

Course Unit	Animal Food Science and Nutrition		Field of study	Agriculture, Silviculture and Fishery	
Bachelor in	Zootechnical Engineering		School	School of Agriculture	
Academic Year	2022/2023	Year of study	2	Level	1-2
Type	Semestral	Semester	2	ECTS credits	6.0
			Code	9129-312-2204-00-22	
Workload (hours)	162	Contact hours	T 30	TP -	PL 30
			TC -	S -	E -
			OT 20	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Mariana Martins Drumond, Vasco Augusto Pilão Cadavez

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Have knowledge of food composition analysis systems, knowledge of nutrients, their digestive and metabolic usage.
2. Quality criterias to evaluate the food and basic principles for the feeding of livestock species.
3. With the aim of enabling learners to formulate nutritionally balanced diets to increase the conversion of food into zootechnical products.

Prerequisites

Before the course unit the learner is expected to be able to:

1. Before the course unit the learner is expected to be able to: Have good knowledge
2. of anatomy, comparative morphology, animal biochemistry, physiology, ethology and welfare.

Course contents

Food composition and analysis systems of food to provide knowledge of the nutrients. Anatomy and physiology of the digestive tract of various livestock species. Digestive and metabolic use of nutrients. Systems of evaluating the energy and protein of food. Vitamin and mineral nutrition. Types of food and additives. Criteria for evaluating the quality of food and basic principles for food. Basic calculating techniques in formulating rations.

Course contents (extended version)

1. Introduction
 - Concepts of animal nutrition and feeding
 - Evolution of the science of animal nutrition. Relationship to other sciences.
 - Importance and objectives of the discipline.
 - Position of various animal species in the chain food .
 - Concept of food and nutrient.
2. The animal and food
 - Reference to general nutrient from food.
 - Water
 - Carbohydrates.
 - Proteins.
 - Lipids.
 - Minerals.
 - Composition of animals and plants.
3. Evaluation food utilization.
 - Productive value concept and nutritional value.
 - Concept of digestibility.
 - Digestive utilization coefficient (CUD) as a measure of digestibility.
 - Digestibility estimates based on composition food chemistry.
 - Microbiological methods for the determination of the digestibility of foods.
4. Nutritional Significance of the digestive system of various animal species
 - Digestive organs of different species.
 - Aspects on the physiology of digestion of ruminants and non-ruminants.
 - Microbial digestion in ruminants.
 - Rumen microbiology. Rumen microbial population.
 - microbial Interactions.
 - Digestion of carbohydrates, lipids and proteins in various livestock species.
5. Analysis of foods.
 - what chemical and biological analysis of food in Animal nutrition.
 - Food analysis systems. Analysis conventional (Weende).
 - Analysis solutions detergents (Van Soest).
 - comparison of analytical system Weende and analytical system of Van Soest.
6. Fundamental aspects of Intermediary metabolism.
 - Metabolism of carbohydrates, lipids and proteins.
 - General aspects of biosynthesis
 - General aspects of metabolic regulation.
7. Food Energy
 - Application of the principles of thermodynamics to food energy.
 - Energy content of foods.
 - Gross Energy.
 - Digestible Energy.
 - Metabolizable Energy
 - Net energy and energy deposition.
 - Heat Increment
 - Concept of basal metabolism and metabolism of fasting.
 - Systems of evaluating the energy of foods
8. Nitrogenous Nutrition
 - concept of essential amino acid, biological value and CPUP
 - Coefficient of practical use of proteins
 - Protein efficiency factors.
 - Value protein food.
 - Use of urea in ruminant feed.
9. Minerals in Animal nutrition
10. Vitamins in Animal nutrition
11. Voluntary Food Intake.
 - Concept.
 - Theories of the monitoring of intake of food in the short and long term.
12. Requirements.

Course contents (extended version)

- Methods of determination of dietary requirements.
- Distinction between food requirements and recommendations.
- Conservation requirements: concept,
- and requirements of energy, protein, minerals and vitamins
- Growth requirements
- Requirements for wool production.
- Breeding requirements.
- Food requirements for egg production.
- 8- Lactation requirements.
- 13. Feeding and Productive Roles.
 - Classification of foods.
 - Tables of nutritional value of food and feed recommendations.
 - Techniques and general procedures to be adopted in formulating feeds
 - feeding of cattle, ovines, goats, pigs, poultry and rabbits.
- 14. Practical:
 - Laboratory practice.
 - calculation of dry matter digestibility of organic matter
 - from tabulated values.
 - Calculating the energy value and protein feed different systems studied.
 - Equivalences and conversions. Techniques in formulating rations.
 - Basic calculating techniques in formulating rations to various livestock species.

Recommended reading

1. Apontamentos do docente. Artigos científicos publicados em revistas da especialidade. CHURCH, D. C. ; 1993. "El Rumiente. Fisiología digestiva y nutrición". Ed. Acribia. Zaragoza. INRA. 1981.
2. ANDRIEU, J. ; DEMARQUILLY, C. ; WEGAT-LITRE, E. , 1981. "Prévision de la valeur nutritive des aliments des ruminants". Ed. INRA. "Alimentation des bovins, ovins et caprins". Ed. INRA.
3. CHURCH, D. C. e POND, W. G. ; 1977. "Bases científicas para la nutrición y alimentación de los animales domésticos". Ed. Acribia.
4. VAN SOEST, P. J. , 1982. "Nutritional Ecology of the Ruminant Metabolism, Nutritional Strategies, the cellulolytic fermentation and chemistry of forages and plant fibers. O&B
5. P. McDONALD ; 2006. "Nutrición Animal". Ed. Acribia. ROGÉRIO DE PAULA LANA; "Nutrição e Alimentação Animal". 2007. Ed. Produção Independente

Teaching and learning methods

Classes of theory and practice. Laboratory practice. Calculation of energy and protein value of food for the different systems studied. Feeding techniques. Establishing diets and feeding plans for different livestock species. When the teacher is absent, students should work on the data of laboratory practices.

Assessment methods

1. Written insert examinations - (Regular, Student Worker) (Final)
2. Restrict exam - (Regular, Student Worker) (Final)
3. General exam - (Regular, Student Worker) (Supplementary, Special)

Language of instruction

Portuguese

Electronic validation

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22-12-2022	23-12-2022	03-01-2023	06-01-2023