

## 28419 - Animal Nutrition

### Información del Plan Docente

Academic Year	2016/17
Academic center	105 - Facultad de Veterinaria
Degree	451 - Degree in Veterinary Science
ECTS	6.0
Course	2
Period	Second semester
Subject Type	Compulsory
Module	---

### 1. Basic info

#### 1.1. Recommendations to take this course

#### 1.2. Activities and key dates for the course

### 2. Initiation

#### 2.1. Learning outcomes that define the subject

#### 2.2. Introduction

### 3. Context and competences

#### 3.1. Goals

#### 3.2. Context and meaning of the subject in the degree

#### 3.3. Competences

#### 3.4. Importance of learning outcomes

### 4. Evaluation

### 5. Activities and resources

#### 5.1. General methodological presentation

The learning process designed for this subject is based on an in-person attendance part, which will be structured in 42 lecture classes of theory of 50 minutes length, and 18 practical classes, divided in 10 classes of practical nutrition cases to be resolved in class (5 sessions of 2 hours), 6 hours of practice in laboratory and 2 h of databases management in computer.

The list of topics included in the theory program is divided into two sections, Nutrient evaluation and Requirements, with 28 and 14 h, respectively. Associate documentation (including concepts in theory, examples and supporting graphics and images) will be available for the students one week in advance, by means of the ADD. Classes of practical cases will

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include problems to be solved in group, to give support to the theory concepts giving in class. Laboratory practices will consist on microscopy inspection for identification of ingredients in feed, and will be combined with basic notions of management of tables of requirements and nutrient databases.

### 5.2.Learning activities

### 5.3.Program

Program of lecture classes of theory:

Lesson 1. Concept of Nutrition. Bases and objectives of animal nutrition. Chemical composition of feeds and animal body. (1 h)

Lesson 2. Feeds 1. Classification based on chemical composition. Components of plant cell content and cell wall. Fibrous feeds. Feeds rich in non-structural carbohydrates. (2 h)

Lesson 3. Feeds 2. Nitrogen-rich vegetal and animal feeds. Fats. (2 h)

Lesson 4. Feeds 3. Vitamines. Minerals. Additives. (2 h)

Lesson 5. Rumen microbial ecosystem. Microbiology. Microbial degradation of fibre. Protein utilization. Rumen biohydrogenation of fatty acids. (2 h)

Lesson 6. Digestibility. Digestibility in different sites of the digestive tract. Apparent and real digestibility. Methods of determination. (1 h)

Lesson 7. Factors affecting digestibility. Composition, associative effects, effect of feed processing. Animal species, physiological stage, level of feeding. (2 h)

Lesson 8. Energy evaluation. Energy partition of feeds. Physiological combustion values. (1 h)

Lesson 9. Utilization of metabolizable energy for different physiological functions: factors. Energy costs of fat and protein synthesis. Energetic efficiency of storage and mobilization of energy reserves. (2 h)

Lesson 10. Energy evaluation systems for monogastric animals. Systems based on digestible, metabolizable or net energy. Predicting energy value of feeds. (1 h)

Lesson 11. Energy evaluation systems for ruminants. British system and variable net energy system. INRA system. NRC system. (3 h)

Lesson 12. Protein evaluation for monogastric animals. Concept of limiting aminoacid. Aminoacid availability and estimation. Evaluation methods. (1 h)

Lesson 13. Protein evaluation for ruminants. Potential and effective rumen degradability of protein. Factors affecting protein rumen degradability. (1 h)

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Lesson 14. Microbial protein synthesis: efficiency and factors affecting. Protein-energy interactions in ruminants. Value of protein reaching the duodenum. (1 h)

Lesson 15. Protein evaluation systems for ruminants. ARC systems. INRA system. CNPS system. (2 h)

Lesson 16. Voluntary feed intake. Intake regulation in monogastric and ruminant animals. Potential feed intake and ingestibility. Factors affecting feed intake. (1 h)

Lesson 17. Estimation of voluntary intake. Factors affecting feed intake. Fill units and rumen fill value. (2 h)

Lesson 18. Requirements and nutrient input. Energy requirements for maintenance. Basal and fasting metabolism. Energy cost of activity in animals. (1 h)

Lesson 19. Environmental effect on energy needs for maintenance. Thermoregulation. Interval of neutral temperature. Critical and critical effective temperature. (1 h)

Lesson 20. Protein requirements for maintenance. Faecal metabolic nitrogen and urinary endogenous nitrogen. Methods of determination. (1 h)

Lesson 21. Growth and development in the different animal species. Body composition and feeding. Compensatory growth. (2 h)

Lesson 22. Energy and protein requirements for growth and fattening: monogastric and ruminant animals. Factors affecting energy and protein requirements for growth and fattening . (3 h)

Lesson 23. Reproduction. Requirements of reproductive females in the different animal species. Requirements of reproductive males during mating periods. Requirements for egg production. (2 h)

Lesson 24. Requirements in pregnancy. Growth of gestating uterus and foetal nutrition. Effects of the level of feeding on different stages of pregnancy. Particularities of the different species. (2 h)

Lesson 25. Lactation. Origin of milk components. Factors affecting milk production and composition. Energy and protein requirements of the milking cow. Effects of feeding on milk production and composition. (3 h)

### **2: Practical classes:**

Practical class 1. Identification of feeds. Feed microscopy. (6 h)

Practical class 2. Management of software for feed rationing (Winfeed) (2 h)

Practical class 3 (Solving practical cases/nutrition problems) - 2 Groups per session, 5 sessions of 2 h

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- Nº hours/student: 10

### 5.4.Planning and scheduling

*The schedule and main features of the subject will be described in detail, together with the other subjects of the Degree in Veterinary Science, in the web page of the Faculty of Veterinary Science ( <http://veterinaria.unizar.es/gradoveterinaria/> ). Such link will be actualized at the start of the course.*

### 5.5.Bibliography and recomended resources

<http://psfunizar7.unizar.es/br13/eBuscar.php?tipo=a>