos de. Normas FEDNA para la formulación de piensos compuestos / elaboradas por C. de Blas, G.G. Mateos y P.G. Rebollar . [Madrid] : Fundación Española para el Desarrollo de la Nutrición Animal, 1999
- BB** Ovino de carne : aspectos claves / coordinador y director, Carlos Buxadé Carbó ; con la participación de 36 profesionales y la colaboración de... Antonio Purroy Unanua . Ed. corregida Madrid [etc.] : Mundi-Prensa, cop. 1998
- BB** Ovino de leche : aspectos claves / con la participación de 34 profesionales ; coordinador y director, Carlos Buxadé Carbó . Madrid [etc.] : Mundi-Prensa, 1997
- BB** Ovinotecnia : producción y economía en la especie ovina : homenaje al profesor Isidro Sierra Alfranca / edición y coordinación Carlos Sañudo Astiz y Ricardo Cepero Briz . 1ª ed. Zaragoza : Prensas Universitarias de Zaragoza, 2009

- BB** Sañudo Astiz, Carlos. Producción de ganado vacuno de carne y tipos comerciales en España / Carlos Sañudo, Vicente Jimeno, Manuel Cerviño. Alcobendas, Madrid : Schering-Plough, cop. 2008
- BB** Vacuno de carne : aspectos claves / coordinador y director Carlos Buxadé Carbó ; con la participación de 41 profesionales . Madrid : Mundi-Prensa, 1997
- BB** Vacuno de leche : aspectos claves / coordinador y director Carlos Buxadé Carbó ; con la participación de 35 profesionales . Madrid : Mundi-Prensa, 1997
- BC** Abecia Martínez, Alfonso. Manejo reproductivo en ganado ovino / Alfonso Abecia Martínez, Fernando Forcada Miranda . Zaragoza : Servet, [2010]
- BC** Alimentación de bovinos, ovinos y caprinos / obra colectiva dirigida por J.[i.e.R.] Jarrige ; versión española de Javier González Cano . Madrid : Mundi-Prensa, 1990
- BC** Alojamiento e instalaciones. I / Coordinador y director, Carlos Buxadé Carbó ; con la participación de 12 autores . Madrid [etc.] : Mundi-Prensa, 1997
- BC** Alojamiento e instalaciones. II / Coordinador y director, Carlos Buxadé Carbó ; con la participación de 12 autores . Madrid [etc.] : Mundi-Prensa, 1998
- BC** Avances de la ciencia de la producción lechera / coordinador, C.J.C. Phillips ; traducido por Jaime Esaín Escobar . Zaragoza : Acribia, 1998
- BC** Bienestar animal y ganado porcino : mitos y realidades / coordinadores, Carlos Buxadé Carbó, Dionisio López Montes ; con la participación de 11 profesionales . [Madrid : Mundi-Prensa, 2005]
- BC** Blas Beorlegui, Carlos de. Producción extensiva de vacuno / Carlos de Blas Beorlegui ; con la colaboración de Jesús Alegre Alvaro...[et al.] . Madrid : Mundi-Prensa, 1983
- BC** Corcy, Jean-Christophe. La cabra / Jean-Christophe Corcy ; versión española de J. Gallego García . Barcelona : Aedos ; Madrid : Mundi-Prensa, 1993
- BC** Daza Andrada, Argimiro. Ganado caprino : producción, alimentación y sanidad / Argimiro Daza Andrada, Carlos Fernández Martínez, Antonio Sánchez López . Madrid : Editorial Agrícola Española, D.L. 2004
- BC** Daza Andrada, Argimiro. Mejora de la productividad y planificación de explotaciones ovinas/ Argimiro Daza Andrada . Madrid : Editorial Agrícola Española, 2002
- BC** Daza Andrada, Argimiro. Reproducción y sistemas de explotación del ganado ovino / Argimiro Daza Andrada . Madrid [etc.] : Mundi-Prensa, 1997
- BC** Dudouet, Christian. La production des bovins allaitants / Christian Dudouet . [Paris] : Editions France Agricole, 1999
- BC** Elli, Massimiliano. Manual de reproducción en ganado vacuno : Manual Fatro/ Massimiliano Elli . Zaragoza : Servet, Diseño y Comunicación S.L., D.L. 2006
- BC** Gestión técnica de granjas de vacuno lechero : aspectos de manejo / director y coordinador : Pedro José Álvarez Nogal . León : Universidad de León, D.L. 2008
- BC** Gordon, Ian. Reproducción controlada del ganado vacuno y búfalos / Ian Gordon ; traducido por Mariano Illera Martín . Zaragoza : Acribia, D. L.1999
- BC** Manual sobre cabras / [José Salvador del Amo García... (et al.)] . Madrid : Ministerio de Agricultura, Pesca y Alimentación, Servicio de Extensión Agraria : Mundi-Prensa, 1989
- BC** Mayén Mena, Javier. Explotación caprina / Javier Mayén Mena . 1ª ed. México : Trillas, 1989
- BC** National Research Council (2007). Nutrient requirements of small ruminants: sheep, goats, cervids and new world camelids. Washington: National Academy Press
- BC** Necesidades nutricionales para rumiantes de cebo : normas FEDNA / elaboradas por, A. Ferret ... [et al.] . Madrid : Fundación Española para el Desarrollo de la Nutrición Animal, 2008
- BC** Necesidades nutricionales para rumiantes de leche : normas FEDNA / elaboradas por, S. Calsamiglia ... [et al.] . Madrid : Fundación Española para el Desarrollo de la Nutrición Animal, 2009
- BC** Nutrient requirements of beef cattle / Subcommittee on Beef Cattle Nutrition, Committee on Animal Nutrition, Board on Agriculture, National Research Council . 7th rev. ed. Washington : National Academy Press, 1996

- BC** Nutrient requirements of dairy cattle / Subcommittee on Dairy Cattle Nutrition, Committee on Animal Nutrition, Board on Agriculture and Natural Resources, National Research Council . 7th rev. ed. Washington : National Academy Press, 2001
- BC** Portolano, Nicola. Explotación de ganado ovino y caprino / Nicola Portolano ; versión española de J. Gallego García . Nueva ed., a cargo de Baldassare Portolano Madrid : Mundi-Prensa, 1990
- BC** Producción caprina / coordinador y director Carlos Buxadé Carbó ; con la participación de 28 autores . Madrid [etc.] : Mundi-Prensa, 1996
- BC** Producción ovina / coordinador y director, Carlos Buxadé Carbó ; con la participación de 25 autores . Madrid [etc.] : Mundi-Prensa, 1996
- BC** Producción vacuna de leche y carne / coordinador y director, Carlos Buxadé Carbó ; con la participación de 23 autores . Madrid [etc.] : Mundi-Prensa, 1996
- BC** Reprology : Controlar la reproducción es controlar el futuro[Archivo de ordenador] / M. Ennuyer... [et al.] . Libourne : CEVA Santé Animale, 2001
- BC** Sañudo Astiz, Carlos. Calidad de la canal en la especie ovina / Carlos Sañudo, Isidro Sierra. Madrid : Ministerio de Medio Ambiente y Medio Rural y Marino, Centro de Publicaciones, D.L. 2009
- BC** Sañudo Astiz, Carlos. Variación morfológica en bovino lechero / C. Sañudo, C. Sánchez García, J. M. Marcén. Madrid : Ministerio de Medio Ambiente y Medio Rural y Marino, Centro de Publicaciones, D.L. 2009
- BC** Thickett, Bill. Cría de terneros / Bill Thickett, Dan Mitchell, Bryan Hallows . Zaragoza : Acribia, D.L. 1988
- BC** Torrent Mollevi, Mateo. La vaca de leche y el ternero de carne / Mateo Torrent Mollevi . [1ª ed.] Barcelona : Aedos, 1991
- BC** Valoración morfológica de los animales domésticos / realización SEZ ; coordinador Carlos Sañudo Astiz . Madrid : Ministerio de Medio Ambiente y Medio Rural y Marino, Centro de Publicaciones, D.L. 2009
- BC** Wilkinson, J.M.. Producción comercial de cabras / J.M. Wilkinson y Barbara A. Stark ; traducido del original inglés por Pedro Ducar Maluenda . [1a. ed.] Zaragoza : Acribia, imp. 1989

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Acero, P. (2004). Planificación y manejo de la explotación del ovino de leche. Valladolid: Consejería de Agricultura y Ganadería

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Acero, P. (2009). Planificación y manejo de la explotación del ovino de carne. Valladolid: Servicio de Formación Agraria e Iniciativas

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Asociación Nacional de Especialistas en Medicina Bovina, ANEMBE

[<https://www.anembe.com/>]

Fundación Española para el Desarrollo de la Nutrición Animal, FEDNA

[<http://www.fundacionfedna.org/>]

Gutiérrez, P. (2009). Manual práctico de manejo de una explotación de vacuno lechero. Valladolid: Servicio de Formación Agraria e Iniciativas, Junta de Castilla y León

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Sañudo, C., Sánchez García, C., Marcén, J.M. (2009). Variación morfológica en bovino lechero. En C. Sañudo (Coord.), Valoración morfológica de los animales domésticos (pp. 231-274). Madrid: Ministerio de Medio Ambiente y Medio Rural y Marino, Secretaría General Técnica, Centro de Publicaciones

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Sociedad Española de Ovinotecnia y Caprinotecnia, SEOC

[<http://seoc.eu/es/inicio/>]

The updated recommended bibliography can be consulted in:
<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28942>