

# Professional Master's Degree Veterinary Cardiology in Large Animals





## Professional Master's Degree Veterinary Cardiology in Large Animals

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/veterinary-medicine/professional-master-degree/master-veterinary-cardiology-large-animals](http://www.techtitute.com/us/veterinary-medicine/professional-master-degree/master-veterinary-cardiology-large-animals)

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# 01

# Introduction

This Professional Master's Degree is unique because it unifies all the relevant and advanced knowledge so that the student acquires a high degree of specialization in Veterinary Cardiology in Large Animals, as a highly qualified veterinarian, in the clinical management of the most common cardiovascular disorders of these species.

The Professional Master's Degree is taught entirely by specialists in the field of Cardiology in Large Animals, which guarantees the highest quality. The program develops the basis of Cardiology and delves into the most up-to-date and advanced techniques currently available, offering extensive and in-depth content.





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*With this intensive program you will learn how to establish an appropriate methodology for animal cardiopathy examination”*

Cardiovascular disorders in animals are highly significant because they can affect their quality of life and life expectancy. Advanced knowledge of cardiology is indispensable for large animal veterinarians: ruminants (cattle, sheep, goats), camelids (alpacas, camels and llamas), swine (pigs, wild boars) and equids (donkeys and mules).

Cardiology in ruminants and swine has been limited, for a long time, due to the limited literature and diagnostic limitations, especially in advanced therapeutic procedures. Regarding Equidae, a high number of horses are used for sporting purposes and cardiac pathologies limit their capacity and even force the animal to withdraw from competition. This is more evident the more demanding the equine is in terms of sport and cardiovascular effort. The management of food species differs, but it also affects their production capacity.

In recent years, there has been a boom in the development of novel diagnostic and therapeutic techniques, such as intracardiac electrocardiograms, electrophysiological mapping in arrhythmias, pacemaker implantation and other intracardiac devices that can be implemented in larger species. These advances, which are necessary for an adequate clinical approach, are not available in books.

Therefore, this Professional Master's Degree offers a comprehensive and developed syllabus that addresses advanced cardiology topics, providing detailed descriptions of the different procedures performed depending on the species, as well as a guide for clinical decision making and patient selection. It incorporates specialized knowledge on cardiology, embryology, anatomy, physiology and cardiac pathophysiology, essential to understand the different pathologies.

These pathologies are covered exhaustively in the syllabus. Not only does it explain what they consist of and how they are treated, but the student also obtains a specialized clinical management guide for each of the cases, which includes decision making, making this Professional Master's Degree a very useful tool for veterinarians.

Cardiac pharmacology plays a relevant role. The key to administering effective treatment lies in the knowledge of the mechanism of action of the different drugs that have an effect on the cardiovascular system, especially when the clinical presentation of cardiac patients is sometimes so different and requires personalized medication.

This unit guides students towards a simple understanding of the action and adverse effects of drugs, which subsequently facilitates an intuitive clinical application.

The Professional Master's Degree in Cardiology in Large Animals brings together all the detailed information on the different fields of Cardiology at a high and advanced level of specialization, and is taught by renowned professors in the field of internal medicine, Cardiology and minimally invasive surgery in veterinary medicine.

This **Professional Master's Degree in Veterinary Cardiology in Large Animals** contains the most complete and up-to-date educational program on the market. The most important features of the program include:

- ♦ Development of practical cases presented by experts in Veterinary Cardiology in Large Animals
- ♦ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Latest developments in Veterinary Cardiology in Large Animals
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ Special emphasis on innovative methodologies in Veterinary Cardiology in Large Animals
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection

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*With this program you will learn how to develop a suitable work methodology to optimize the use of non-invasive diagnostic tests"*

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 immersive learning programmed to train in real situations.

This program is designed around Problem Based Learning, whereby the specialist must try to solve the different professional practice situations that arise during the academic year. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts in Veterinary Cardiology in Large Animals.

*This program has the best teaching material on the market, which will allow you to study in context, quickly and efficiently.*

*Combine your studies with your professional work while you increase your knowledge in veterinary cardiology.*



02

# Objectives

The Professional Master's Degree in Veterinary Cardiology in Large Animals is aimed at facilitating the performance of professionals dedicated to Veterinary Medicine with the latest advances and most up-to-date treatments in the sector.







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*Throughout these months you will learn to examine the main aspects involved in the development of congenital heart disease and its progression after birth"*



## General Objectives

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- ♦ Analyze the embryological development of the different cardiac structures
- ♦ In-depth development of the fetal circulation and its evolution to the adult animal
- ♦ Examine cardiac anatomy and its topography in the thoracic cavity in depth
- ♦ Establish the basic principles of cardiovascular functioning
- ♦ Generate specialized knowledge in cardiac physiology
- ♦ Recognize the mechanisms involved in the genesis of arrhythmias
- ♦ Identify the basis of cardiac pathophysiology of syncope and heart failure
- ♦ Detail the mechanisms of action, adverse effects and contraindications of drugs used in the cardiovascular area
- ♦ Establish a suitable methodology for animal cardiopathy examination
- ♦ Identify all clinical signs associated with cardiovascular disease
- ♦ Generate specialized knowledge of cardiac auscultation
- ♦ Establish the specific clinical approach to animals with a cardiovascular disorder
- ♦ Develop a suitable working methodology to optimize the use of non-invasive diagnostic tests
- ♦ Analyze the basics of ultrasound to learn the tools useful in the assessment of cardiac function and structure
- ♦ Establish solid concepts in the genesis of the electrocardiogram
- ♦ Develop a diagnostic protocol based on the electrocardiogram.
- ♦ Examine the main aspects involved in the development of congenital heart disease and its progression after birth
- ♦ Analyze the anatomical-ecocardiographic relationship of complex congenital heart diseases in order to make a simple diagnosis
- ♦ Develop the etiology, progression and prognosis of acquired structural heart disorders
- ♦ Establish a diagnostic methodology to address acquired structural cardiac disorders and select the appropriate therapeutic management for each of them.
- ♦ Proper identification of sinus rhythm
- ♦ Establish an appropriate methodology for the interpretation of arrhythmias.
- ♦ Generate specialized knowledge of resting and stress electrocardiograms
- ♦ Establish the specific clinical approach to animals with arrhythmia
- ♦ Generate specialized knowledge on the most common vascular problems
- ♦ Identify all clinical signs associated with each disease
- ♦ Establish the specific clinical approach for each pathology
- ♦ Determine the prognosis and the most appropriate treatment in each case
- ♦ Learn about cardiovascular system adaptations to exercise and how they apply to examining sports horses
- ♦ Identify all clinical signs associated with cardiovascular overtraining and undertraining
- ♦ Establish cardiovascular fitness assessment methods
- ♦ Know the complementary tests used to evaluate horses with heart disease during exercise.
- ♦ Establish an accurate criterion to address performance decline and sudden death in horses.
- ♦ Examine in detail how organ imbalances, intoxications and critical pathologies such as shock affect the heart



- ◆ Development of systemic diseases related to cardiovascular disorders
- ◆ Establish the adaptive and pathological changes manifested by the heart with certain systemic diseases
- ◆ Establish therapeutic protocols in systemic diseases affecting the heart, addressing the treatment as a whole
- ◆ Generate specialized knowledge in advanced cardiac diagnostic and therapeutic techniques
- ◆ Examine the instrumentation required to perform cardiac catheterization and minimally invasive surgery
- ◆ Establish the appropriate methodology for the performance of these advanced procedures, including their anesthetic approach
- ◆ Strengthen the basis for selecting appropriate cases for cardiac catheterization and minimally invasive surgery
- ◆ Develop cardiopulmonary resuscitation protocols



## Specific Objectives

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### **Module 1. Cardiac embryology, anatomy and physiology in large animals: equidae, ruminants and swine**

- ♦ Specify the foundations of embryonic development
- ♦ Establish the foundations of possible cardiac malformations
- ♦ In-depth examination of the cardiac structure
- ♦ Analyze the microscopic characteristics of the heart
- ♦ Develop the concepts of the electrical activity of the heart
- ♦ Examine the characteristics of cardiomyocytes
- ♦ Generate specialized knowledge about ion channels and action potentials

### **Module 2. Cardiovascular pathophysiology and pharmacology in large animals: equidae, ruminants and swine**

- ♦ Analyze the arrhythmogenic bases and classify them according to the causative mechanism
- ♦ Recognize the main mechanisms underlying syncope
- ♦ Differentiate the mechanisms leading to the onset of heart failure
- ♦ Establish the different pathways activated in heart failure
- ♦ Detail the control of the organism in heart failure
- ♦ Describe and detail the pharmacological groups with action on the cardiovascular system
- ♦ Specify the indications for antiarrhythmic drugs, their mechanism of action and adverse effects

### **Module 3. General examination of large animals with cardiovascular pathology: equidae, ruminants and swine**

- ♦ Develop specialized information on the clinical examination of cardiac patients
- ♦ Accurately recognize the normal sounds that can be encountered
- ♦ Differentiate between physiological murmurs and pathological murmurs
- ♦ Establish differential diagnoses of abnormal rhythms based on irregularity and heart rate
- ♦ Establish a work methodology for patients with murmurs and for patients with arrhythmias.
- ♦ Generate a work methodology for patients with syncope
- ♦ Develop a work methodology for animals with heart failure

### **Module 4. Complementary non-invasive cardiovascular tests in large animals: equidae, ruminants and swine**

- ♦ Fundamentals of ultrasound physics and imaging principles
- ♦ Differentiate the types of echocardiography and analyze their usefulness in different clinical situations
- ♦ Recognize all the ultrasound planes described and propose a standardized protocol for evaluating the heart
- ♦ Gain insight into the genesis of the electrocardiogram in order to analyze its pattern, the existence of artifacts and morphological anomalies
- ♦ Specify the different recording systems and methods used to obtain the electrocardiogram and adapt it to the patient's clinical situation
- ♦ Establish a systematic protocol that simplifies the reading of the electrocardiogram
- ♦ Identify the main mistakes made when analyzing the electrocardiogram

**Module 5. Structural cardiac pathologies in major species: equidae, ruminants and swine**

- ♦ Generate specific knowledge of the underlying pathophysiology of congenital heart disease
- ♦ Specify the appropriate diagnostic and therapeutic protocol for each of them
- ♦ Propose a standardized protocol for evaluating the heart when there is a congenital anomaly
- ♦ Analyze the etiology and pathophysiology of acquired cardiac disorders in order to understand their evolution, treatment and progression
- ♦ Identify clinical, echocardiographic and electrocardiographic markers that provide information to establish the clinical relevance of structural pathologies
- ♦ Update knowledge with the latest therapeutic advances in congenital and acquired pathologies of the heart

**Module 6. Arrhythmias in major species: equidae, ruminants and swine**

- ♦ Generate knowledge about the genesis of the electrocardiogram
- ♦ Accurate recognition of sinus rhythm and pathological rhythm
- ♦ Differentiate all arrhythmias from each other
- ♦ Establish differential diagnoses for physiological and pathological arrhythmias
- ♦ Know the clinical relevance of arrhythmias
- ♦ Establish therapeutic protocols for arrhythmias

**Module 7. Pathologies of the endocardium, myocardium, pericardium and vascular system in major species: equidae, ruminants and swine**

- ♦ Identify the main pathologies affecting blood vessels
- ♦ Analyze the origin of the problem and establish the prognosis of myocarditis
- ♦ Recognize the clinical and laboratory signs of the main intoxications affecting the myocardium
- ♦ Specify the mechanisms of pericardial disease and its consequences
- ♦ Establish the prognosis of horses with thrombophlebitis and possible complications
- ♦ Identify the symptoms of vasculitis and propose treatment options
- ♦ In-depth examination of vascular lesions caused by parasites
- ♦ Recognize the signs of horses with vascular fistulas and their implications
- ♦ Propose a treatment plan for horses with dilated cardiomyopathy

**Module 8. Cardiac response to exercise, sports performance and sudden death in sports horses**

- ♦ Generate specialized knowledge on the cardiovascular fitness required according to discipline and the different training methods
- ♦ Specify the information required in clinical examination of sports horses
- ♦ Precisely examine the cardiovascular and hematological adaptations resulting from cardiovascular training
- ♦ Analyze the different cardiovascular training methods according to discipline
- ♦ Differentiate between the symptoms of overtraining and cardiovascular detraining

- ♦ Propose a methodology for assessing cardiovascular fitness of horses
- ♦ Establish working protocols for the clinical evaluation of cardiac horses during performance
- ♦ Identify cardiac pathologies that decrease performance and cardiac pathologies that increase the risk of sudden death
- ♦ Establish criteria for assessing the risk of sudden death in horses

#### **Module 9. Systemic Disorders and Specific Situations Affecting the Heart in Large Animals: Equidae, Ruminants and Swine**

- ♦ Specify the specific risks of electrolyte disturbances in patients
- ♦ Examine the specific risks of critical states such as shock
- ♦ Develop the most common endocrine pathologies and establish their relationship with the heart
- ♦ Develop specialized knowledge of cardiorenal syndrome and establish its treatment
- ♦ Differentiate between primary and secondary cardiac pathologies
- ♦ Establish the complications associated with the administration of sedative and anesthetic drugs routinely used in daily clinical practice





**Module 10. Advanced cardiac procedures: interventionism, minimally invasive surgery and cardiopulmonary resuscitation in major species: equidae, ruminants and swine**

- ♦ Analyze the specific risks posed by anesthesia
- ♦ Develop appropriate anesthetic protocols that allow for safe anesthesia
- ♦ Adequately select cases that can undergo cardiac catheterization and minimally invasive surgery, establishing a risk-benefit ratio
- ♦ Develop in-depth knowledge of the instruments used in cardiac catheterization and minimally invasive surgery techniques
- ♦ Differentiate the types of existing pacemakers and defibrillators
- ♦ Integrating electrical cardioversion as a routine treatment option in the equine clinic
- ♦ Examine the complications that arise during cardiac catheterization and minimally invasive surgery procedures and establish protocols for dealing with these complications
- ♦ Establish up-to-date protocols for cardiopulmonary resuscitation in foals and adult horses



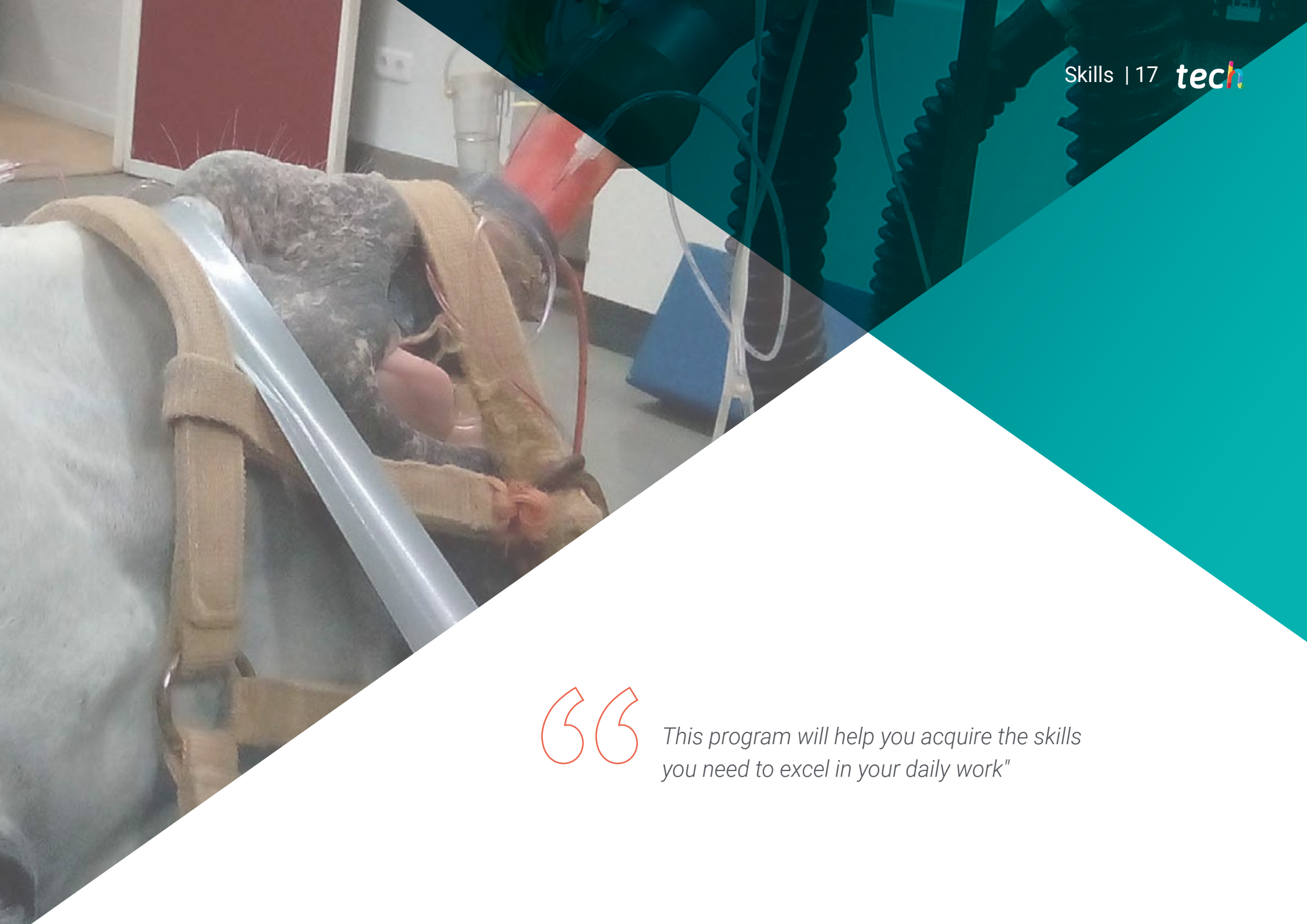
*A path to achieve training and professional growth that will propel you towards a greater level of competitiveness in the employment market"*

# 03 Skills

After passing the assessments on the Professional Master's Degree in Veterinary Cardiology in Large Animals, the professional will have acquired the skills required for quality and up-to-date practice based on the most innovative teaching methodology.







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*This program will help you acquire the skills you need to excel in your daily work”*



## General Skills

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- ♦ Analyze the embryological development of the different cardiac structures
- ♦ Identify the basis of cardiac pathophysiology of syncope and heart failure
- ♦ Develop a suitable working methodology to optimize the use of non-invasive diagnostic tests
- ♦ Analyze the basics of ultrasound to learn the tools useful in the assessment of cardiac function and structure
- ♦ Analyze the anatomical-ecocardiographic relationship of complex congenital heart diseases in order to make a simple diagnosis
- ♦ Develop the etiology, progression and prognosis of acquired structural heart disorders
- ♦ Establish the specific clinical approach to animals with arrhythmia
- ♦ Identify all clinical signs associated with each disease
- ♦ Identify all clinical signs associated with cardiovascular overtraining and undertraining
- ♦ Development of systemic diseases related to cardiovascular disorders
- ♦ Establish therapeutic protocols in systemic diseases affecting the heart, addressing the treatment as a whole
- ♦ Examine the instrumentation required to perform cardiac catheterization and minimally invasive surgery
- ♦ Develop cardiopulmonary resuscitation protocols





## Specific Skills

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- ◆ Establish the foundations of possible cardiac malformations
- ◆ Recognize the main mechanisms underlying syncope
- ◆ Differentiate between physiological murmurs and pathological murmurs
- ◆ Differentiate the types of echocardiography and analyze their usefulness in different clinical situations
- ◆ Propose a standardized protocol for evaluating the heart when there is a congenital anomaly
- ◆ Establish differential diagnoses for physiological and pathological arrhythmias
- ◆ Identify the main pathologies affecting blood vessels
- ◆ Analyze the different cardiovascular training methods according to discipline
- ◆ Develop specialized knowledge of cardiorenal syndrome and establish its treatment
- ◆ Establish up-to-date protocols for cardiopulmonary resuscitation in foals and adult horses

04

# Course Management

The program includes world-renowned veterinarians from different countries with proven theoretical and practical professional experience.





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*Our teaching faculty, experts in Cardiology in Large Animals, will help you achieve success in your profession"*

## International Guest Conductor

Dr. Brian Scansen is professor and head of the cardiology and cardiac surgery service at Colorado State University. He also serves on the editorial board of the Journal of Veterinary Cardiology and lectures internationally on cardiac disease in animals. His clinical and research interests focus on congenital heart disease, advanced cardiac imaging and minimally invasive therapies.

He has recently led several sessions on cardiac disease in dogs and cats at veterinary conferences. In these sessions, Scansen addressed mitral valve disease in dogs and presented new therapies and strategies in development to treat heart disease and heart failure in dogs. He shared information on the progression of the disease and stressed the importance of identifying dogs at risk for heart failure.

As for his academic background, Scansen is a graduate of veterinary school at Michigan State University, where he graduated with Doctor of Veterinary Medicine and Master of Science degrees. He subsequently completed a fellowship in Interventional Radiology and Endoscopy at the University of Pennsylvania and the Animal Medical Center, New York.

He has published over 200 original journal articles, book chapters, proceedings and scientific abstracts related to cardiac disease in animals. In addition, he is a member of the Editorial Board of the Journal of Veterinary Cardiology and a Founding Member of the Society of Veterinary Interventional Radiology and Interventional Endoscopy.



## Dr. Scansen, Brian

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- Head of the cardiology and cardiac surgery service at Colorado State University.
- Member of the editorial board of the Journal of Veterinary Cardiology.
- M.D. from Michigan State University
- Master of Science, Michigan State University.
- Author of over 200 original journal articles, book chapters, proceedings and scientific abstracts related to cardiac disease in animals.

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*Thanks to TECH, you will be able to learn with the best professionals in the world”*

## Management



### Dr. Villalba Orero, María

- ♦ Doctor of Veterinary Medicine, Complutense University of Madrid.
- ♦ Doctoral thesis in Equine Anesthesia in 2014
- ♦ Degree in Veterinary from the Complutense University Madrid

## Professors

### Dr. Sanchez Afonso, Tiago

- ♦ PhD in Veterinary Medicine from the University of Georgia (USA)
- ♦ Doctoral thesis with research topic in Equine Cardiology, University of Georgia (USA)
- ♦ Degree in Veterinary Medicine from the University of Lisbon (Portugal)

### Ms. Roquet Carne, Imma

- ♦ Degree in Veterinary Medicine from the Autonomous University of Barcelona, 2005
- ♦ Master's Degree in Veterinary Science from the University of Saskatchewan (Canada)
- ♦ Professor of several Equine Clinical Master's Degrees at the University of Extremadura and the Autonomous University of Barcelona.

### Dr. Medina Torres, Carlos

- ♦ Doctor in Internal Medicine of Large Animals
- ♦ Doctorate (PhD) - The University of Queensland (International Scholarship)
- ♦ Australian Equine Laminitis Research Unit
- ♦ School of Veterinary Medicine, Faculty of Science, The University of Queensland

### Ms. Criado García, Guadalupe

- ♦ Degree in Veterinary Medicine from the University of Extremadura (2015)
- ♦ Private equine medicine service (2020, Catalonia)





**Ms. Fuentes Romero, Beatriz**

- ◆ Degree in Veterinary Medicine from Alfonso X El Sabio University
- ◆ Member of the Spanish Association of Equine Veterinarians (AVEE).

**Ms. Mateos Pañero, María**

- ◆ Degree in Veterinary Medicine from the University of Extremadura.
- ◆ Member of the British Small Animal Veterinary Association, member of the Veterinary Cardiovascular Society.

**Dr. Martín Cuervo, María**

- ◆ Doctorate with international mention (2017)
- ◆ Degree in Veterinary Medicine from the University of Cordoba in 2005

**Ms. Pradillo Martínez, Alicia**

- ◆ Degree in Veterinary from the Complutense University Madrid
- ◆ Equine Physical Preparation Teacher in Technical Sports Training Level 3

**Dr. Troya Portillo, Lucas**

- ◆ Degree in Veterinary Medicine from the Complutense University of Madrid
- ◆ Associate Professor, Department of Animal Medicine and Surgery, Autonomous University of Barcelona, teaching equine internal medicine since 2018.

# 05

# Structure and Content

The structure of the contents has been designed by the best professionals in the field of Veterinary Cardiology in Large Animals, with extensive experience and recognized prestige in the profession, backed by the volume of cases reviewed, studied and diagnosed, and with extensive knowledge of new technologies applied to veterinary medicine.





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*This Professional Master's Degree contains the most complete and up-to-date scientific program on the market”*

## Module 1. Cardiac Embryology, Anatomy and Physiology in Large Animals: Equidae, Ruminants and Swine

- 1.1. Embryology I. Cardiac Tube and Cardiac Loop Formation
  - 1.1.1. Cardiac Tube Formation
  - 1.1.2. Cardiac Loop Formation
- 1.2. Embryology II. Formation of Cardiac Septa and Major Blood Vessels, Fetal and Transitional Blood Circulation
  - 1.2.1. Cardiac Septa Formation
  - 1.2.2. Major Blood Vessel Formation
- 1.3. Embryology III. Fetal and Transitional Blood Circulation
  - 1.3.1. Fetal and Transitional Blood Circulation
- 1.4. Cardiac Anatomy I. Key Aspects
  - 1.4.1. General Data
  - 1.4.2. Orientation in the Thoracic Cavity.
  - 1.4.3. Pericardium
- 1.5. Cardiac Anatomy II. Heart and Coronary Blood Vessels. Atria, Ventricles and Conduction System
  - 1.5.1. Heart and Coronary Blood Vessels
  - 1.5.2. Atria and Ventricles
  - 1.5.3. Conduction System
- 1.6. Cardiac Physiology I. Cardiac Cycle, Cardiac Metabolism, Cardiac Muscle
  - 1.6.1. Cardiac Cycle
  - 1.6.2. Cardiac Metabolism
  - 1.6.3. Ultrastructure of Cardiac Muscle
- 1.7. Cardiac Physiology II. Systolic Heart Function I
  - 1.7.1. Preload
  - 1.7.2. Afterload
- 1.8. Cardiac Physiology III. Systolic Heart Function II
  - 1.8.1. Contractility
  - 1.8.2. Hypertrophy
  - 1.8.3. Wall Stress Curves

- 1.9. Cardiac Physiology IV. Flows and Neurohormonal Control of Circulation
  - 1.9.1. Blood Flow.
  - 1.9.2. Coronary Flow.
  - 1.9.2. Neurohormone Control of Circulation
- 1.10. Cardiac Physiology V. Ion Channels and Action Potentials
  - 1.10.1. Ion Channels
  - 1.10.2. Action Potential

## Module 2. Cardiovascular Pathophysiology and Pharmacology in Large Animals: Equidae, Ruminants and Suids

- 2.1. Pathophysiology of Arrhythmias
  - 2.1.1. Arrhythmogenic Mechanisms
- 2.2. Syncope Pathophysiology
  - 2.2.1. Collapse and Syncope
  - 2.2.2. Mechanisms Involved in Syncope
  - 2.2.3. Types of Syncope According to the Mechanism Involved
- 2.3. Heart Failure Pathophysiology
  - 2.3.1. Definition
  - 2.3.2. Mechanisms Involved
- 2.4. Types of Heart Failure
  - 2.4.1. Systolic and Diastolic
  - 2.4.2. Left and Right
  - 2.4.3. Acute and Chronic
- 2.5. Compensatory Mechanisms in Heart Failure
  - 2.5.1. Sympathetic Response
  - 2.5.2. Endocrine Response
  - 2.5.3. Neurohumoral Response
- 2.6. Cardiovascular Pharmacology I. Diuretics and Vasodilators
  - 2.6.1. Diuretics
  - 2.6.2. Vasodilators
- 2.7. Cardiovascular Pharmacology II. Calcium Channel Blockers and Digitalis
  - 2.7.1. Calcium Blockers
  - 2.7.2. Digitalis



- 2.8. Cardiovascular Pharmacology III. Adrenergic and Dopaminergic Receptor Agonists
  - 2.8.1. Adrenergic
  - 2.8.2. Dopaminergics
- 2.9. Antiarrhythmics I
  - 2.9.1. Class I
  - 2.9.2. Class II
- 2.10. Antiarrhythmics II
  - 2.10.1. Class III
  - 2.10.2. Others

### **Module 3. General Examination of Large Animals with Cardiovascular Pathology: Equidae, Ruminants and Swine**

- 3.1. Anamnesis, General and Specific Clinical Examination in Equidae
  - 3.1.1. Anamnesis
  - 3.1.2. General Physical Examination
  - 3.1.3. Cardiovascular System Examination
- 3.2. Anamnesis, General and Specific Clinical Examination of Ruminants and Camelids
  - 3.2.1. Ruminants
    - 3.2.1.1. Anamnesis
    - 3.2.1.2. General Physical Examination
    - 3.2.1.3. Cardiovascular System Examination
  - 3.2.2. Camelids
    - 3.2.2.1. Anamnesis
    - 3.2.2.2. General Physical Examination
    - 3.2.2.3. Cardiovascular System Examination
- 3.3. General Auscultation of Heart Sounds
  - 3.3.1. Interpretation of Normal Heart Sounds
  - 3.3.2. General Characteristics of Heart Murmurs
  - 3.3.3. Physiological Murmurs
  - 3.3.4. Differential Diagnosis of Physiological Murmurs

- 3.4. Auscultation of Murmurs and Arrhythmias
  - 3.4.1. Systolic Pathological Murmurs
  - 3.4.2. Diastolic Pathological Murmurs
  - 3.4.3. Continuous Murmurs
  - 3.4.4. Irregular Rhythms
- 3.5. Blood Pressure Measurement
  - 3.5.1. Role of Systemic Arterial Pressure
  - 3.5.2. Reference Values
  - 3.5.3. Alterations in Systemic Arterial Blood Pressure
  - 3.5.4. Methods for Measuring Systemic Blood Pressure
- 3.6. Cardiac Output Measurement
  - 3.6.1. Definition and Regulation of Cardiac Output
  - 3.6.2. Monitoring
  - 3.6.3. Indications for Monitoring
- 3.7. Interpretation of Blood Analysis I
  - 3.7.1. Blood Count:
  - 3.7.2. Leukogram
  - 3.7.3. Platelet Disorders
  - 3.7.4. Biochemistry
- 3.8. Interpretation of Blood Analysis II
  - 3.8.1. Electrolyte Disorders
  - 3.8.2. Troponin, BNP and ANP
- 3.9. Clinical Approach to Animals with Heart Murmur or Arrhythmias
  - 3.9.1. Interpretation of Clinical Signs and Assessment of Clinical Significance
  - 3.9.2. Prognosis
- 3.10. Clinical Approach to Syncope
  - 3.10.1. Interpretation of Clinical Signs and Assessment of Clinical Significance
  - 3.10.2. Prognosis

## Module 4. Complementary Non-Invasive Cardiovascular Tests in Large Animals: Equidae, Ruminants, Swine

- 4.1. General Echocardiography Concepts
  - 4.1.1. Ultrasound Characteristics
  - 4.1.2. Ultrasound-Tissue Interaction
  - 4.1.3. Ultrasound Image Formation
  - 4.1.4. Equipment Features
- 4.2. Basic Ultrasound Modes
  - 4.2.1. M-mode Ultrasound
  - 4.2.2. Two-Dimensional Ultrasound
  - 4.2.3. Doppler Technique
  - 4.2.4. *Speckle Tracking*
- 4.3. Special Ultrasound Modes and Cardiac Formulas
  - 4.3.1. Contrast Ultrasound
  - 4.3.2. Stress Ultrasound
  - 4.3.3. Transesophageal Ultrasound
  - 4.3.4. Fetal Cardiac Ultrasound
  - 4.3.5. Cardiac Formulas
- 4.4. Ultrasound Views
  - 4.4.1. Right Hemithorax Views
  - 4.4.2. Left. Hemithorax Views
- 4.5. Electrocardiogram Interpretation
  - 4.5.1. Assessing Cardiac Function
  - 4.5.2. Assessment of the Structure and Dimensions of the Chambers
- 4.6. What is an Electrocardiogram?
  - 4.6.1. Anatomical and Electrophysiological Foundations
  - 4.6.2. What Is It and How Does It Originate?
- 4.7. Recording Techniques
  - 4.7.1. Einthoven's Classical System
  - 4.7.2. Base-Apex Systems and Handheld Devices
  - 4.7.3. Electrocardiogram Acquisition Modes

- 4.8. Electrocardiogram Interpretation
  - 4.8.1. Normal Electrocardiogram
  - 4.8.2. Determining Heart Rate
  - 4.8.3. Interpreting Heart Rate
  - 4.8.4. Electrocardiogram Waveform Interpretation
- 4.9. Electrocardiogram Abnormalities
  - 4.9.1. Artefacts
  - 4.9.2. Wave Morphological Abnormalities
- 4.10. How to Deal with an Electrocardiogram?
  - 4.10.1. Reading Protocol
  - 4.10.2. Tricks

## Module 5. Structural Cardiac Pathologies in Major Species: Equidae, Ruminants and Swine

- 5.1. Congenital Cardiac Alterations I. Ventricular Septal Defect
  - 5.1.1. Definition, Prevalence and Etiology
  - 5.1.2. Pathophysiology.
  - 5.1.3. Diagnosis
  - 5.1.4. Necessary Complementary Tests
  - 5.1.5. Treatment
  - 5.1.6. Clinical and Prognostic Relevance
- 5.2. Congenital Cardiac Disorders II. Tetralogy/Pentalogy of Fallot
  - 5.2.1. Definition, Prevalence and Etiology
  - 5.2.2. Pathophysiology.
  - 5.2.3. Diagnosis
  - 5.2.4. Necessary Complementary Tests
  - 5.2.5. Treatment
  - 5.2.6. Clinical and Prognostic Relevance
- 5.3. Congenital Cardiac Disorders III. Patent Ductus Arteriosus
  - 5.3.1. Definition, Prevalence and Etiology
  - 5.3.2. Pathophysiology.
  - 5.3.3. Diagnosis
  - 5.3.4. Necessary Complementary Tests
  - 5.3.5. Treatment
  - 5.3.6. Clinical and Prognostic Relevance
- 5.4. Congenital Cardiac Disorders IV. Rare Abnormalities.
  - 5.4.1. Patent Ductus Arteriosus
  - 5.4.2. Atrial Septal Defect
  - 5.4.3. Atrioventricular Valve Dysplasia
  - 5.4.4. Pulmonary Stenosis.
- 5.5. Acquired Cardiac Diseases I. Aortic Insufficiency
  - 5.5.1. Definition, Prevalence and Etiology
  - 5.5.2. Pathophysiology.
  - 5.5.3. Diagnosis
  - 5.5.4. Necessary Complementary Tests
  - 5.5.5. Treatment
  - 5.5.6. Clinical and Prognostic Relevance
- 5.6. Acquired Cardiac Diseases II. Mitral Insufficiency
  - 5.6.1. Definition, Prevalence and Etiology
  - 5.6.2. Pathophysiology.
  - 5.6.3. Diagnosis
  - 5.6.4. Necessary Complementary Tests
  - 5.6.5. Treatment
  - 5.6.6. Clinical and Prognostic Relevance
- 5.7. Acquired Cardiac Diseases III. Tricuspid Regurgitation
  - 5.7.1. Definition, Prevalence and Etiology
  - 5.7.2. Pathophysiology.
  - 5.7.3. Diagnosis
  - 5.7.4. Necessary Complementary Tests
  - 5.7.5. Treatment
  - 5.7.6. Clinical and Prognostic Relevance

- 5.8. Acquired Cardiac Diseases IV. Pulmonary Insufficiency and Pulmonary Hypertension
  - 5.8.1. Definition, Prevalence and Etiology
  - 5.8.2. Pathophysiology.
  - 5.8.3. Diagnosis
  - 5.8.4. Necessary Complementary Tests
  - 5.8.5. Treatment
  - 5.8.6. Clinical and Prognostic Relevance
- 5.9. Acquired Cardiac Alterations V. Aorto-Cardiac and Aorto-Pulmonary Fistulas
  - 5.9.1. Definition, Prevalence and Etiology
  - 5.9.2. Pathophysiology.
  - 5.9.3. Diagnosis
  - 5.9.4. Necessary Complementary Tests
  - 5.9.5. Treatment
  - 5.9.6. Clinical and Prognostic Relevance
- 5.10. Heart Failure
  - 5.10.1. Definition, Prevalence and Etiology
  - 5.10.2. Pathophysiology
  - 5.10.3. Diagnosis
  - 5.10.4. Treatment
  - 5.10.5. Clinical and Prognostic Relevance

## Module 6. Arrhythmias in Large Animals: Equidae, Ruminants and Swine

- 6.1. Sinus Rhythm
  - 6.1.1. Features
  - 6.1.2. EKG Recognition
- 6.2. Respiratory Sinus Arrhythmia, Bradycardia and Tachycardia Sinus Arrhythmias
  - 6.2.1. Definition, Prevalence and Etiology
  - 6.2.2. Pathophysiology.
  - 6.2.3. Diagnosis
  - 6.2.4. Necessary Complementary Tests
  - 6.2.5. Treatment
  - 6.2.6. Clinical and Prognostic Relevance

- 6.3. Premature Supraventricular Complexes and Atrial Tachycardia
  - 6.3.1. Definition, Prevalence and Etiology
  - 6.3.2. Pathophysiology.
  - 6.3.3. Diagnosis
  - 6.3.4. Necessary Complementary Tests
  - 6.3.5. Treatment
  - 6.3.6. Clinical and Prognostic Relevance
- 6.4. Atrial Fibrillation
  - 6.4.1. Definition, Prevalence and Etiology
  - 6.4.2. Pathophysiology.
  - 6.4.3. Diagnosis
  - 6.4.4. Necessary Complementary Tests
  - 6.4.5. Treatment
  - 6.4.6. Clinical and Prognostic Relevance
- 6.5. Premature Ventricular Complexes and Ventricular Tachycardia
  - 6.5.1. Definition, Prevalence and Etiology
  - 6.5.2. Pathophysiology.
  - 6.5.3. Diagnosis
  - 6.5.4. Necessary Complementary Tests
  - 6.5.5. Treatment
  - 6.5.6. Clinical and Prognostic Relevance
- 6.6. Non-Pathological Conduction Disorders
  - 6.6.1. Sinus Block and Second Degree Atrioventricular Block
    - 6.6.1.1. Definition, Prevalence and Etiology
    - 6.6.1.2. Pathophysiology.
    - 6.6.1.3. Diagnosis
    - 6.6.1.4. Necessary Complementary Tests
    - 6.6.1.5. Treatment
    - 6.6.1.6. Clinical and Prognostic Relevance



- 6.7. Pathological Conduction Disorders
  - 6.7.1. Advanced Second Degree and Third Degree Atrioventricular Block
    - 6.7.1.1. Definition, Prevalence and Etiology
    - 6.7.1.2. Pathophysiology.
    - 6.7.1.3. Diagnosis
    - 6.7.1.4. Necessary Complementary Tests
    - 6.7.1.5. Treatment
    - 6.7.1.6. Clinical and Prognostic Relevance
  - 6.7.2. Sick Sinus Syndrome
    - 6.7.2.1. Definition, Prevalence and Etiology
    - 6.7.2.2. Pathophysiology.
    - 6.7.2.3. Diagnosis
    - 6.7.2.4. Necessary Complementary Tests
    - 6.7.2.5. Treatment
    - 6.7.2.6. Clinical and Prognostic Relevance
- 6.8. Supraventricular Beats and Escape Rhythms
  - 6.8.1. Definition, Prevalence and Etiology
  - 6.8.2. Pathophysiology.
  - 6.8.3. Diagnosis
  - 6.8.4. Necessary Complementary Tests
  - 6.8.5. Treatment
  - 6.8.6. Clinical and Prognostic Relevance
- 6.9. Ventricular Beats and Escape Rhythms
  - 6.9.1. Definition, Prevalence and Etiology
  - 6.9.2. Pathophysiology.
  - 6.9.3. Diagnosis
  - 6.9.4. Necessary Complementary Tests
  - 6.9.5. Treatment
  - 6.9.6. Clinical and Prognostic Relevance

- 6.10. Accelerated Idioventricular Rhythm and Ventricular Preexcitation Syndrome
  - 6.10.1. Definition, Prevalence and Etiology
  - 6.10.2. Pathophysiology.
  - 6.10.3. Diagnosis
  - 6.10.4. Necessary Complementary Tests
  - 6.10.5. Treatment
  - 6.10.6. Clinical and Prognostic Relevance

### **Module 7. Pathologies of the Endocardium, Myocardium, Pericardium and Vascular System in Large Animals: Equidae, Ruminants and Swine**

- 7.1. Pericardial Disorders
  - 7.1.1. Pathophysiology of Pericarditis
  - 7.1.2. Physical Examination and Clinical Signs
  - 7.1.3. Diagnostic tests
  - 7.1.4. Treatment Options and Prognosis
- 7.2. Myocardial Disorders
  - 7.2.1. Pathophysiological Causes of Myocarditis
  - 7.2.2. Clinical Signs
  - 7.2.3. Treatment Options
- 7.3. Intoxications Affecting the Myocardium
  - 7.3.1. Ionophore Poisoning
  - 7.3.2. Poisoning by Ingestion of Toxic Plants
- 7.4. Hypoglycine A Myopathy
  - 7.4.1. Pathogenesis.
  - 7.4.2. Clinical Signs
  - 7.4.3. Diagnosis
  - 7.4.4. Treatment and Prognosis
- 7.5. Endocarditis
  - 7.5.1. Pathophysiology.
  - 7.5.2. Diagnosis
  - 7.5.3. Prognosis

- 7.6. Thrombophlebitis and Aortoiliac Thromboses
  - 7.6.1. Thrombophlebitis
  - 7.6.2. Aortoiliac Thrombosis
- 7.7. Vasculitis
  - 7.7.1. Infectious and Non-Infectious Causes
  - 7.7.2. Diagnosis
  - 7.7.3. Treatment and Prognosis
- 7.8. Vascular Lesions Caused by Parasites and Vascular Neoplasms
  - 7.8.1. Strongilus Vulgaris
  - 7.8.2. Hemangiosarcoma and Hemangioma
  - 7.8.3. Lymphangioma and Lymphangiosarcoma
- 7.9. Vascular Ruptures
  - 7.9.1. Aortocardiac and Aortopulmonary Fistulas
  - 7.9.2. Pulmonary Artery Rupture
  - 7.9.3. Congenital Problems Causing Vascular Lesions and Other Causes of Rupture
- 7.10. Cardiomyopathies
  - 7.10.1. Pathophysiology
  - 7.10.2. Diagnosis
  - 7.10.3. Prognosis

## Module 8. Cardiac Response to Exercise, Sports Performance and Sudden Death in Sports Horses

- 8.1. The Cardiovascular System
  - 8.1.1. Anatomical Review
  - 8.1.2. Blood
  - 8.1.3. Cardiovascular Function During Exercise
  - 8.1.4. Cardiovascular Response to Exercise
- 8.2. Energy Production During Exercise
  - 8.2.1. ATP.
  - 8.2.2. Metabolic Routes
  - 8.2.3. Anaerobic Threshold
  - 8.2.4. Interrelation of the Different Energy Systems
  - 8.2.5. Oxygen Consumption
- 8.3. Practical Aspects of Physical Preparation
  - 8.3.1. Basic Principles
  - 8.3.2. Cardiovascular Fitness
  - 8.3.3. Cardiovascular Overtraining
  - 8.3.4. Cardiovascular Detraining
- 8.4. Discipline-Specific Cardiovascular Fitness Training
  - 8.4.1. Dressage
  - 8.4.2. Jump
  - 8.4.3. Full Competition
  - 8.4.4. Raid
  - 8.4.5. Racing
  - 8.4.6. Polo
- 8.5. Cardiovascular Fitness Assessment Test
  - 8.5.1. Test Under Controlled Conditions
  - 8.5.2. Field Test
- 8.6. Complementary Tests to Assess Clinical Relevance Cardiac Pathologies During Exercise
  - 8.6.1. Exercise Electrocardiography
  - 8.6.2. Post-Exercise Echocardiography

- 8.7. Laboratory Analysis for Cardiac Pathology Evaluation
  - 8.7.1. Respiratory System Samples
  - 8.7.2. CK
  - 8.7.3. Troponins
  - 8.7.4. BNP
  - 8.7.5. ANP
- 8.8. Cardiac Pathologies Affecting Sports Performance
  - 8.8.1. Arrhythmias
  - 8.8.2. Structural Pathologies
- 8.9. Sudden Death
  - 8.9.1. Definition and Prevalence
  - 8.9.2. Clinical Assessment of Sudden Death Risk
- 8.10. Cardiac Pathologies Related to Sudden Death
  - 8.10.1. Arrhythmias
  - 8.10.2. Structural Pathologies

## Module 9. Systemic Disorders and Specific Situations Affecting the Heart in Large Animals: Equidae, Ruminants and Swine

- 9.1. Potassium-Associated Electrolyte Abnormalities
  - 9.1.1. Pathophysiology of Potassium
  - 9.1.2. Effect of Potassium Disorders in the Heart
  - 9.1.3. Treatment
- 9.2. Calcium-Associated Electrolyte Disorders
  - 9.2.1. Pathophysiology of Calcium
  - 9.2.2. Effect of Potassium Disorders in the Heart
  - 9.2.3. Treatment
- 9.3. Magnesium-Associated Electrolyte Disorders
  - 9.3.1. Effect of Magnesium Disorders in the Heart
  - 9.3.2. Treatment
- 9.4. Metabolic Syndrome
  - 9.4.1. Etiology and Prevalence
  - 9.4.2. Pathophysiology
  - 9.4.3. Effects on the Heart
  - 9.4.4. Treatment

- 9.5. Cushing's Syndrome and Pheochromocytoma
  - 9.5.1. Etiology and Prevalence
  - 9.5.2. Pathophysiology
  - 9.5.3. Effects on the Heart
  - 9.5.4. Treatment
- 9.6. Renal Insufficiency
  - 9.6.1. Etiology and Prevalence
  - 9.6.2. Pathophysiology.
  - 9.6.3. Effects on the Heart
  - 9.6.4. Treatment
- 9.7. Intoxications
  - 9.7.1. By Natural Products
  - 9.7.2. By Artificial Products
- 9.8. Parasitic Infections
  - 9.8.1. Etiology and Prevalence
  - 9.8.2. Pathophysiology.
  - 9.8.3. Effects on the Heart
  - 9.8.4. Treatment
- 9.9. Shock
  - 9.9.1. Endotoxic Shock
  - 9.9.2. Hypovolemic Shock
- 9.10. Anesthetic Drugs
  - 9.10.1. Sedatives
  - 9.10.2. Hypnotics

**Module 10.** Advanced Cardiac Procedures: Interventionism, Minimally Invasive Surgery and Cardiopulmonary Resuscitation in Large Animals: Equidae, Ruminants and Swine

- 10.1. Anesthesia of Patients Undergoing Cardiac Interventional and Minimally Invasive Surgery
  - 10.1.1. Monitoring
  - 10.1.2. General Anesthesia in Non-Critically Ill Patients
  - 10.1.3. General Anesthesia in Critically Ill Patients
  - 10.1.4. Anesthesia for On-Station Procedures
- 10.2. Endomyocardial Biopsy
  - 10.2.1. Instruments
  - 10.2.2. Technique
  - 10.2.3. Indications for Use
  - 10.2.4. Associated Complications
- 10.3. Pacemaker Implantation
  - 10.3.1. Instruments
  - 10.3.2. Technique
  - 10.3.3. Indications for Use
  - 10.3.4. Associated Complications
- 10.4. Septal Occlusion with Amplatzer Devices for Interventricular Communication
  - 10.4.1. Instruments
  - 10.4.2. Technique
  - 10.4.3. Indications for Use
  - 10.4.4. Associated Complications
- 10.5. Septal Occlusion of Aorto-Cardiac Fistulas with Amplatzer Devices
  - 10.5.1. Instruments
  - 10.5.2. Technique
  - 10.5.3. Indications for Use
  - 10.5.4. Associated Complications





- 10.6. Endovenous Electrical Cardioversion
  - 10.6.1. Instruments
  - 10.6.1. Technique
  - 10.6.2. Indications for Use
  - 10.6.3. Associated Complications
- 10.7. Electrophysiological Mapping
  - 10.7.1. Instruments
  - 10.7.2. Technique
  - 10.7.3. Indications for Use
  - 10.7.4. Associated Complications
- 10.8. Ablation of Supraventricular Arrhythmias
  - 10.8.1. Instruments
  - 10.8.2. Technique
  - 10.8.3. Indications for Use
  - 10.8.4. Associated Complications
- 10.9. Pericardiectomy by Thoracoscopy
  - 10.9.1. Instruments
  - 10.9.2. Technique
  - 10.9.3. Indications for Use
  - 10.9.4. Associated Complications
- 10.10. Cardiopulmonary Resuscitation
  - 10.10.1. In Foals
  - 10.10.2. In Adults

“ *This training will allow you to advance in your career comfortably*”

# 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.



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*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 re-learn). 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

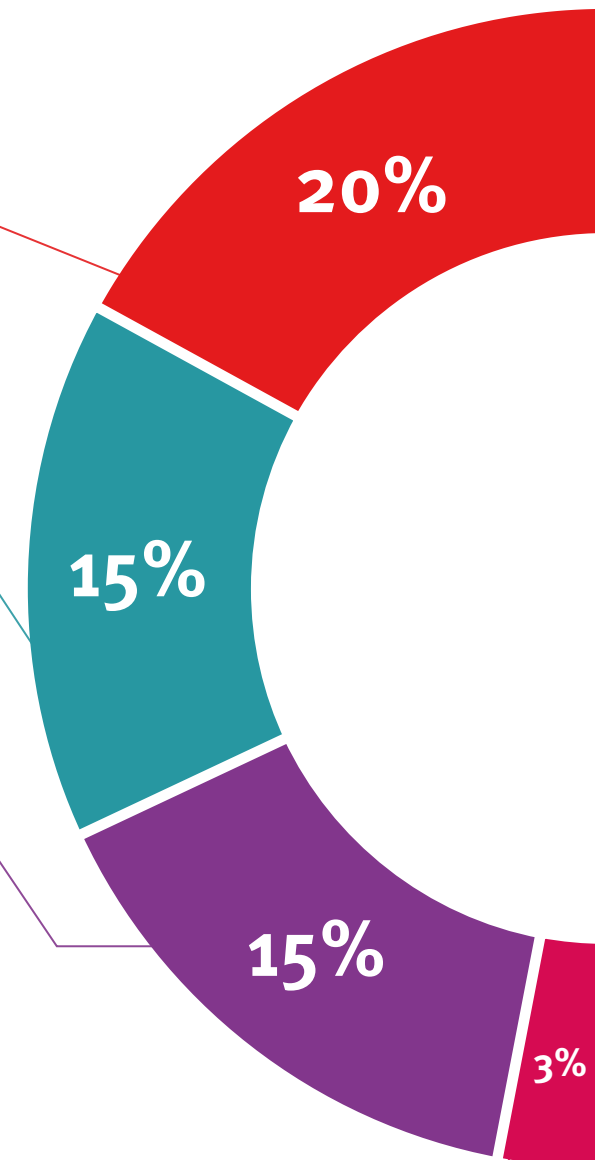
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

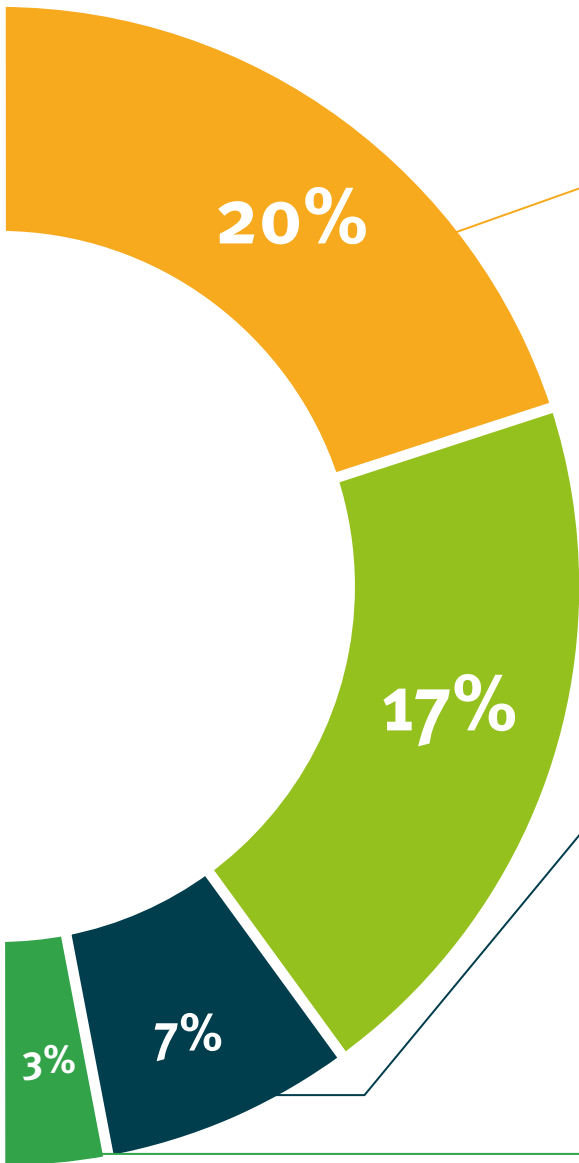
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### 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

Through a different and stimulating learning experience, you will be able to acquire the necessary skills to take a big step in your training. An opportunity to progress, with the support and monitoring of a modern and specialized university, which will propel you to another professional level.



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*Include a Professional Master's Degree in Veterinary Cardiology in your education: a high-quality added value for any professional in this field"*

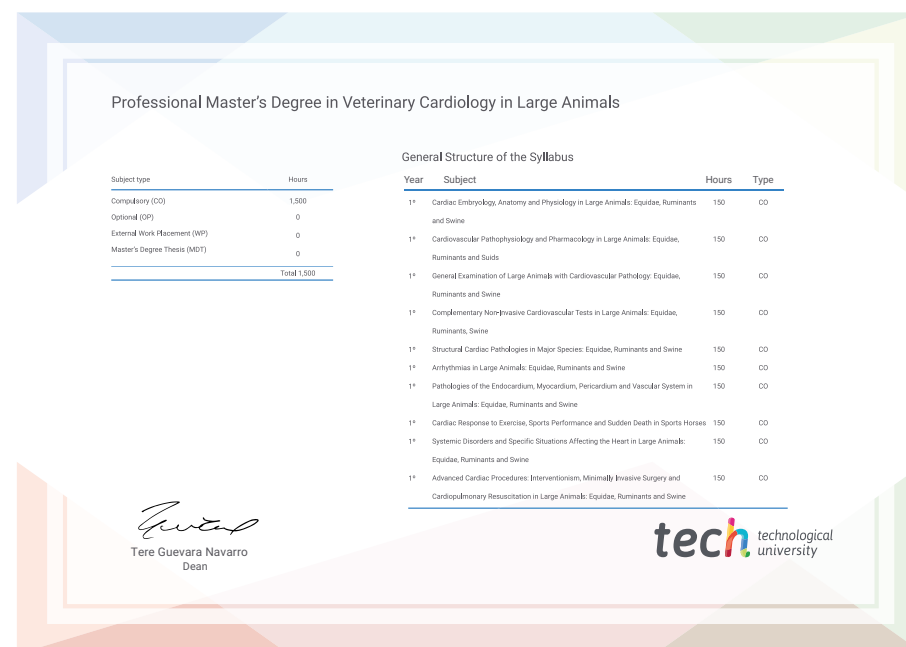
This **Professional Master's Degree in Veterinary Cardiology in Large Animals** contains the most complete and up-to-date scientific program on the market.

After passing the assessments, the student 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 Cardiology in Large Animals**

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  
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guarantee accreditation teaching  
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community commitment  
personalized service innovation  
knowledge present  
development languages  
virtual classroom

**tech** technological  
university

**Professional Master's Degree**  
Veterinary Cardiology in  
Large Animals

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Professional Master's Degree

## Veterinary Cardiology in Large Animals

