

Professional Master's Degree Veterinary Nutrition





Professional Master's Degree Veterinary Nutrition

Course Modality: Online

Duration: 12 months

Certificate: TECH Technological University

Official N° of hours: 1,500 h.

Website: www.techtute.com/us/veterinary-medicine/professional-master-degree/master-veterinary-nutrition

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01

Introduction

The animal world faces new challenges every day related to digestive processes, food tolerances or problems with the metabolism of different species. Therefore, this program focused on Veterinary Nutrition has been designed to give a global and complete perspective of the nutrients needed by animals, so that veterinary professionals can update and improve their technical and practical knowledge within the sector of animals for protein production, monogastrics (poultry and pigs) and ruminants (cattle). The future graduate specializes in animal production systems by developing critical and reflective thinking.





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Become one of the most demanded professionals of the moment: specialize with this Professional Master's Degree in Veterinary Nutrition from Tech comfortably through an online program”

The Professional Master's Degree in Veterinary Nutrition specializes professionals in one of the sectors of Animal Production with the most demand in labor and therefore the need for specialization. It is a unique program given its level of specialization and the logical learning sequence in which the content is arranged, structured by industry experts in ten meticulously developed modules.

First, it establishes the fundamental principles of Veterinary Nutrition for a later approach to nutrition and feeding by species. In addition, it studies in depth the main raw materials used in the formulation of balanced feed, the characteristics, inclusion levels and quality parameters, since without quality in the basic components of the feed, there is no nutrition. An entire module is dedicated to the additives used in Ration Manufacturing. This segment is evolving year after year and includes important topics such as antibiotic-free production and the use of phyto-genetic crops, which are currently the most topical issues.

The current world population is estimated to be 7.6 billion people and is expected to increase to 8.6 billion by 2030. Veterinary Nutrition is one of the disciplines being called upon to find ways in which to produce sufficient and economical protein, in an efficient and sustainable manner, to be able to feed this growing demand in the population..

In summary, this program is an ambitious, broad, structured and interwoven approach, covering everything from the fundamental and relevant principles of nutrition to food manufacturing. In addition, it specializes the student in the food manufacturing process with the latest innovations and the newest technology in the current market.

This **Professional Master's Degree in Veterinary Nutrition** contains the most complete and up to date scientific program on the market. The most important features include:

- ◆ The latest technology in online teaching software
- ◆ A highly visual teaching system, supported by graphic and schematic contents that are easy to assimilate and understand
- ◆ Practical cases presented by practising experts
- ◆ State-of-the-art interactive video systems
- ◆ Teaching supported by telepractice
- ◆ Continuous updating and recycling systems
- ◆ Autonomous learning: full compatibility with other occupations
- ◆ Practical exercises for self-evaluation and learning verification
- ◆ Support groups and educational synergies: questions to the expert, debate and knowledge forums
- ◆ Communication with the teacher and individual reflection work
- ◆ Content that is accessible from any fixed or portable device with an Internet connection
- ◆ Banks of complementary documentation permanently available, even after the Professional Master's Degree



Join the elite, with this highly effective program training and open new paths to help you advance in your professional progress"

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A Professional Master's Degree that will enable you to work in all areas of Veterinary Nutrition with the solvency of a high-level professional"

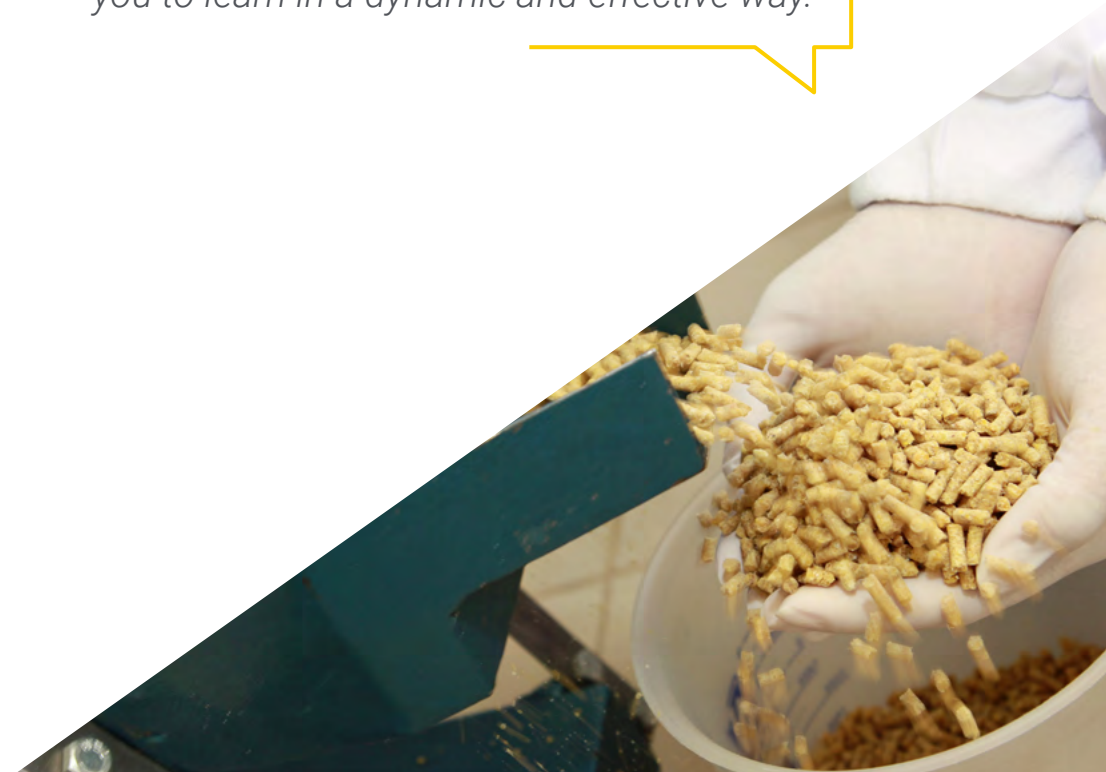
With the experience of working professionals who are experts in Veterinary Nutrition.

With a methodological design based on proven teaching techniques, this Professional Master's Degree in Veterinary Nutrition will take you through different teaching approaches to allow you to learn in a dynamic and effective way.

The teaching staff includes professionals from the field of Veterinary Nutrition, who bring their experience to this program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide the necessary knowledge to train students for real-life situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise throughout the program. To this end, the professional will be assisted by an innovative system of interactive videos made by leading and experienced food safety experts.



02 Objectives

The objectives of the Professional Master's Degree in Veterinary Nutrition are to promote the veterinarian's professional career so that they can broaden their field of work and contribute to the nutritional study of the different species of our planet. In this way, he/she will be able to identify and classify which foods are essential for each case, will know how to create diets according to the symptoms and nutritional requirements of each case, as well as analyze the complete manufacturing process of nutrient-rich foods for the animal kingdom, its phases and processes to which they are subjected to ensure compliance with quality standards.





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If your objective is to broaden your skill set to include new paths of success and development, this is your Professional Master's Degree: the qualification you need to strive for excellence"



General Objectives

- ♦ Determine the properties, use and metabolic transformations of nutrients in relation to the nutritional needs of an animal
- ♦ Provide clear and practical tools so that the professional can identify and classify the different foods that are available in the region and have better elements of judgement to make the most appropriate decision in terms of differential costs, etc.
- ♦ Propose a series of technical arguments which allow for a better quality of diet and nutrition and therefore, improve the end produce (meat or milk)
- ♦ Analyze the different raw material components with both positive and negative effects on Veterinary Nutrition and how animals use them for the production of animal protein
- ♦ Identify and understand the different levels of digestibility for each of the various nutritional components according to their origin
- ♦ To analyze the key aspects for the design and creation of diets (food) aimed at achieving the maximum utilization of nutrients by animals intended for animal protein production
- ♦ Provide specialized training on the nutritional requirements for the two main species of birds to be used in animal protein production
- ♦ Develop specialized understanding of the nutritional requirements of the porcine species and the different feeding strategies needed in order to guarantee that they reach the expected welfare and production standards according to their production stage
- ♦ Provide practical, theoretical and specialized knowledge on the physiology of canine and feline digestive systems
- ♦ Analyze the digestive system of ruminants and their particular way of assimilating nutrients from fiber-rich foods
- ♦ Analyze the main additive groups used in the food production industry, focused on ensuring the quality and performance of different food products
- ♦ Analyze, in a clear way, how the complete animal feed manufacturing process is developed: the phases and processes which feed undergoes to guarantee its nutritional composition, quality and safety



You will be able to establish appropriate diets according to the animal's symptomatology thanks to a proper diagnosis and nutritional supplement treatments"



Specific Objectives

Module 1. Introduction to Nutrition and Animal Food

- ◆ Develop the most relevant concepts of Animal Nutrition and Feeding
- ◆ Determine how digestive systems are formed and the differences between animal species (monogastrics and ruminants)
- ◆ Analyze the functionality, metabolism and differences between the digestive systems of different species
- ◆ Establish the different nutritional components of the raw materials used in food production and their function within Veterinary Nutrition
- ◆ Determine how the nutrients are used by different animal species
- ◆ Compare and contrast the digestive systems of the main species of zootechnical interest
- ◆ Identify the different nutritional components of the raw materials used in feed production and their function within Veterinary Nutrition
- ◆ Examine the analyses used to determine the composition of different feeds
- ◆ Develop the variables and units used to estimate the nutritional intake and requirements
- ◆ Determine how to measure the energy content of foods and their expressions

Module 2. Chemical Composition of Food and Quality of the Raw Materials for Ruminants and Non-Ruminants

- ♦ Develop the most important concepts of Veterinary Nutrition, taking into account the functions and effects of feed in the digestion process in large and small livestock
- ♦ Classify foods according to their origin and their nutritional characteristics
- ♦ Design a balanced diet considering the nutritional requirements of the species and categories
- ♦ Implement the procedures for manufacturing concentrates, guaranteeing the quality of the product to be used for feeding the different productive species
- ♦ Apply nutrition and feeding strategies for the different productive species according to an annual program based on the herd's requirements
- ♦ Evaluate the nutritional quality and impact on production systems (meat or milk) of different fresh, preserved and natural feed. These could be either in direct grazing or as forage reserves such as hay (rolls) or whole plant silage, with or without the addition of additives (Nutraliq, Smartfeed, etc.), Multi-Nutritional Blocks (MNB), Rumen Activator Supplements (RAS) or energy or protein concentrates
- ♦ Develop the main chemical determinations that characterize feed (concentrates, fresh forages, preserved forages and additives)



Module 3. Nutrients and Metabolism

- ♦ Develop the different nutrients contained in the raw materials used in Veterinary Nutrition
- ♦ Develop the different components of each one of the nutrient groups
- ♦ Determine the destinations or metabolic pathways of nutrients to be utilized by the animal
- ♦ Establish how animals obtain energy from different nutrients and what energy metabolism consists of
- ♦ Analyze the different assimilation processes of nutrients that different species of animals have and which are necessary for their well-being and production
- ♦ Evaluate the importance of water as a nutrient and the effect that it has on animals

Module 4. Digestibility, Ideal Protein and Advances in Veterinary Nutrition

- ♦ Develop the concepts of digestibility and how it is determined
- ♦ Analyze the advances in protein nutrition and the importance of synthetic amino acids in Veterinary Nutrition
- ♦ Identify the factors which are involved in the definition of the different nutrient levels
- ♦ Establish the critical points in the use of fats, their quality and effect on nutrition
- ♦ Develop the basic concepts of organic minerals and their importance
- ♦ Justify the concept of intestinal integrity and how to enhance it in production
- ♦ Analyze patterns in the use of antibiotics in Veterinary Nutrition
- ♦ Define the patterns in precision nutrition and the most influential factors in its application

Module 5. Nutrition and Food in Poultry

- ♦ Establish the nutritional requirements and the feeding programs of broiler chickens
- ♦ Specify the nutritional requirements of laying hens (commercial eggs)
- ♦ Specify the nutritional requirements and feeding programs in confusion matrices
- ♦ Identify the critical phases of broilers and layers and the adjustments that can be implemented through the use of special diets
- ♦ Establish the different nutritional strategies used to manage challenges such as heat stress and shell quality
- ♦ Analyze the Nutritional Profiles and Strategies that allow higher yield of meat cuts and modification of egg size
- ♦ Determine the different production phases in commercial poultry farming by species
- ♦ Compile the different feeding programs in commercial poultry farming
- ♦ Apply different strategies in the application of feeding programs focused on guaranteeing zootechnical results

Module 6. Nutrition and Food in Pigs

- ♦ Establish the nutritional requirements of fattening pigs
- ♦ Determine the nutritional requirements of breeding sows
- ♦ Identify the different stages of production in commercial swine farming
- ♦ Develop different feeding programs in commercial swine farming
- ♦ Analyze different strategies in the application of feeding programs focused on guaranteeing zootechnical results
- ♦ Understand the anatomical and physiological differences in the digestive system of swine which allows them to use alternative raw materials in their diet
- ♦ Establish the nutritional requirements of slaughter pigs according to their age, production stage and genetic line
- ♦ Establish the nutritional requirements of sows and breeding boars in each of their life stages and production phases
- ♦ Design nutritional and feeding programs for swine according to their specific requirements based on age and physiological state
- ♦ Develop different feeding programs in commercial swine farming
- ♦ Apply different strategies in the application of feeding programs focused on guaranteeing zootechnical results

Module 7. Nutrition and Food in Canines and Felines

- ♦ Identify myths related to the diet of cats and dogs
- ♦ Establish nutritional requirements for cats and dogs
- ♦ Analyze the concept of a balanced diet, focusing on the factors that influence their ingestion
- ♦ Analyze the dietary treatments in certain pathologies whose use is aimed at reducing symptoms and improving the animals condition
- ♦ Guarantee an appropriate diet according to the stage of development
- ♦ Evaluate the types of food available on the pet food market
- ♦ Establish an appropriate diet based on physiological state and the development of the species in question

Module 8. Nutrition and Food in Ruminants

- ♦ Analyze the digestive system of ruminants and their particular way of assimilating nutrients from fiber-rich foods
- ♦ Analyze the nutritional metabolism of ruminants, recognising their potential and their limitations
- ♦ Determine the nutritional requirements for the maintenance and production of the main ruminants of zootechnical interest
- ♦ Examine the main food resources for ruminants' nutrition, their main characteristics, their advantages and limitations
- ♦ Evaluate the main feeding strategies for ruminants according to the production context



Module 9. Additives in Animal Food

- ◆ Analyze the different types of additives which exist in the animal feed and nutrition market
- ◆ Define the recommendations for the use and functionality of the different additive groups
- ◆ Gain up-to-date knowledge of the new technology focused on improving the quality and efficiency of animal feed
- ◆ Identify mycotoxins as the hidden enemy in diet quality, animal health and productivity; what are the strategies for their control, the different types and use of mycotoxin binders
- ◆ Specialize in the use of enzymes in balanced feed what they are the differences between enzymes of the same category, what they are used for and the benefits of their incorporation in the diet
- ◆ Analyze phytochemicals as a category that goes beyond essential oils; what they are, types of phytochemical substances, modes of use and benefits

Module 10. Manufacturing of Balanced Foods: Processes, Quality Control and Critical Points

- ◆ Determine the processes involved in the creation of feed for animals
- ◆ Establish an appropriate way to manage raw materials
- ◆ Analyze the different feed presentations and the feed manufacturing processes themselves
- ◆ Identify the different equipment used in the manufacturing of food
- ◆ Implement monitoring and control programs at critical points in the food manufacturing process
- ◆ Implement sampling and establish its importance in the quality control process

03 Skills

After completing this Professional Master's Degree in Veterinary Nutrition, the veterinary professional will achieve high competencies in the sector, which will give them a boost in the labor market. Its intensive program will enable you to work in all fields related to the feeding of production animals, as well as domestic animals such as dogs and cats, with the assurance of becoming an expert in the field. It specializes and updates professionals in the most advanced technical and scientific aspects of animal nutrition and feeding, enabling them to enter, link and professionalize one of the most important and most demanded sectors of animal production today.



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The Professional Master's Degree in Veterinary Nutrition will provide you with essential personal and professional skills to play an adequate role in any professional situation in this field of intervention"



General Skills

- ♦ Gain the specific understanding of Veterinary Nutrition in the field of veterinary science
- ♦ Describe the nutritional needs of animals by determining the metabolic aspects of each different species
- ♦ Recognize the other functions of nutrients in the context of animal production and health
- ♦ Know how to plan an appropriate diet for each species, taking into account availability and opportunity according to the geographical location where it is found
- ♦ Know the nutritional requirements for poultry for human consumption
- ♦ Implement appropriate nutritional programs for the swine species, according to the required welfare and production criteria
- ♦ Recognise the requirements for canine and feline diets and create appropriate nutritional plans
- ♦ Know the nutritional requirements of ruminants
- ♦ Know how the animal feed manufacturing process is carried out and which additives are included in it, as well as its suitability



Specific Skills

- ♦ Describe the digestive systems of the different animal species, recognising the differences in metabolism
- ♦ Recognise the nutritive components in raw materials and be able to conduct an analysis of them
- ♦ Create a nutritional classification of feeds according to their nutritional characteristics in order to propose appropriate diets for different species and situations
- ♦ Determine how different nutritional approaches affect different animal production species
- ♦ Utilize extensive knowledge of all aspects of nutrients to understand the processes of energy and animal protein production
- ♦ Recognise the importance of water as a nutrient
- ♦ Understand the importance of the concept of digestibility and intestinal integrity and to know which are the factors that most influence them
- ♦ Define the use and characteristics of fats in Veterinary Nutrition
- ♦ Define the use of antibiotics in Veterinary Nutrition
- ♦ Perform a complete analysis and an appropriate intervention in all aspects of the raising of broiler chickens and laying hens
- ♦ Carry out nutritional strategies aimed at achieving zootechnical objectives



- ◆ Perform a complete analysis and appropriate intervention in all aspects of the raising of breeding and fattening pigs
- ◆ Know what the alternative swine feeding strategies are
- ◆ Recognise all nutritional aspects of cats and dogs and identify the myths surrounding them
- ◆ Know how to establish appropriate dietary treatments for every circumstance or pathology
- ◆ Determine what foods are available in the market and their suitability
- ◆ Perform a complete analysis and appropriate intervention in all nutritional aspects of ruminants
- ◆ Know which are the most appropriate strategies for feeding ruminants according to the geographical context
- ◆ Know the nutritional additives in animal feed and be aware of the up-to-date information surrounding this area
- ◆ Understand food production processes, as well as the proper handling of raw materials by understanding the processes and machinery involved
- ◆ Know how to perform quality control and, as part of the process, sampling at critical control points of animal feed

04

Course Management

The faculty of this program has an excellent and extensive academic and professional background, synonymous with Tech's quality. Each one of them is an expert in the different subjects covered by the program, giving a complete and global vision of everything encompassed within the field of Veterinary Nutrition. This team is made up of a multidisciplinary and cross-disciplinary team that has poured its knowledge and experience into the design of an exceptional program, which will enable students to achieve their academic objectives, positioning them among the elite of the sector.





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The best teaching team in the animal feed sector is at your disposal at the click of a button. Enroll in this Professional Master's Degree and specialize with the elite!"

Management



Dr. Carlos Julio Cuello Ocampo

- ◆ Technical Director at Huvepharma in Latin America
- ◆ Degree in Veterinary Medicine from the National University of Colombia
- ◆ Professional Master's Degree in Animal Production with emphasis on Monogastric Nutrition at the Universidad Nacional de Colombia
- ◆ Postgraduate Certificate in Ration Formulation for Productive Species at the University of Applied and Environmental Sciences UDCA

Professors

Mr. Crespo Sancho, Rubén

- ♦ Commercial Director of Agrimprove Iberia in Agrifirm
- ♦ Postgraduate Certificate in Agricultural Engineering, specializing in Agricultural Operations, Polytechnic University of Madrid
- ♦ Professional Master's Degree in Animal Nutrition, University of Zaragoza, Spain
- ♦ Technical Agricultural Engineering, Polytechnic University of Madrid

Dr. Fernández Mayer, Anibal Enrique

- ♦ Agricultural Engineer from the University of Nacional de la Plata
- ♦ PhD in Veterinary Science
- ♦ Post-Doctorate in Veterinary Medicine: Animal Nutrition in Institute of Animal Science (IAS)

Mr. Fernández de Juan, Álvaro

- ♦ Agricultural Engineer specialized in Animal Production at the Polytechnic University of Madrid
- ♦ Professional Master's Degree in Animal Production and Health specialized in Animal Nutrition at the Polytechnic University of Madrid
- ♦ Support Researcher at the Polytechnic University of Madrid

Mr. González Aliseda, Bernardo

- ♦ Engineer at Nutrave S.A., poultry integration in Bargas
- ♦ Degree in Agricultural Engineering from the Polytechnic University of Madrid

Dr. Ordoñez Gómez, Ciro Alberto

- ♦ Lecturer in the area of animal nutrition and feeding at the Francisco de Paula Santander University
- ♦ Degree in Animal Husbandry from Francisco de Paula Santander University
- ♦ Specialization in university teaching practice at the Francisco de Paula Santander University
- ♦ Master in animal production at the Francisco de Paula Santander University

Dr Portillo Hoyos, Diana Paola

- ♦ Supervisor of the National Agricultural Survey
- ♦ Zootechnician at the National University of Colombia

Dr. Rodríguez Patiño, Leonardo

- ♦ Nutritionist at Corporación Fernández for Broilers and Pigs
- ♦ Animal technician with a Master's Degree in Veterinary Nutrition

Mr. Scappaticcio, Rocco

- ♦ Nutritionist technician and head of R+D+i at Camar Agroalimentaria
- ♦ Agronomist Engineer in the delgi studi di Perugia University
- ♦ Technical Agricultural Engineer in the delgi studi di Perugia University
- ♦ Industrial Technical Engineer at the Industrial Technical Institute E. Majorana Cassino
- ♦ Professional Master's Degree in Animal Production and Health at Universidad Politécnica de Madrid

Dr Sarmiento García, Ainhoa

- ♦ Veterinarian in charge of the nutrition department at Casaseca Livestock
- ♦ Degree in Veterinary Medicine from the University of León
- ♦ PhD. in Chemical Science and Technology from the University of Salamanca
- ♦ Professional Master's Degree in Biomedical and Health Sciences Innovation
- ♦ Collaborative researcher at the Faculty of Agricultural and Environmental Sciences and the Polytechnic School of Zamora at the University of Salamanca

05

Structure and Content

The contents of this program have been developed by the different experts on this course, with a clear purpose: to ensure that our students acquire each and every one of the necessary skills to become true experts in Veterinary Nutrition. Its structure and internship plan make this Professional Master's Degree the most complete on the market today, as it covers all the relevant knowledge for the veterinarian to develop successfully. The ten-module structure allows you to study the course in phases so that you can combine it with your work duties. It includes a syllabus that introduces the basic aspects of animal nutrition and feeding, the chemical composition of food and its application by species up to the development of new nutrients.



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A comprehensive teaching program, structured in well-developed teaching units, oriented towards learning that is compatible with your personal and professional life"

Module 1. Introduction to Nutrition and Animal Food

- 1.1. Nutrition and Animal Food. Concepts
 - 1.1.1. Introduction to the Concepts of Nutrition and Food
 - 1.1.2. Nutrients: Definition and Characteristics
 - 1.1.3. The Importance of Veterinary Medicine
- 1.2. Digestive Systems and Food Adaptation
 - 1.2.1. Digestive System and the Digestion Process in Birds
 - 1.2.2. Digestive System and the Digestion Process in Pigs
 - 1.2.3. Digestive System and the Digestion Process in Ruminants
 - 1.2.4. Digestive System and the Digestion Process in Fish (aquatic poikilotherms)
 - 1.2.5. Gastrointestinal Functionality in Animal Nutrition and Health
- 1.3. Digestive System in Ruminants
 - 1.3.1. The Rumen as a Source of Nutrients
 - 1.3.2. Ruminal Physiology
 - 1.3.3. The Digestion Process in Ruminants
 - 1.3.4. Volatile Fatty Acids
 - 1.3.5. Protein of Bacterial Origin
- 1.4. Measurements of Nutritional Value of Foods and Evaluation Methods
 - 1.4.1. Characterization of Context
 - 1.4.2. Physical and Chemical Characterization
 - 1.4.3. Obtaining Information on the Composition of Nutrients
 - 1.4.4. Weende Proximate Analysis
 - 1.4.5. Van Soest Analysis
 - 1.4.5.1. Analysis using Specialized Analytical Methods
 - 1.4.5.2. Heat Meter Pump
 - 1.4.5.3. Amino Acid Analysis
 - 1.4.5.4. Atomic Absorption Spectrophotometry
 - 1.4.5.5. Automized Analysis Equipment
 - 1.4.5.6. Biological and Nutritional Characterization
- 1.5. Forms of Food Energy
 - 1.5.1. Forms of Energy Expression
 - 1.5.2. Gross Energy
 - 1.5.3. Digestive Energy
 - 1.5.4. Metabolizable Energy
 - 1.5.5. Net Energy
 - 1.5.6. Calculation of Values (EB-ED-EM-EN) according to the NRC and ARC systems
- 1.6. Energy Content of Food Ingredients
 - 1.6.1. Energy sources
 - 1.6.2. Energy and Consumption
 - 1.6.3. Energy Balance
 - 1.6.4. Energetic Density
- 1.7. Protein and Amino Acid Content of Food Ingredients
 - 1.7.1. Animal Protein Functions
 - 1.7.2. Protein Food Resources
 - 1.7.2.1. Plant Sources - Oilseeds
 - 1.7.2.2. Plant Sources - Legumes
 - 1.7.2.3. Animal Sources
- 1.8. Protein Quality and Digestibility
 - 1.8.1. Protein Quality
 - 1.8.1.1. Amino Acid Profile
 - 1.8.2. Digestibility
 - 1.8.2.1. Apparent Digestibility
 - 1.8.2.2. Real Digestibility
 - 1.8.2.3. Nitrogen Balance
 - 1.8.2.4. Biological Value
 - 1.8.2.5. Net Usage of Protein
 - 1.8.2.6. Protein Efficiency Ratio or Rate
 - 1.8.2.7. Chemical Score
 - 1.8.2.8. Protein Digestion



- 1.9. Other Important Nutrients in Veterinary Nutrition
 - 1.9.1. Minerals and Microminerals
 - 1.9.1.1. Classification, Functions, General Requirements
 - 1.9.1.2. Principal Minerals: Calcium, Phosphorous, Magnesium, Sodium
 - 1.9.1.3. Microminerals: Cobalt, Iodine
 - 1.9.2. Vitamins
 - 1.9.3. Fibre
 - 1.9.4. Water:
- 1.10. Nomenclature and Classification of Foods (NRC)
 - 1.10.1. Forage or Dry Roughage
 - 1.10.2. Forage or Fresh Coarse Feed
 - 1.10.3. Silage
 - 1.10.4. Concentrated Energy
 - 1.10.5. Protein Concentrate
 - 1.10.6. Mineral Supplement
 - 1.10.7. Vitamin Supplement
 - 1.10.8. Non- nutritious Additives

Module 2. Chemical Composition of Food and Quality of the Raw Materials for Ruminants and Non-Ruminants

- 2.1. Key Concepts of Raw Materials Used in Feeding Ruminants and Non- Ruminants
 - 2.1.1. Introduction
 - 2.1.2. Chemical Composition of Food
 - 2.1.2.1. Water and Dry Matter
 - 2.1.2.2. Organic Material and Minerals
 - 2.1.2.3. Protein Rich Foods
 - 2.1.2.4. Energy Rich Foods
 - 2.1.2.5. Vitamins
 - 2.1.3. Vitamins
 - 2.1.3.1. Winter Grains, Summer Grains and Pastures (Grasslands)
 - 2.1.4. Conserved Forages:
 - 2.1.4.1. Silage, Hay and Other Types of Preserved Fodder (Haylage, Silage)
 - 2.1.4.1.1 Silages
 - 2.1.4.1.2. Hay and Haylage

- 2.1.5. Energy and Protein Concentrates
 - 2.1.5.1. Energy Compounds
 - 2.1.5.2. Protein Powders
- 2.2. Plant-Based By-products used in Feeding Ruminants and Non-Ruminants
 - 2.2.1. Cereal Grains
 - 2.2.1.1. Corn
 - 2.2.1.1.1. Fine-ground Bran, Bran or Corn Bran
 - 2.2.1.1.2. Corn Gluten Feed and Corn Gluten Meal
 - 2.2.1.1.2.1. Corn Gluten Feed
 - 2.2.1.1.2.2. Corn Gluten Meal
 - 2.2.1.2. Corn Gluten Feed and Corn Gluten Meal
 - 2.2.2. Sorghum Grain
 - 2.2.3. Oats, Barley and Wheat Grain
 - 2.2.3.1. Oat Grain
 - 2.2.3.2. Barley Grain
 - 2.2.3.3. Wheat Grain
 - 2.2.3.3.1. Fine-ground Bran, Bran or Wheat Bran
 - 2.2.4. By-products of Rice
 - 2.2.4.1. Fine-ground Bran or Rice Bran
 - 2.2.5. Oilseed By-Products
 - 2.2.5.1. Cotton
 - 2.2.5.1.1. Cotton Seed
 - 2.2.5.1.2. Cotton Flour
 - 2.2.5.2. Soya
 - 2.2.5.2.1. Soybeans
 - 2.2.5.2.2. Soybean Shell
 - 2.2.5.2.3. Soya Flour
 - 2.2.5.3. Sunflower
 - 2.2.5.3.1. Sunflower Shell
 - 2.2.5.3.2. Sunflower Flour
 - 2.2.6. Horticultural By-products
 - 2.2.6.1. Salad Cucumber Crop Residue
 - 2.2.6.2. Melon Crop Residue
 - 2.2.6.3. Tomato Crop Residue
- 2.3. Animal-Based By-products used in Feeding Ruminants and Non-Ruminants
 - 2.3.1. Dairy Industry
 - 2.3.1.1. Serum Permeate
 - 2.3.1.2. Cheese Whey and Butter
 - 2.3.2. Fishing Industry
 - 2.3.2.1. Fish Flour
 - 2.3.3. Meat Industry
 - 2.3.3.1. Recycled Animal Fat
 - 2.3.4. Poultry Production
 - 2.3.4.1. Feather Flour
 - 2.3.4.1.1. Processes to Improve Digestibility
 - 2.3.4.1.2. Supply Methods
 - 2.3.5. Chicken/ Hen Litter (Chicken Manure)
- 2.4. Fats and Oils used in Feeding Ruminants and Non-Ruminants
 - 2.4.1. Nutritional Values of Fats in the Feeding of Ruminants and Non-Ruminants
 - 2.4.1.1. Sources and Types of Fat
 - 2.4.1.1.1. Yellow Fat
 - 2.4.1.1.2. Tallow
 - 2.4.1.1.3. Mixed Fats
 - 2.4.1.1.4. Soap Extract and Other Sources of Fat
 - 2.4.2. Factors Which Indicate the Digestibility in Ruminants and Non-Ruminants
 - 2.4.2.1. Free Fatty Acids
 - 2.4.2.2. Proportion of Saturated and Unsaturated Fatty Acids
 - 2.4.2.2.1. Addition Method and Level of Inclusion
 - 2.4.2.2.2. Protected Fats
 - 2.4.2.2.2.1. Calcium Salts of Fatty Acids or Protected Soaps
 - 2.4.2.2.2.2. Saturated Fats with Variable Degrees of Hydrogenation
 - 2.4.3. Oils used in Feeding Ruminants and Non-Ruminants
 - 2.4.3.1. African Palm Oil
 - 2.4.3.2. Other Vegetable Oils

- 2.5. Probiotics, Prebiotics, Enzymes and Organic Acids in Feeding Ruminants and Non-Ruminants
 - 2.5.1. Characterization and Classification of Probiotics and Prebiotics
 - 2.5.1.1. Prebiotic
 - 2.5.1.1.1. Basifying Agents or Ruminant Buffers
 - 2.5.1.1.2. Organic Acids: Malic and Fumaric Acid
 - 2.5.1.1.3. Plant Extracts: Essential Oils
 - 2.5.1.1.4. Enzymes
 - 2.5.1.2. Probiotic
 - 2.5.1.3. Symbiotics
 - 2.5.2. Mechanisms of Action and Productive Response
 - 2.5.2.1. Effects on Young Animals
 - 2.5.2.2. Effects on Adult Animals
 - 2.5.3. Brewer's Yeast
 - 2.5.3.1. Reduction of Unpleasant Odors and Firm Stools
 - 2.5.3.2. Effects on Growing and Finishing Animals
 - 2.5.3.3. Effects on Lactating Cows
 - 2.5.3.4. Effects on Lactating Sheep
 - 2.5.3.5. Effects on Lactating Goats
 - 2.6. Liquid Additives, Multinutritional Blocks and Rumen Activator Supplement for Ruminants
 - 2.6.1. Characteristics of Liquid Energy, Protein and Mineral Additives
 - 2.6.2. Multinutritional Blocks (MNB) and Rumen Activator Supplement (RAS)
 - 2.6.2.1. Procedure to Create MNB and RAS
 - 2.6.2.1.1. Proportions of Ingredients and Chemical Composition of MNB and RAS
 - 2.6.2.1.1.1. Composition of "MNB" or "RAS" with "Smartfeed"
 - 2.6.2.1.1.2. Composition of "MNB" or "RAS" with "Nutrilig 2050" (including Urea)
 - 2.6.2.1.1.3. Composition of "MNB" or "RAS" with Glucose or "Molasses"
 - 2.6.2.1.1.4. Composition of the Salty Minerals of the MNB and RAS
 - 2.6.2.1.2. Purpose of Each Ingredient
 - 2.6.2.1.3. Differences Between the MNB and RAS
 - 2.6.2.1.4. Forms of Supply and Consumption of BMN or SAR
 - 2.6.2.1.5. Experimental Work
- 2.7. Glycerol, Corn and Sorghum Starch for Ruminant and Non-Ruminant Feeds
 - 2.7.1. Glycerol
 - 2.7.1.1. Principal Characteristics of Glycerol
 - 2.7.1.2. Chemical Composition of Glycerol for Animal Consumption
 - 2.7.1.3. Productive Response
 - 2.7.1.4. Recommendations
 - 2.7.2. Corn and Sorghum Starch
 - 2.7.2.1. Chemical Composition
 - 2.7.2.2. Dry or Wet Starch
 - 2.7.2.3. Recommendations
- 2.8. Tannins, Saponins and Essential Oils in Ruminants
 - 2.8.1. Effect on Ruminant Bacterias
 - 2.8.2. Effects on Protozoa
 - 2.8.3. Effects on Rumen Fungi
 - 2.8.4. Effects on Methanogenic Bacteria
 - 2.8.5. Effect on Secondary Metabolites of Plants
 - 2.8.5.1. Effects on the Digestibility
 - 2.8.5.2. Effects on the Parameters of Ruminant Fermentation
 - 2.8.5.2.1. Volatile Fatty Acids (AGV)
 - 2.8.5.2.2. Concentration of Ammonia
 - 2.8.5.2.3. Production of Gas
 - 2.8.5.2.4. Impacts on Rumen Degeneration and the Digestibility of DM and Cell Wall
 - 2.8.5.2.5. Impacts on Rumen Degeneration and the Digestibility of Protein
 - 2.8.5.2.6. Impacts on Digesta Transit Kinetics
 - 2.8.5.3. Effects on Methanogenesis
 - 2.8.6. Adaptations to Tannin Consumption
 - 2.8.7. Positive Effects of Tannins on the Non-Animal Metabolism and Some of the Productive Results

- 2.9. Mycotoxins and Contaminants in Concentrates and Forage Concentrates in both Ruminants and Non-Ruminants
 - 2.9.1. Characteristics of Mycotoxins, Typology of Fungi and Favorable Conditions
 - 2.9.2. Clinical Diagnosis of Mycotoxins, Symptomatology and Associated Diseases Affecting Ruminants and Non-Ruminants
 - 2.9.2.1. Ruminants
 - 2.9.2.1.1. Sensitivity
 - 2.9.2.1.2. Some Symptomatologies
 - 2.9.2.1.3. Symptomatology Associated with Illnesses
 - 2.9.2.1.4. Mycotoxins and Mycotoxicosis in Poultry and Swine. Symptomology and Associated Illnesses
 - 2.9.2.1.4.1. Aflatoxins
 - 2.9.2.1.4.2. Ochratoxins
 - 2.9.2.1.4.3. T-2 and DAS
 - 2.9.2.1.4.4. Fumonisin
 - 2.9.2.1.4.5. DON (Vomitoxin)
 - 2.9.2.2. Non-Ruminants
 - 2.9.2.2.1. Mycotoxins and Mycotoxicosis in Poultry and Swine. Symptomology and Associated Illnesses
 - 2.9.2.2.1.1. Aflatoxins
 - 2.9.2.2.1.2. Ochratoxins
 - 2.9.2.2.1.3. Trichothecenes
 - 2.9.2.2.1.4. Zearalenone
 - 2.9.2.2.1.5. Fumonisins
 - 2.9.2.2.2. Use of Mycotoxin-Absorbing Substances in Ruminant and Non-Ruminant Feeds
 - 2.9.3. Factors for the Development of Fungi and their Mycotoxins
 - 2.9.3.1. In the Countryside
 - 2.9.3.2. During Storage of the Concentrates



2.10. Analysis and Quality Control of the Ingredients used in Ruminants and Non- Ruminants

2.10.1. Chemical Determinations

2.10.1.1. Dry Matter (DM)

2.10.1.2. Organic Material (OM) and Minerals

2.10.1.3. Digestibility of Dry Matter

2.10.1.4. Direct Methods

2.10.1.4.1. "In Vivo" Methods

2.10.1.5. Indirect Methods

2.10.1.5.1. Method by Difference

2.10.1.5.2. Internal Markers

2.10.1.5.3. Lignin

2.10.1.5.4. Silica

2.10.1.5.5. Acid Insoluble Ash

2.10.1.6. External Markers

2.10.1.6.1. Dyed Food

2.10.1.6.2. Chromic Oxide

2.10.1.6.3. Rare Earth Elements

2.10.1.6.4. Mordant Chrome-Treated Fiber

2.10.1.6.5. Hydrosoluble Markers

2.10.1.6.6. Alkanes

2.10.1.7. "In Vitro" Methods

2.10.1.7.1. "In Vitro" Digestibility of Dry Matter (DM)

2.10.1.7.2. Neutral Detergent Fiber (NDF)

2.10.1.7.3. "In Vitro" Digestibility of Neutral Detergent Fiber (NDF)

2.10.1.7.4. Acidic Detergent Fiber (ADF)

2.10.1.8. Protein

2.10.1.8.1. Crude Protein (Total Nitrogen, CP)

2.10.1.8.2. Soluble Crude Protein (SCP)

2.10.1.8.3. Neutral Detergent Fiber-Bound Nitrogen (ADIN)

2.10.1.9. Ethereal Extract (EE)

2.10.1.10. Water Soluble Carbohydrates (WSC)

2.10.1.11. Lignin, cellulose, hemicellulose and silica (LIG, CEL, HEM, SIL)

2.10.1.12. Taninos

2.10.1.13. PH in Silage Samples

2.10.1.14. Particle Sizes

2.10.2. Summary of Some Laboratory Techniques

2.10.2.1. Total Nitrogen (semi-micro kjeldahl)

2.10.2.2. "In Vitro" Digestibility (Tilley Terry Edited. Direct Acidification Method)

2.10.2.3. Neutral Detergent Fiber (NDF) (with ANKOM equipment)

2.10.2.4. Acidic Detergent Fiber (ADF) (with ANKOM equipment)

2.10.2.5. Soluble Non-Structural Carbohydrates (NSC) Antrona Method, Developed by A.J. Silva (Viscosa-Brasil)

2.10.2.6. Total Starch (Megazyme enzyme kit - AA/AMG) (AACC Method 76-12)

Module 3. Nutrients and Metabolism

3.1. Carbohydrates

3.1.1. Carbohydrates in Animal Food

3.1.2. Classification of Carbohydrates

3.1.3. Digestion Process

3.1.4. Fiber and Digestion of Fiber

3.1.5. Factors which Affect the Utilition of Fiber

3.1.6. Physical Function of Fibre

3.2. Metabolism of Carbohydrates

3.2.1. Metabolic Fate of Carbohydrates

3.2.2. Glycolysis, Glycogenolysis, Glycogenesis and Gluconeogenesis

3.2.3. Pentose Phosphate Cycle

3.2.4. Krebs Cycle

3.3. Lipids

3.3.1. Classification of Lipids

3.3.2. Functions of Lipids

3.3.3. Fatty Acids

3.3.4. Digestion and Absorption of Fats

3.3.5. Factors which Affect Lipid Digestion

- 3.4. Lipid Metabolism
 - 3.4.1. Metabolic Fate of Lipids
 - 3.4.2. Fat Metabolism Energy
 - 3.4.3. Oxidative Rancidity
 - 3.4.4. Essential Fatty Acids
 - 3.4.5. Lipid Metabolism Problems
- 3.5. Energetic Metabolism
 - 3.5.1. Measurement of Heat Reaction
 - 3.5.2. Biological Partitioning of Energy
 - 3.5.3. Nutrient Caloric Increase
 - 3.5.4. Energy Balance
 - 3.5.5. Environmental Factors that Influence Energy Requirements
 - 3.5.6. Characteristics of Energy Deficiencies and Excesses
- 3.6. Proteins
 - 3.6.1. Protein Classification
 - 3.6.2. Functions of the Different Proteins
 - 3.6.3. Digestion and Absorption of Proteins
 - 3.6.4. Factors which Affect Protein Digestion
 - 3.6.5. Nutritional Classification of Amino Acids for Poultry and Swine
- 3.7. Protein Metabolism in Poultry and Swine
 - 3.7.1. Metabolic Fate of Proteins
 - 3.7.2. Gluconeogenesis and Degradation of Amino Acids
 - 3.7.3. Excretion of Nitrogen and Synthesis of Uric Acid
 - 3.7.4. Imbalance of Amino Acids and Energetic Cost of Protein Metabolism
 - 3.7.5. Interaction Between Amino Acids
- 3.8. Vitamins and Minerals
 - 3.8.1. Vitamin Classification
 - 3.8.2. Vitamin Requirements for Poultry and Swine
 - 3.8.3. Vitamin Deficiencies
 - 3.8.4. Macro and Micro minerals
 - 3.8.5. Interaction Between Minerals
 - 3.8.6. Organic Chelates

- 3.9. Mineral and Vitamin Metabolism
 - 3.9.1. Vitamin Interdependence
 - 3.9.2. Deficiencies and Toxicity of Vitamins
 - 3.9.3. Choline
 - 3.9.4. Metabolism of Calcium and Phosphorus
 - 3.9.5. Electrolyte Balance
- 3.10. Water. The Forgotten Nutrient
 - 3.10.1. Principal Functions of Water
 - 3.10.2. Distribution of Water in an Organism
 - 3.10.3. Sources of Water
 - 3.10.4. Factors Affecting Water Requirements
 - 3.10.5. Water Requirements
 - 3.10.6. Requirements for the Quality of Drinking Water

Module 4. Digestibility, Ideal Protein and Advances in Veterinary Nutrition

- 4.1. Apparent Digestibility Coefficients
 - 4.1.1. Techniques to Obtain the Ileal Digesta
 - 4.1.1.1. Methodology to Calculate Digestibility
 - 4.1.2. Endogenous Losses
 - 4.1.2.1. Origin and Composition of Endogenous Amino Acids
 - 4.1.2.2. Techniques to Measure Endogenous Losses
 - 4.1.3. Standardized Coefficients and True Digestibility
 - 4.1.4. Factors Affecting Digestibility Coefficients
 - 4.1.4.1. Age and Physical State
 - 4.1.4.2. Food Consumption and Composition
- 4.2. Synthetic Amino Acids in Veterinary Nutrition
 - 4.2.1. Synthesis of Synthetic Amino Acids
 - 4.2.2. Use of Synthetic Amino Acids in Diets
- 4.3. Ideal Protein and Advances in Protein Nutrition
 - 4.3.1. Concept of Ideal Protein
 - 4.3.2. Profiles of Ideal Protein
 - 4.3.3. Use of Practical Applications

- 4.4. Estimation of Nutritional Requirements Through Performance Experiments
 - 4.4.1. Evaluation Methods for Nutritional Requirements
 - 4.4.2. Requirements Determination
- 4.5. Factors Affecting Nutrient Utilization
 - 4.5.1. Age
 - 4.5.2. Physiological Condition
 - 4.5.3. Level of Consumption
 - 4.5.4. Environmental Conditions
 - 4.5.5. Diet
- 4.6. Importance of the Quality and Stability of Fats in Nutrition
 - 4.6.1. Types of Fats
 - 4.6.2. Nutritional Profile of Fats
 - 4.6.3. Quality
 - 4.6.4. Inclusion of Fat in the Diet
- 4.7. Organic Minerals in Monogastric Nutrition
 - 4.7.1. Macrominerals
 - 4.7.2. Microminerals
 - 4.7.3. Structure of Organic Minerals
- 4.8. The Importance of Integrity and Intestinal Health in Veterinary Nutrition
 - 4.8.1. Intestinal Physiology and Anatomy
 - 4.8.2. Intestinal Health and Digestibility
 - 4.8.3. Factors which Affect Intestinal Integrity
- 4.9. Strategies for Animal Production Without Using Growth Enhancing Antibiotics
 - 4.9.1. Effects of Antibiotics on Nutrition
 - 4.9.2. Risk of Using Antibiotics
 - 4.9.3. Global Patterns
 - 4.9.4. Formulation and Feeding Strategies
- 4.10. Concept of Precision Nutrition
 - 4.10.1. Diets Close Up
 - 4.10.2. Animal Models
 - 4.10.3. Ideal Protein
 - 4.10.4. Physiological Condition
 - 4.10.5. Growth Physiology

Module 5. Nutrition and Food in Poultry

- 5.1. Broiler Chickens, Feeding Programs and Nutritional Requirements
 - 5.1.1. Genetic Evolution and Changes in Nutritional Requirements
 - 5.1.2. Food Programs
 - 5.1.3. Nutritional Requirements in the Main Genetic Lines
 - 5.1.4. Nutrition by Gender
 - 5.1.5. Nutritional Strategies to Reduce Environmental Impact
- 5.2. Special Food for Broiler Chickens
 - 5.2.1. Transport Feed (from Hatchery to Farm)
 - 5.2.2. Pre-Starter Food
 - 5.2.3. Finishing Food
- 5.3. Nutritional Strategies to Improve the Quality of a Whole Chicken
 - 5.3.1. Production Focus: Whole Chicken or Chicken Pieces
 - 5.3.2. Feeding Program for Chicken Pieces
 - 5.3.3. Nutritional Adjustments for Increased Chicken Breast Yield
 - 5.3.4. Strategies to Ensure the Quality of Fresh or Chilled Whole Chickens
- 5.4. Pullet Chickens, Feeding Programs and Nutritional Requirements
 - 5.4.1. Nutritional Program According to Age and Performance
 - 5.4.2. Nutritional Specifications of Pullet Diets
 - 5.4.3. Factors Affecting the Performance and Optimization of Nutrient Consumption
- 5.5. Pre-Posture Diet
 - 5.5.1. What is the Purpose of a Pre-Posture Diet?
 - 5.5.2. Supply Period
 - 5.5.3. Nutritional Profile of the Pre-Posture Diet
 - 5.5.4. Calcium and Phosphorus in Pre-Posture Diet
- 5.6. Layer Hens, Feeding Programs and Nutritional Requirements
 - 5.6.1. Posture Stages and Characteristics
 - 5.6.2. Staged Feeding Program
 - 5.6.3. Nutritional Requirements
 - 5.6.4. Consumption Models
 - 5.6.5. Food Texture
 - 5.6.6. Egg Size

- 5.7. Nutrition and Egg Shell
 - 5.7.1. Importance of the Shell Quality
 - 5.7.2. Formation of the Shell
 - 5.7.3. Factors Which Affect a Good Quality Shell
 - 5.7.4. Nutritional Strategies and the Additives to Safeguard the Quality of the Shell
- 5.8. Confusion Matrices, Feeding Programs and Nutritional Requirements
 - 5.8.1. Development Stages of the Breeder
 - 5.8.2. Feeding Program for Chicks
 - 5.8.3. Nutritional Requirements of Chicks
 - 5.8.4. Nutritional Program for Breeding Adults
 - 5.8.5. Male Nutrition
 - 5.8.6. Nutrition and Hatchability
- 5.9. Nutritional Strategies and the Additives for the Intestinal Health of the Poultry
 - 5.9.1. Importance of Intestinal Health and Integrity
 - 5.9.2. Aspects Which Challenge the Intestinal Integrity
 - 5.9.3. Nutritional Strategies to Safeguard Intestinal Health
 - 5.9.4. Additives and Programs for Intestinal Health
- 5.10. Caloric Stress and Nutritional Strategies
 - 5.10.1. Physiology and Caloric Stress
 - 5.10.2. Nutrition and Endogenous Heat Production
 - 5.10.3. Electrolyte Balance
 - 5.10.4. Physiological Mechanisms of Heat Dissipation in Birds
 - 5.10.5. Nutritional Strategies to Help Combat Caloric Stress





Module 6. Nutrition and Food in Pigs

- 6.1. Productive Phases and Food Programs in Pig Farming
 - 6.1.1. Gestation and Lactation
 - 6.1.2. Replacement females
 - 6.1.3. Piglet Initiation
 - 6.1.4. Raising of Commercial Pigs
 - 6.1.5. Fattening and Completion of Commercial Pigs
- 6.2. Pre-start-up Diets, Nutrition Challenges and Opportunities to Optimize Performance
 - 6.2.1. Nutritional Requirements for Piglets in Maternity and Rearing
 - 6.2.2. Digestibility of Nutrients in Piglets Diets
 - 6.2.3. Special Raw Materials
- 6.3. Simple and Complex Diets for Piglet Performance in Pre-Starting Piglets
 - 6.3.1. Simple Diets
 - 6.3.2. Expected Performance with the use of Simple Diets in Piglets
 - 6.3.3. Complex Diets
 - 6.3.4. Expected Performance with the use of Complex Diets in Piglets
 - 6.3.5. Intestinal Integrity in Piglets
- 6.4. Food Programs and Nutritional Needs of Growing Pigs
 - 6.4.1. Stages of Production in Growing Pigs
 - 6.4.2. Food for the Different Phases of Growth
 - 6.4.3. Nutritional Requirements in Growing Pigs
 - 6.4.4. Nutrition Focused on the Intestinal Integrity of Growing Pigs
- 6.5. Food Programs and Nutritional Needs of Fattening and Finishing Pigs
 - 6.5.1. Food for Fattening Pigs
 - 6.5.2. Nutritional Requirements for Fattening Pigs
- 6.6. Nutrition and Food in the First-Time Sow
 - 6.6.1. Understanding the Nutrition of a Replacement Female
 - 6.6.2. Nutritional Requirements for Replacement Females
 - 6.6.3. Nutritional Requirements for First-Time Sows
 - 6.6.4. Gestation of First-Time Sows
 - 6.6.5. Lactation in First-Time Sows

- 6.7. Nutrition and Food in the Lactating Sows
 - 6.7.1. Ad Libitum Feeding in Lactating Females
 - 6.7.2. Nutritional Requirements for Lactating Females
 - 6.7.3. Requirements According to the Size of the Litter
- 6.8. Nutrition and Food in the Pregnant Sows
 - 6.8.1. Post-weaning Feeding
 - 6.8.2. Food for Different Phases During Gestation
 - 6.8.3. Nutritional Requirements for Pregnant Females
- 6.9. Interactions Between Health, Immune System and Nutrition of Pigs
 - 6.9.1. The Digestive System as Part of the Pigs Immune System
 - 6.9.2. Interaction between Nutrition and Immunity
 - 6.9.3. Nutrition Focused on Improving the Intestinal Health and Integrity
- 6.10. Alternative Nutrition to Reduce the Environmental Impact of Pig Farming
 - 6.10.1. Impact of Nutrition of the Environment
 - 6.10.2. Nutrition Focused on Reducing the Environmental Impact of Pig Slurry

Module 7. Nutrition and Food in Canines and Felines

- 7.1. Physiology of the Digestive System of Canines and Felines (I)
 - 7.1.1. Introduction
 - 7.1.2. Functioning of the Digestive System
 - 7.1.3. Principle Differences and Similarities Between Both Species
- 7.2. Physiology of the Digestive System of Canines and Felines (II)
 - 7.2.1. Introduction
 - 7.2.2. Balanced Diet
 - 7.2.3. Factors that Influence Ingestion
- 7.3. Requirements
 - 7.3.1. Energy and Carbohydrates for Dogs and Cats
 - 7.3.2. Fats and Proteins
 - 7.3.3. Vitamins and minerals
- 7.4. Foods Available for Pet Animals
 - 7.4.1. Introduction
 - 7.4.2. Types of Diets
 - 7.4.3. Owners Interpretation of the Label

- 7.5. Nutrition for Different Stages of Life (I)
 - 7.5.1. Introduction
 - 7.5.2. Maintenance for Adults
 - 7.5.3. Food for Puppies
- 7.6. Nutrition for Different Stages of Life (II)
 - 7.6.1. Reproduction and Lactation
 - 7.6.2. Food for Pets of an Advanced Age
 - 7.6.3. A Special Case. Food for Racing Dogs
- 7.7. Pathologies Derived from Nutrition and their Treatments (I)
 - 7.7.1. Introduction
 - 7.7.2. The Obese Patient
 - 7.7.3. The Underweight Patient
- 7.8. Pathologies Derived from Nutrition and their Treatments (II)
 - 7.8.1. Cardiac Patient
 - 7.8.2. Renal Patient
 - 7.8.3. Liver patient
- 7.9. Pathologies Derived from Nutrition and their Treatments (II)
 - 7.9.1. Gastrointestinal Problems
 - 7.9.2. Skin Diseases
 - 7.9.3. Diabetes Mellitus
- 7.10. Nutritional Management in Extreme Situations
 - 7.10.1. Introduction
 - 7.10.2. Food for a Sick Patient
 - 7.10.3. Intensive Care Nutritional Support

Module 8. Nutrition and Food in Ruminants

- 8.1. Digestion and Ruminal Process in Bovines
 - 8.1.1. Anatomy of the Digestive System of a Ruminant
 - 8.1.2. Physiology and Importance of Rumination
 - 8.1.3. Ruminal Microorganisms and their Importance
 - 8.1.4. Digestion of Carbohydrates in Rumen
 - 8.1.5. Digestion of Fats in Rumen
 - 8.1.6. Digestion of Nitrogen Compounds in Rumen
- 8.2. Post-ruminal Digestion and Metabolism
 - 8.2.1. Post-ruminal Digestion of Carbohydrates, Lipids and Proteins
 - 8.2.2. Absorption of Nutrients in the Ruminant
 - 8.2.3. Metabolism of Carbohydrates, Lipids and Proteins in Ruminants
- 8.3. Protein Requirements
 - 8.3.1. Methodology for Protein Titration in Ruminants
 - 8.3.2. Maintenance Requirements
 - 8.3.3. Gestation Requirements
 - 8.3.4. Milk Production Requirements
 - 8.3.5. Growth Requirements
- 8.4. Energy Requirements
 - 8.4.1. Methodology of Energetic Valuation in Ruminants
 - 8.4.2. Maintenance Requirements
 - 8.4.3. Gestation Requirements
 - 8.4.4. Milk Production Requirements
 - 8.4.5. Growth Requirements
- 8.5. Fiber Requirements
 - 8.5.1. Fiber Valuation Methods
 - 8.5.2. Fiber Requirements for Maintaining Good Health and Production in Ruminants
- 8.6. Mineral and Vitamin Requirements
 - 8.6.1. Hydrosoluble Vitamins
 - 8.6.2. Liposoluble Vitamins
 - 8.6.3. Macrominerals
 - 8.6.4. Microminerals
- 8.7. Water, Requirements and Factors which Affect its Consumption
 - 8.7.1. Importance of Water in the Production of Ruminants
 - 8.7.2. Water Quality for Ruminants
 - 8.7.3. Water Requirements for Ruminants
- 8.8. Nutrition and Food in Lactating Ruminants
 - 8.8.1. Physiology of Esophageal Leakage
 - 8.8.2. Requirements in Lactating Ruminants
 - 8.8.3. Diet Design for Lactating Ruminants
- 8.9. Main Foods in Diets for Ruminants
 - 8.9.1. Fibrous Foods
 - 8.9.2. Energy Rich Foods
 - 8.9.3. Protein Rich Foods
 - 8.9.4. Vitamin Supplements
 - 8.9.5. Mineral Supplements
 - 8.9.6. Additives and Others
- 8.10. Dietary Formulation and Supplements for Bovines
 - 8.10.1. Requirement Calculations
 - 8.10.2. Ration Balancing Methods
 - 8.10.3. Dietary Formulation for Beef Cattle
 - 8.10.4. Dietary Formulation for Dairy Cattle
 - 8.10.5. Dietary Formulation for Sheep and Goats

Module 9. Additives in Animal Food

- 9.1. Definitions and Types of Additives Used in Animal Food
 - 9.1.1. Introduction
 - 9.1.2. Classification of Additive Substances
 - 9.1.3. Additives for Quality
 - 9.1.4. Performance Enhancing Additives
 - 9.1.5. Nutraceuticals
- 9.2. Anticoccidials and GrowthPromoting Antibiotics
 - 9.2.1. Types of Anticoccidials
 - 9.2.2. Anticoccidials Programs
 - 9.2.3. Growth-Promoting Antibiotics and Purposes of Use
- 9.3. Enzymes
 - 9.3.1. Phytases
 - 9.3.2. Carbohydrases
 - 9.3.3. Proteases
 - 9.3.4. Mananasa Beta
- 9.4. Antifungals and Mycotoxin Binders
 - 9.4.1. Importance of Fungal Contamination
 - 9.4.2. Types of Fungi that Contaminate Grains
 - 9.4.3. Substances with Antifungal Characteristics
 - 9.4.4. What are Mycotoxins?
 - 9.4.5. Types of Mycotoxins
 - 9.4.6. Types of Binders
- 9.5. Acidifiers and Organic Acids
 - 9.5.1. Objectives and Approaches to the Use of Acidifiers in Poultry and Swine
 - 9.5.2. Types of Acidifiers
 - 9.5.3. What are Organic Acids?
 - 9.5.4. Main Organic Acids Used
 - 9.5.5. Mechanisms of action
 - 9.5.6. Technological Characteristics of Acidifiers
- 9.6. Antioxidants and Pigmenting Agents
 - 9.6.1. Importance of Antioxidantes in Balanced Foods and Veterinary Nutrition
 - 9.6.2. Natural and Synthetic Anitoxidants
 - 9.6.3. How Antioxidants Work?
 - 9.6.4. Pigmentation in the Egg and the Chicken
 - 9.6.5. Pigment Sources
- 9.7. Probiotics, Prebiotics, and Symbiotics
 - 9.7.1. Differences between Probiotics, Prebiotics, and Symbiotics
 - 9.7.2. Types of Probiotics and Prebiotics
 - 9.7.3. Approaches and Strategies of Use
 - 9.7.4. Benefits of Poultry and Pig Farming
- 9.8. Odor Control Products
 - 9.8.1. Air Quality and Ammonia Control in Poultry Farming
 - 9.8.2. Yucca Shidigera
 - 9.8.3. Odour Controls in Pig Farming
- 9.9. Phytoгенics
 - 9.9.1. What are Phytoгенic Substances?
 - 9.9.2. Types of Phytoгенic Substances
 - 9.9.3. Procurement Processes
 - 9.9.4. Mechanisms of action
 - 9.9.5. Essential Oils
 - 9.9.6. Flavonoids
 - 9.9.7. Pungent Substances, Saponins, Tannins and Alkaloids
- 9.10. Bacteriophages and Other New Technologies
 - 9.10.1. What are Bacteriophages?
 - 9.10.2. Recommendations for Use
 - 9.10.3. Proteins and Bioactive Peptides
 - 9.10.4. Egg Immunoglobulins
 - 9.10.5. Additives for the Correction of Process Losses

Module 10. Manufacturing of Balanced Foods: Processes, Quality Control and Critical Points

- 10.1. From Formula to Food Processing, Aspects to be Considered
 - 10.1.1. What is a Balanced Food Formula and What Information Should it Contain
 - 10.1.2. How to Read and Analyze a Balanced Food Formula
 - 10.1.3. Preparation of Raw Materials and Additives
 - 10.1.4. Equipment Preparation
 - 10.1.5. Basic Analysis of Manufacturing Costs of Balanced Foods
- 10.2. Storage of Cereals
 - 10.2.1. Reception Process of Raw Materials
 - 10.2.2. Sampling of Raw Materials
 - 10.2.3. Basic Analysis upon Reception
 - 10.2.4. Types of Storage and Characteristics
- 10.3. Storage of Liquids and Animal By-products
 - 10.3.1. Liquid Products and Handling and Storage Characteristics
 - 10.3.2. Dosage of Liquid Products
 - 10.3.3. Control Regulations and Storage of Animal By-products
- 10.4. Steps in the Process for Making Balanced Foods
 - 10.4.1. Weighing
 - 10.4.2. Milling
 - 10.4.3. Mixing
 - 10.4.4. Addition of Liquids
 - 10.4.5. Conditioning
 - 10.4.6. Pelletizing
 - 10.4.7. Cooling
 - 10.4.8. Packaging
 - 10.4.9. Other Processes
- 10.5. Milling and the Nutritional Consequences
 - 10.5.1. Purpose of Milling
 - 10.5.2. Types of Mill
 - 10.5.3. Efficiency of Milling
 - 10.5.4. Importance of Particle Size
 - 10.5.5. Effects of Particle Size on the Zootechnical Performance of Birds and Pigs
- 10.6. Mixing, Uniformity and the Nutritional Consequences
 - 10.6.1. Types of Mixers and Characteristics
 - 10.6.2. Stages in the Process of Mixing
 - 10.6.3. Importance of the Process of Mixing
 - 10.6.4. Coefficient Variation of Mixing and Methodology
 - 10.6.5. Effects of a Bad Mix on the Animal Performance
- 10.7. Pelletization, Quality and the Nutritional Consequences
 - 10.7.1. Purpose of Pelletization
 - 10.7.2. Phases in the Process of Pelletizing
 - 10.7.3. Types of Pellets
 - 10.7.4. Factors which Affect and Benefit the Success of the Process
 - 10.7.5. Pellet Quality and Effects on the Zootechnical Performance
- 10.8. Other Machines and Equipment Used in the Balancing Industry
 - 10.8.1. Sampling Probes
 - 10.8.2. Quarters
 - 10.8.3. Moisture Meters
 - 10.8.4. Sieve
 - 10.8.5. Densimetric Tables
 - 10.8.6. Hopper Scale
 - 10.8.7. Mill Batchers
 - 10.8.8. Post-pellets Applications
 - 10.8.9. Monitoring Systems
- 10.9. Forms and Types of Feed Offered by Balanced Feed Plants
 - 10.9.1. Flour Foods
 - 10.9.2. Peletized Foods
 - 10.9.3. Extruded Food
 - 10.9.4. Wet Food
- 10.10. Control Quality Control and Critical Points Control
 - 10.10.1. Quality Administration in the Plant
 - 10.10.2. Good Practices in Food Production
 - 10.10.3. Quality Control of Raw Materials
 - 10.10.4. Production Process and Finished Product
 - 10.10.5. Hazard Analysis and Critical Control Points (HACCP)

06 Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





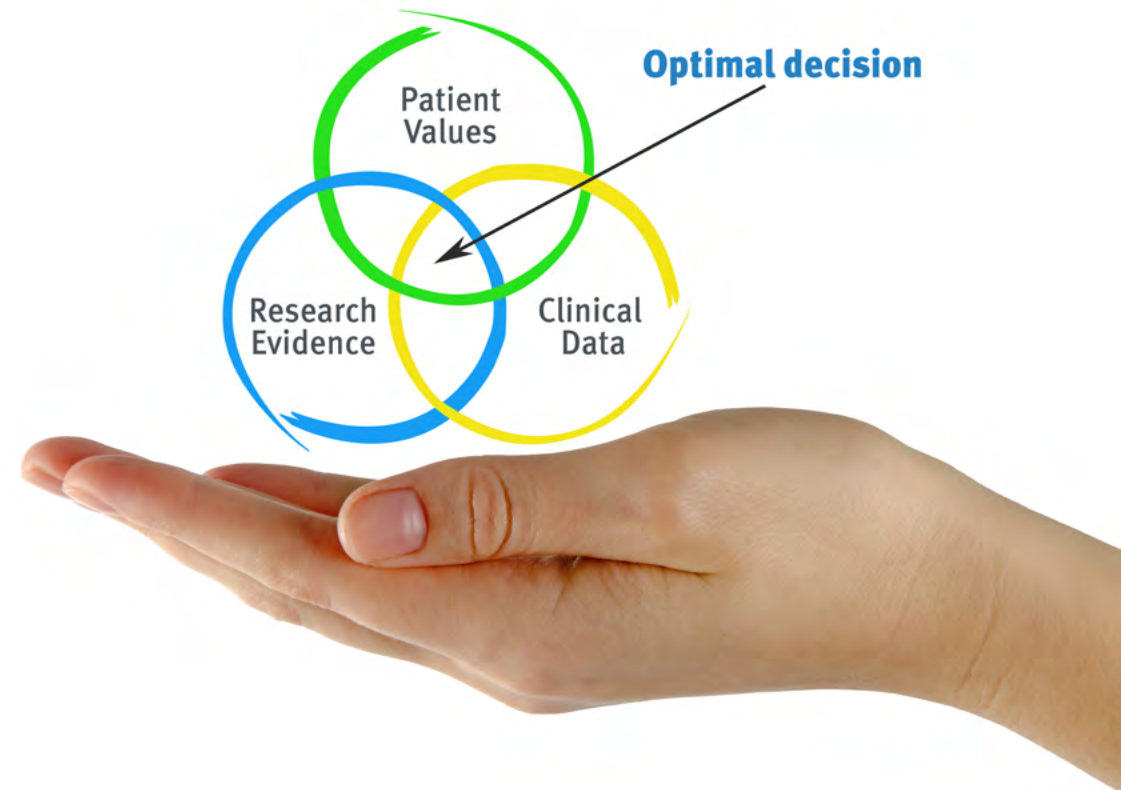
“

Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, in an attempt to recreate the actual conditions in a veterinarian's professional practice.

“

Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”

The effectiveness of the method is justified by four fundamental achievements:

1. Veterinarians who follow this method not only manage to assimilate concepts, but also develop their mental capacity through exercises to evaluate real situations and knowledge application
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. The feeling that the effort invested is effective becomes a very important motivation for veterinarians, which translates into a greater interest in learning and an increase in the time dedicated to working on the course.



Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.



Veterinarians will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.

At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology more than 65,000 veterinarians have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. Our teaching method is developed in a highly demanding environment, where the students have a high socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and relearn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



Latest Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current and procedures of veterinary techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



07

Certificate

The Professional Master's Degree in Veterinary Nutrition guarantees you, in addition to the most rigorous and updated training, access to a Professional Master's Degree issued by TECH Technological University.





“

*Successfully complete this program
and receive your university degree
without travel or laborious paperwork”*

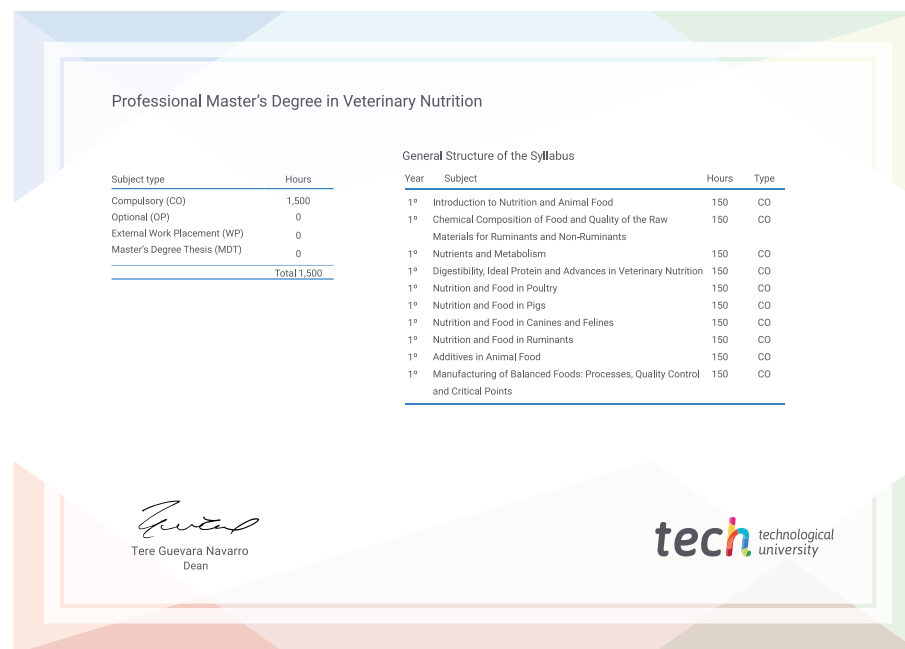
This **Professional Master's Degree in Veterinary Nutrition** contains the most complete and updated scientific program on the market.

After the student has passed the evaluations, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Veterinary Nutrition**

Official N° of hours: **1,500 h.**



*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

future
health confidence people
education information tutors
guarantee accreditation teaching
institutions technology learning
community commitment
personalized service innovation
knowledge present quality
development language
virtual classroom



**Professional Master's
Degree**
Veterinary Nutrition

Course Modality: Online

Duration: 12 months

Certificate: TECH Technological University

Official N° of hours: 1,500 h.

Professional Master's Degree Veterinary Nutrition

