Professional Master's Degree
Ultrasound in Small Animals

tech *technological university*

Professional Master's Degree
Ultrasound in Small Animals

Course Modality: **Online**

Duration: **12 months.**

Certificate: **TECH Technological University**

Official Nº of hours: **1,500 h.**

Website: **www.techtitute.com/veterinary-medicine/professional-master-degree/master-ultrasound-small-animals**

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01
Introduction

This high-level program in Ultrasound in Small Animals is taught by a large group of veterinarians specialized in Ultrasound, who practise this discipline daily. Over these months, students will learn how to operate the ultrasound scanner correctly and study the different types of probe, their classification and purpose, among other really interesting matters for a veterinary professional.

This online program gives the student freedom to plan their own learning time, balancing their working life with the Professional Master's Degree in order to specialize in Ultrasound in Small Animals.

With this comprehensive program in Ultrasound in Small Animals that has been carefully designed by experts, become one of the professionals who are currently in great demand"

Ultrasound scanning is a universal, non-invasive, real-time technique that provides very accurate diagnostic information. Ultrasound examinations are gaining great importance in everyday practice, and it is increasingly common among veterinary medicine professionals to include them in their diagnostic protocols.

The applications of ultrasound scanning are very broad, covering studies of almost all parts of the patient's body, so it has become the cornerstone in veterinary clinic or hospital organization charts. Included within diagnostic imaging, it is gradually becoming its own entity, an external service required by many veterinary clinics. Mobile companies are even being created for this purpose.

Ultrasound scans provide the veterinary professional with moving images of the structures being studied, as well as information on the condition of the different tissues. It also allows samples to be taken and uses contrast to refine diagnoses.

This method of work requires a detailed study by the person in charge of performing the scans, since the reliability of the technique depends heavily on the veterinarian's expertise in interpreting the images observed.

The Professional Master's Degree in Ultrasound in Small Animals is a specialization that treats Ultrasound Scanning as a separate entity within clinical practice, with the aim of obtaining highly qualified professionals. It addresses, among many other aspects, the most advanced applications of the technique, such as ultrasound-guided punctures and biopsies.

All of the modules include a large amount of multimedia material: photos, videos and diagrams, which are highly important in a specialty where imaging techniques are relevant, for example, in surgery.

As it is an online Professional Master's Degree, students are not hindered by fixed timetables, nor do they need to commute to another location. All the content can be accessed at any time of the day, so you can balance your professional or personal life with your academic life.

This program offers the principles and tools for you to become an expert in Veterinary Ultrasound taught by recognized professionals with extensive experience in the sector.

This **Professional Master's Degree in Ultrasound in Small Animals** offers you all the features of a high-level scientific, teaching, and technological course. These are some of its most notable features:

- 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
- Supplementary documentation databases are permanently available, even after the course

A Professional Master's Degree that will enable you to work in all fields of veterinary ultrasound with the competence of a high-level professional"

Learn from real cases with this highly effective educational Professional Master's Degree and open up new paths to your professional progress"

Our teaching staff is made up of professionals from different fields related to this specialty. In this way, we ensure that we provide you with the update program we are aiming for. A multidisciplinary team of professionals trained and experienced in different settings, who will work through theoretical content in an efficient way but, above all, will make available their own practical knowledge derived from experience: one of the distinguishing features of this specialist course.

Command of the subject is complemented by the effectiveness of the methodological design of this Professional Master's Degree in Ultrasound in Small Animals. Developed by a multidisciplinary team of e-learning experts, it integrates the latest advances in educational technology. This way, you will be able to study with a range of comfortable and versatile multimedia tools that will give you the operability you need in your training.

The design of this program is based on Problem-Based Learning: an approach that conceives learning as a highly practical process. To achieve this remotely, we will use telepractice learning: with the help of an innovative interactive video system, and learning from an expert, you will be able to acquire the knowledge as if you were actually dealing with the scenario you are learning about. A concept that will allow you to integrate and fix learning in a more realistic and permanent way.

Professionals with extensive experience will teach you how to approach an ultrasound scan correctly in abdominal cavity exploration.

As the course is online, you will be able to train wherever and whenever you want, balancing your personal and professional life.
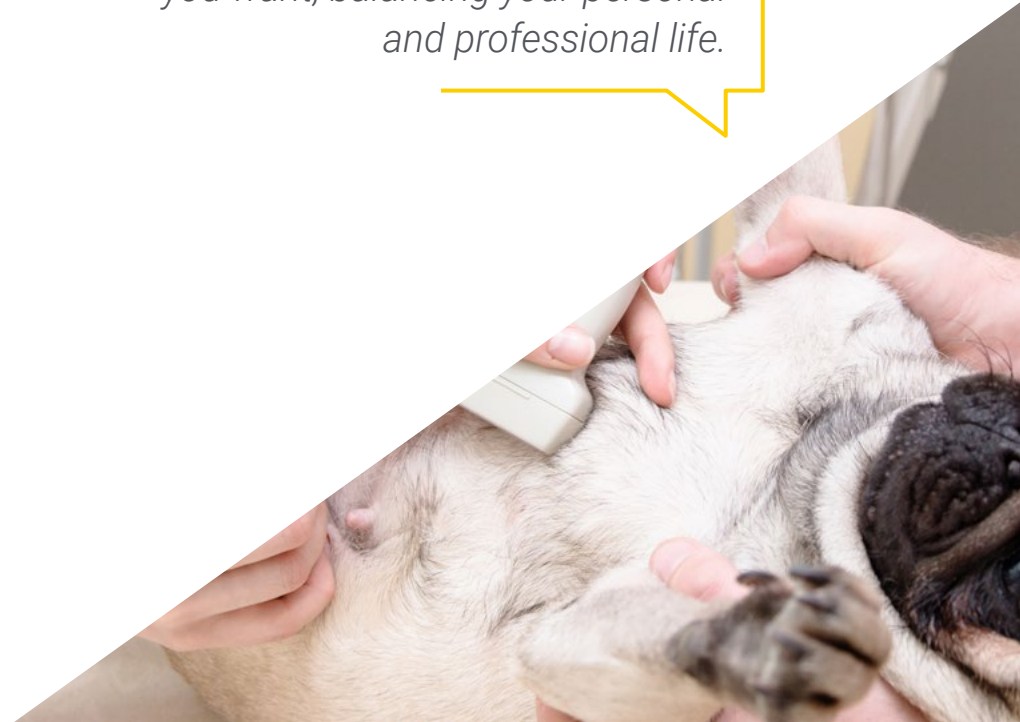
02
Objectives

Our objective is to train highly qualified professionals for the working A goal that you will reach in just a few months and that will allow you to achieve professional excellence.

If your objective is to broaden your skill set to include new paths of success and development, this is your Professional Master's Degree: training that aspires to excellence"

General Objectives

- Introduce the physical principles of an ultrasound scanner, as well as its basic operation in order to understand what we visualize in an ultrasound image and how to obtain it.

- Study the different types of probe, their classification and purpose.

- Determine the different ways in which an ultrasound scanner can be used

- Propose an adequate positioning of the patient for an ultrasound examination

- Perform a correct ultrasound approach in exploring the abdominal cavity

- Assimilate and reinforce the location and positioning of the viscera, an element in this module.

- Identify the correct scanning technique for each organ

- Correlate the anatomy of the viscera with its physiological ultrasound image.

- Perform a correct ultrasound approach in exploring the abdominal cavity

- Assimilate and reinforce the location and positioning of the viscera, an element in this module.

- Identify the correct scanning technique for each organ

- Correlate the anatomy of the viscera with its physiological ultrasound image.

- Acquire knowledge on Doppler operation.

- Determine the types of Doppler that exist and their uses.

- Study of abdominal pathologies detected by ultrasound Doppler.

- Be familiar with other useful applications beyond the traditional scanning modes

- Learn how to identify which structures can be explored using ultrasound

- Study the protocol to be followed in ultrasound-guided interventions

- Identify the main blocks using ultrasound-guidance

- Establish the basics of pulmonary ultrasonography in cats, and the main pathological signs.

- Review feline pathologies that can be diagnosed using abdominal ultrasonography

- Determine the situations in which it is advisable to perform a cervical ultrasound scan and which findings may be pathological

- Take a closer look at the uses of Doppler ultrasound beyond echocardiography

- List the possible complementary techniques for use with conventional ultrasound

- Determine which organs or cavities can be evaluated by ultrasound-guided cytology.

- Establish ultrasonography as a diagnostic imaging tool in exotic animals or new companion animals (NCA)

- Study the difficulties of diagnostic ultrasound in different species
- Develop specialized knowledge for the correct ultrasound interpretation of NCA anatomy
- Identify the advantages of ultrasound scanning over other diagnostic imaging tests in small mammals, birds and reptiles.
- Develop a comprehensive echocardiographic examination protocol
- Build confidence for conducting different echocardiographic cuts
- Optimize the image to achieve a correct and accurate examination
- Determine the different echocardiographic measures applied in veterinary cardiology.
- Develop the ability to interpret echocardiographic images of the most common diseases
- Effectively assess each disease and be able to stage it
- Differentiate between the different diseases that can be detected by echocardiography
- Improve reporting capabilities
- Increase your knowledge of the jargon used in ultrasonography
- Record and save studies and images in the most appropriate manner
- Increase skills for describing organs and lesions using technical terms

Specific Objectives

- Establish the fundamentals of ultrasound physics and how a scan is performed with image formation
- Determine the different ultrasound artifacts so as to avoid misinterpretation
- Identify the basic operation system of an ultrasound scanner in order to make the best use of it
- Establish the different types of probe and their function
- List the different uses for which an ultrasound scanner can be used
- Propose a system for preparing patients before an ultrasound examination
- Master physiological image identification
- Identify and recognize ultrasound findings
- Recognize the main pathologies affecting the previously mentioned organs
- Differentiate between incidental and relative findings
- Establish a correlation between ultrasound findings and clinical signs
- Form the most frequent differential diagnoses
- Propose appropriate complementary tests
- Master physiological image identification
- Identify and recognize ultrasound findings

- Recognize the main pathologies affecting the previously mentioned organs
- Differentiate between incidental and relative findings
- Establish a correlation between ultrasound findings and clinical signs
- Form the most frequent differential diagnoses
- Propose appropriate complementary tests
- Study the physical principles of a Doppler
- Obtain a correct ultrasound beam for accurate flow study
- Differentiate between vein flow and artery flow
- Use vascular indices of vascular resistance and pulsatility
- Evaluate vascularization in organs and masses
- Identify structures by absence or presence of flow
- Detect vascular alterations
- Assess thromboembolisms and infarctions
- Determine how to perform an organized and concise examination of the thoracic and cervical structures
- Perform serial and structured follow-up in emergency ultrasonography
- Establish a correct technique for administering anesthesia with the help of ultrasound

- Conduct a good screening and follow-up of pregnancy cases

- Interpret findings that may show up in pediatric and geriatric animals

- Recognize the signs of a healthy lung

- Differentiate between the different findings in pulmonary ultrasound and be familiar with the different pathologies that can be correlated with these findings

- Perform a FAST ultrasound scan on the emergency feline patient

- Use ultrasound to determine the main pathologies in abdominal organs and their correlation

- Study the most common findings in the feline kidney and how to differentiate between acute and chronic kidney disease

- Reliably measure the different renal structures (pelvis, ureter) and consider their possible differential diagnoses when they are altered

- Differentiate between the different types of alteration in the gastrointestinal tract and their association with different feline diseases

- Use abdominal ultrasound scans to diagnose biliary tract pathologies

- Perform correct gestational diagnoses in cats

- Incorporate the use of Doppler ultrasound to diagnose vascular pathologies

- Incorporate the use of Doppler ultrasound to diagnose neoplastic pathologies

- Use ultrasound as a diagnostic tool in pathologies affecting the cervix

- Safely and effectively use ultrasound-guided punctures on a regular basis in organs, masses or cavities (gall bladder, cysts, etc.)

- Determine when it is advisable to use contrasts in abdominal ultrasound scans and what information they can provide

- Develop containment and positioning methods for the ultrasound study of small mammals, birds and reptiles

- Study existing ultrasound equipment and diagnostic options

- Determine the ultrasound protocol for small mammals: rabbits, ferrets, guinea pigs and small rodents

- Determine the ultrasound protocol for birds and reptiles

- Determine the anatomical references for New Companion Animals (NCA) in ultrasonography

- Identify ultrasound findings in the most common pathologies of New Companion Animals (NCA)

- Evaluate the different possibilities provided by ultrasound in daily clinical practice with New Companion Animals (NCA)

- Determine ultrasound equipment requirements for echocardiographic studies

- Establish the different physical principles that generate echocardiographic images

- Work on the different types of images used in echocardiography

- Provide key criteria for implementing the Doppler mode in echocardiography

- Assess the size of the cardiac chambers using echocardiography
- Assess systolic and diastolic function using echocardiography
- Assess and study valvular heart disease
- Identify echocardiographic signs for detecting pulmonary hypertension
- Be able to differentiate between and diagnose canine and feline cardiomyopathies
- Evaluate the pericardial cavity, as well as the layers that form the pericardium
- Detect the different cardiac neoplasms
- Establish the theoretical bases for pericardiocentesis
- Study the different congenital conditions that can be found in small animals
- Assess for cardiac parasites
- Develop advanced echocardiography techniques
- Correctly handle abdominal, cardiac, ophthalmic or other organ or system ultrasound reports
- Standardize the way in which reports are carried out
- Work on and interpret the most commonly used physiological and pathological measurements in ultrasound
- Train students to elaborate differential diagnoses and to issue a definitive diagnosis
- Gain knowledge about how to advise a clinician based on study results

Incorporate the latest techniques in Ultrasound in Small Animals in your daily practice and improve diagnosis"

03

Skills

This Professional Master's Degree in Ultrasound in Small Animals has been created as a high-quality training tool for veterinary professionals. It brings together a compendium of innovative knowledge that will provide you with the appropriate skills for using ultrasound scanners.

This specialization course will provide you with the necessary personal and professional skills to use ultrasound scanners correctly"

General Skills

- Analyze clinical cases objectively and precisely
- Generate specialized knowledge to correctly examine, diagnose and treat pathologies using ultrasound
- Be familiar with and know how to implement existing protocols

" *A unique program that will allow you to acquire superior training to develop in this field"*

Specific Skills

- Be familiar with the basic operation system of an ultrasound scanner
- Recognize ultrasound findings
- Form the most frequent differential diagnoses
- Detect vascular alterations
- Perform a good screening and follow-up of pregnancy cases
- Differentiate between the different types of alteration in the gastrointestinal tract and their association with different diseases
- Use abdominal ultrasound scans to diagnose biliary tract pathologies
- Assess the size of the cardiac chambers using echocardiography
- Detect the different cardiac neoplasms
- Develop advanced echocardiography techniques
- Correctly handle abdominal, cardiac, ophthalmic or other organ or system ultrasound reports
- In-depth knowledge on how to advise a clinician based on study results

04
Course Management

We provide you with an elite teaching team made up of professionals with extensive experience in the sector Professionals from different areas and fields of expertise that make up a complete, multidisciplinary team. A unique opportunity to learn from the best.

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A unique opportunity to learn from internationally renowned professors, with teaching, clinical and research experience"

Management

Ms. Conde Torrente, María Isabel

- Head of the Diagnostic Imaging and Cardiology Service at Alcor Veterinary Hospital. Currently
- Degree in Veterinary Medicine from the University of Santiago de Compostela in 2012 with a certified European degree
- Advanced Postgraduate Course in Diagnostic Imaging (Computerized Axial Tomography). General Practitioner Advanced Certificate TCESMD. 2019
- Postgraduate General Practitioner Certificate in Diagnostic Imaging (GPCert- DI) 2016
- Professor in Veterinary Practical Training in 2015 as a teacher for the official qualification of veterinary technical assistant
- Gives training courses on clinical and laboratory analysis for veterinarians at Hospital Veterinario Alberto Alcocer
- Medical Director and head of the Advanced Diagnostic Imaging Service at Grupo Peñagrande. Exclusive handling of TC General Electrics TriAc Revolution 16 cuts. 2017-2019
- Head of the Diagnostic Imaging Service at Mejorada Veterinary Center. 2016-2017
- Responsible for diagnostic services at Alberto Alcocer Veterinary Hospital 2013-2016
- University of Santiago de Compostela. Department of Animal Pathology. Collaboration with the research group on heavy metal accumulation in bovine meat in collaboration with Cornell University, New York; published in the Journal of Animal Science.

Professors

Mr. Monge Utrilla, Óscar

- Cardiology, Diagnostic Imaging and Endoscopy, KITICAN Group, Madrid (currently)
- Degree in Veterinary Medicine, Complutense University of Madrid 2017
- GPCert Cardiology IVSPS 2017
- Degree Course "Specialist Course in Veterinary Hospital Clinic", University of León 2018
- Professional Master's Degree "Veterinary Anesthesiology", TECH Technological University. 2021
- In-house training in cardiology and respiratory medicine at Grupo Veterinario Kitican
- Veterinary Intern/Resident at the Veterinary Hospital of the University of León Faculty of Veterinary Medicine 2018
- Veterinarian at the Emergency Department of the Surbatán Veterinary Clinic 2018
- Veterinarian at the Emergency Department and in charge of the Cardiology Department at El Retiro Veterinary Hospital 2018
- Veterinarian at the Emergency Department and the Cardiology Department at Majadahonda Veterinary Hospital 2019
- Cardiology, Ultrasound and Outpatient Endoscopy for Coromoto Diagnostic Imaging, Sinergia 2020

Dr. Millán Varela, Lorena

- Director of the Cardiology and Diagnostic Imaging Service at San Pedro Veterinary Clinic
- Specialized Technical Assistance in Internal Medicine and Diagnostic Imaging in Small Animals together with the Universidad de León
- Doctor in Veterinary Medicine from the Universidad de León.
- AVEPA Accredited Specialist in Diagnostic Imaging

Dr. Pérez López, Luis Alejandro

- Veterinarian at Davies Veterinary Specialists, UK, since January 2020, member of the Diagnostic Imaging team (Digital Radiology, Ultrasound, CT, MRI and Fluoroscopy).
- Degree in Veterinary Medicine from the University of Córdoba 2009.
- AVEPA (Association of Spanish Specialist Veterinarians of Small Animals) Accredited in Diagnostic Imaging (2020)
- Member of the AVEPA Diagnostic Imaging Group
- Veterinary Hospital Alhaurín El Grande VETSUM (Málaga), from August 2010 to December 2019, responsible for the Diagnostic Imaging Service since 2014, offering Digital Radiology, Ultrasound and CT services
- Radiological and ultrasound diagnosis of foreign body intestinal obstructions in the small intestine of dogs. ESVPS NEWS, No. 6. October 2017
- Speaker at national courses in Spain and the United Kingdom

Mr. García Guerrero, Francisco

- Veterinarian at Ecopet (Ultrasound Service/Outpatient Cardiology) (2013-present)
- Degree in Veterinary Medicine from the University of Cordoba in 2003
- Experience at the Diagnostic Imaging and Cardiology Service at the University of Murcia. (March 2012-June 2012)
- Stay at the Diagnostic Imaging and Internal Medicine Department of UAB Clinical Hospital (May 2014 – August 2014)
- Abdominal Ultrasound Course for Trauvet in May 2018
- Several Private Training Courses at Veterinary Centers/Hospitals
- Veterinarian at García Vallejo Veterinary Clinic (Sevilla) (2003-2016)

Dr. Martí Navarro, María Teresa
- Clinical Veterinarian in several centers in Zaragoza and Valencia
- Associate Professor of the Department of Diagnostic Imaging at the CEU Cardenal Herrera University, Valencia
- Collaboration with the Cardiology Unit at La Fe Hospital, Valencia
- Degree in Biology from the University of Navarra
- Degree in Veterinary Medicine from the Faculty of Veterinary Medicine, Zaragoza.
- Improve Postgraduate Course in Cardiology
- Member of the AVEPA Diagnostic Imaging and Cardiology Group

Dr. Bargueño Batres, Ángela
- Veterinarian at Puchol Veterinary Hospital in charge of performing abdominal ultrasound, cervical ultrasound and musculoskeletal ultrasound.
- Collaboration and assistance in radiology and advanced imaging training
- Degree in Veterinary Medicine from the University of Leon.
- Postgraduate Course in Diagnostic Imaging organized by NeoAnimalia
- Course of Feline Medicine and Ethology at the University of León
- Online course of fluid therapy by INVET

Dr. Huguet Pradell, Clàudia
- Veterinarian at Anicura Glòries Veterinary Hospital
- Degree in Veterinary Medicin from the Autonomous University of Barcelona
- First Aid course in small animals at the UAB
- Course on Clinical Cases in small mammals at the UAB

Dr. Rojas, Francisco Javier
- Veterinarian at the Alcor Veterinary Hospital
- Veterinary degree from Complutense University of Madrid
- Course of radiological interpretation in small animals
- GPCert Student in Diagnostic Imaging ISVPS (Improve International)

An impressive teaching staff, made up of professionals from different areas of expertise, will be your teachers during your training: a unique opportunity not to be missed"

05
Structure and Content

The contents of this Professional Master's Degree 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 this field.

A complete and well-structured program that will take you to the highest standards of quality and success.

A complete update program that will take through the necessary thorough training to intervene as a specialist in the theoretical and practical aspects of Ultrasound in Small Animals"

Module 1. Ultrasound Diagnosis

1.1.   Ultrasound Scanners
    1.1.1.   Frequency
    1.1.2.   Depth
    1.1.3.   Acoustic Impedance
    1.1.4.   Physical Phenomena
        1.1.4.1. Reflection
        1.1.4.2. Refraction:
        1.1.4.3. Absorption
        1.1.4.4. Dispersion
        1.1.4.5. Attenuation
    1.1.5.   Transduction and Transducer

1.2.   Operation of an Ultrasound Scanner
    1.2.1.   Patient Selection and Data Entry
    1.2.2.   Types of Exam (*Presets*)
    1.2.3.   Transducer Position
    1.2.4.   Freeze, Save, or Pause Image
    1.2.5.   *Cine Loop*
    1.2.6.   Image Mode Selection
    1.2.7.   Depth
    1.2.8.   Zoom
    1.2.9.   Focus
    1.2.10. Gain
    1.2.11. Frequency
    1.2.12. Sector Size

1.3.   Types of Probe
    1.3.1.   Sectorial
    1.3.2.   Lineal
    1.3.3.   Microconvex

1.4.   Ultrasound Modes
    1.4.1.   M-Mode
    1.4.2.   Two-dimensional Mode
    1.4.3.   Transesophageal Echocardiogram

1.5.   Doppler Ultrasound
    1.5.1.   Physical Principles
    1.5.2.   Indications
    1.5.3.   Types
        1.5.3.1. Spectral Doppler
        1.5.3.2. Pulsed Doppler
        1.5.3.3. Continuous Doppler

1.6.   Harmonic and Contrast Ultrasound
    1.6.1.   Harmonic Ultrasound
    1.6.2.   Contrast Ultrasound
    1.6.3.   Utilities

1.7.   Patient Preparation
    1.7.1.   Prior Preparation
    1.7.2.   Positioning
    1.7.3.   Sedation?

1.8.   Ultrasounds on the Patient
    1.8.1.   How Do Ultrasound Waves Behave when Passing through Tissue?
    1.8.2.   What Can We See in the Image?
    1.8.3.   Echogenicity

1.9.   Image Orientation and Expression
    1.9.1.   Orientation
    1.9.2.   Terminology.
    1.9.3.   Examples:

1.10.   Artefacts
    1.10.1. Reverberation
    1.10.2. Acoustic Shadow
    1.10.3. Lateral Shadow
    1.10.4. Posterior Acoustic Enhancement
    1.10.5. Margin Effect
    1.10.6. Mirror or Specular Image
    1.10.7. Scintillation Artefact
    1.10.8. Aliasing

Module 2. Abdominal Ultrasound Scan I

2.1. Scanning Technique
    2.1.1. Introduction
    2.1.2. Methodology
    2.1.3. Systematization
2.2. Retroperitoneal Cavity
    2.2.1. Introduction.
    2.2.2. Limits
    2.2.3. Ultrasound Approach
    2.2.4. Pathologies of the Retroperitoneal Cavity
2.3. Urinary Bladder
    2.3.1. Introduction.
    2.3.2. Anatomy
    2.3.3. Ultrasound Approach
    2.3.4. Urinary Bladder Pathologies
2.4. Kidneys
    2.4.1. Introduction.
    2.4.2. Anatomy
    2.4.3. Ultrasound Approach
    2.4.4. Kidney Pathology
2.5. Ureters
    2.5.1. Introduction
    2.5.2. Ultrasound Approach
    2.5.3. Ureter Pathology

2.6. Urethra
    2.6.1. Introduction.
    2.6.2. Anatomy
    2.6.3. Ultrasound Approach
    2.6.4. Urethral Pathologies
2.7. Female Genital System
    2.7.1. Introduction.
    2.7.2. Anatomy
    2.7.3. Ultrasound Approach
    2.7.4. Pathologies of the Female Reproductive System
2.8. Pregnancy and Post-partum
    2.8.1. Introduction
    2.8.2. Pregnancy Diagnosis and Estimation of Gestation Time
    2.8.3. Pathologies
2.9. Male Genital System
    2.9.1. Introduction
    2.9.2. Anatomy
    2.9.3. Ultrasound Approach
    2.9.4. Pathologies of the Male Reproductive System
2.10. Adrenal Glands
    2.10.1. Introduction
    2.10.2. Anatomy
    2.10.3. Ultrasound Approach
    2.10.4. Pathologies of the Adrenal Gland

Module 3. Abdominal Ultrasound Scan II

3.1. Peritoneal Cavity
  3.1.1. Introduction
  3.1.2. Methodology
  3.1.3. Pathologies of the Peritoneal Cavity
3.2. Stomach.
  3.2.1. Introduction
  3.2.2. Anatomy
  3.2.3. Ultrasound Approach
  3.2.4. Stomach Pathologies
3.3. Small Intestine
  3.3.1. Introduction
  3.3.2. Anatomy
  3.3.3. Ultrasound Approach
  3.3.4. Pathologies of the Small Intestine
3.4. Large Intestine
  3.4.1. Introduction
  3.4.2. Anatomy
  3.4.3. Ultrasound Approach
  3.4.4. Pathologies of the Large Intestine
3.5. Bladder
  3.5.1. Introduction
  3.5.2. Anatomy
  3.5.3. Ultrasound Approach
  3.5.4. Pathologies of the Spleen
3.6. Liver
  3.6.1. Introduction
  3.6.2. Anatomy
  3.6.3. Ultrasound Approach
  3.6.4. Pathologies of the Liver

3.7. Gallbladder
  3.7.1. Introduction
  3.7.2. Anatomy
  3.7.3. Ultrasound Approach
  3.7.4. Gallbladder Pathologies
3.8. Pancreas
  3.8.1. Introduction
  3.8.2. Anatomy
  3.8.3. Ultrasound Approach
  3.8.4. Pathologies of the Pancreas
3.9. Abdominal Lymph Nodes
  3.9.1. Introduction
  3.9.2. Anatomy
  3.9.3. Ultrasound Approach
  3.9.4. Pathologies of the Abdominal Lymph Nodes
3.10. Abdominal Masses
  3.10.1. Ultrasound Approach
  3.10.2. Localisation
  3.10.3. Possible Causes/Origins of Abdominal Masses

Module 4. Doppler Ultrasound and its Abdominal Applications

4.1. Doppler Ultrasound
  4.1.1. Flow Characteristics
  4.1.2. The Doppler Effect
4.2. Types of Doppler
  4.2.1. Continuous Wave Doppler
  4.2.2. Pulsed Doppler
  4.2.3. Duplex Doppler
  4.2.4. Color Doppler
  4.2.5. *Power Doppler*

4.3. Abdominal Vascular System

    4.3.1. Single-vessel Doppler Study

    4.3.2. Types of Vascular Flow

    4.3.3. Abdominal Vascularization

4.4. Vascular System Applications

    4.4.1. Aortic Flow

    4.4.2. Vena Cava Flow Rate

    4.4.3. Hepatic Vessel Hypertension

4.5. Abdominal Cavity Applications

    4.5.1. Renal Vascularization

    4.5.2. Vascularization in Abdominal Masses

    4.5.3. Vascularization in Parenchymal Organs

4.6. *Shunts*

    4.6.1. Congenital Portosystemic Shunts

        4.6.1.1. Intrahepatic

        4.6.1.2. Extrahepatic

    4.6.2. Acquired Portosystemic Shunts

    4.6.3. Arteriovenous Fistulae

4.7. Heart Attacks

    4.7.1. Renal

    4.7.2. Intestinal

    4.7.3. Hepatic

    4.7.4. Others

4.8. Thrombosis

    4.8.1. Aortic Thromboembolism

    4.8.2. Aortic Mineralization

    4.8.3. Portal Vein Thrombosis

    4.8.4. Vena Cava Thromboembolism

4.9. Lymph Node Vascularization

    4.9.1. Exploration

    4.9.2. Pathological Abdominal Lymph Nodes

4.10. Intestinal Volvulus

Module 5. Other Ultrasound Applications

5.1. Non-cardiac Thoracic Ultrasound

    5.1.1. Thoracic Ultrasound Scan

    5.1.2. Ultrasound Examination of the Thorax

    5.1.3. Findings and Main Pathologies

    5.1.4. TFAST

5.2. Cervical Ultrasonography

    5.2.1. Cervical Ultrasound Scan

    5.2.2. Ultrasound Examination of the Cervical Region

    5.2.3. Thyroid and Parathyroid Glands

    5.2.4. Lymph Nodes and Salivary Glands

    5.2.5. Trachea and Esophagus

5.3. Ophthalmic Ultrasonography

    5.3.1. Ophthalmologic Ultrasound Scan

    5.3.2. Ultrasound Examination of the Eye and Surrounding Area

    5.3.3. Findings and Main Pathologies

5.4. Transcerebral Ultrasound and Gestational Ultrasonography

    5.4.1. Ultrasound Scans in Pregnancy

    5.4.2. Gestational Screening Protocol

    5.4.3. Transcerebral Ultrasound Scan.

5.5. Interventional Ultrasonography

    5.5.1. Basics of Interventional Ultrasonography

    5.5.2. Equipment and Patient Preparation

    5.5.3. Types of Punctures and Biopsy

    5.5.4. Case-specific Technique

5.6. Musculoskeletal Ultrasonography

    5.6.1. Musculoskeletal Examination

    5.6.2. Skeletal Muscle Scanning and Patterning

    5.6.3. Musculoskeletal Pathologies

Module 6. Ultrasonography in Feline Patients

Module 7. Ultrasound in Exotic Animals

7.6.   Ultrasonography in Lizards
    7.6.1.   Diagnostic and Physiological Ultrasonography
    7.6.2.   Renal Ultrasound Scan
    7.6.3.   Ultrasound Scan of the Reproductive System
    7.6.4.   Hepatic Ultrasound Scan
7.7.   Ultrasonography in Snakes
    7.7.1.   Diagnostic and Physiological Ultrasonography
    7.7.2.   Renal Ultrasound Scan
    7.7.3.   Ultrasound Scan of the Reproductive System
    7.7.4.   Ultrasound Scan of the Digestive System
    7.7.5.   Hepatic Ultrasound Scan
7.8.   Ultrasonography in Birds
    7.8.1.   Diagnostic and Physiological Ultrasonography
    7.8.2.   Ultrasound Scan of the Reproductive System
    7.8.3.   Hepatic Ultrasound Scan
    7.8.4.   Echocardiography in Birds
7.9.   Thoracic Ultrasound Scan
    7.9.1.   Thoracic Ultrasonography in Rabbits
    7.9.2.   Thoracic Ultrasonography in Guinea Pigs
    7.9.3.   Thoracic Ultrasonography in Ferrets
7.10.   Echocardiography
    7.10.1.   Echocardiography in Rabbits
    7.10.2.   Echocardiography in Ferrets

Module 8. Echocardiography I. Echocardiographic Examination. Examination Methods Application to Cardiology

8.1.   Echocardiography
    8.1.1.   Equipment and Probes
    8.1.2.   Patient Positioning
    8.1.3.   Echocardiographic Examination Methods
8.2.   Keys to Carrying Out an Optimal Echocardiographic Study
    8.2.1.   How to Optimize the Performance of my Ultrasound Equipment?
    8.2.2.   Factors Affecting the Quality of an Echocardiographic Study
    8.2.3.   Artifacts in Echocardiography
8.3.   Echocardiographic Slicing
    8.3.1.   Right Side Parasternal Cuts
    8.3.2.   Left Side Parasternal Cuts
    8.3.3.   Subcostal Cuts
8.4.   M Mode Echocardiographic Examination
    8.4.1.   How to Optimize the Image in M Mode
    8.4.2.   M Mode Applied to the Left Ventricle
    8.4.3.   M Mode Applied Mitral Valve
    8.4.4.   M Mode Applied Aortic Valve
8.5.   Color and Spectral Doppler Echocardiographic Examinations
    8.5.1.   Physical Principles of Color Dopplers
    8.5.2.   Physical Principles of Spectral Dopplers
    8.5.3.   Color Doppler Imaging
    8.5.4.   Pulsed Doppler Imaging Importance of Continuous Dopplers in Echocardiography
    8.5.5.   Tissue Doppler

8.6.   Echocardiographic Examination of the Aortic and Pulmonary Valves
        8.6.1.   Color Doppler Mode at Aortic Valve
        8.6.2.   Color Doppler Mode at Lung Valve
        8.6.3.   Spectral Doppler Mode at Aortic Valve
        8.6.4.   Spectral Doppler Mode at Lung Valve
8.7.   Echocardiographic Examination of Mitral/Tricuspid Valves and Pulmonary Veins
        8.7.1.   Color Doppler Mode at Mitral and Tricuspid Valves
        8.7.2.   Spectral Doppler Mode at Mitral and Tricuspid Valves
        8.7.3.   Spectral Doppler Mode at Pulmonary Veins
8.8.   Assessment of Systolic and Diastolic Function Using Echocardiography
        8.8.1.   Determination of Systolic Function in 2d Mode
        8.8.2.   Determination of Systolic Function in M Mode
        8.8.3.   Determination of Systolic Function in Spectral Doppler Mode
8.9.   Assessment of Systolic and Diastolic Function Using Echocardiography
        8.9.1.   Determination of Diastolic Function in 2D Mode
        8.9.2.   Determination of Diastolic Function in M Mode
        8.9.3.   Determination of Diastolic Function in Spectral Doppler Mode
8.10.   Echocardiographic Examination to Assess Hemodynamics Application in Cardiology
        8.10.1.   Pressure Gradients
        8.10.2.   Systolic Pressure
        8.10.2.   Diastolic Pressure

Module 9. Echocardiography II Assessment of Main Cardiac Diseases

9.1.   Valvular Diseases
        9.1.1.   Chronic Mitral Valve Degeneration
        9.1.2.   Chronic Tricuspid Valve Degeneration
        9.1.3.   Atrioventricular Valve Stenosis
        9.1.4.   Semilunar Valve Abnormalities
9.2.   Pulmonary Hypertension
        9.2.1.   Echocardiographic Signs of Pulmonary Hypertension: B Mode
        9.2.2.   Echocardiographic Signs of Pulmonary Hypertension: M Mode
        9.2.3.   Echocardiographic Signs of Pulmonary Hypertension: Doppler
        9.2.4.   Causes and Differentiation of Types of Pulmonary Hypertension
9.3.   Myocardial Diseases
        9.3.1.   Canine Dilated Cardiomyopathy
        9.3.2.   Arrhythmogenic Right Ventricular Cardiomyopathy
        9.3.3.   Myocarditis
9.4.   Feline Cardiomyopathies
        9.4.1.   Hypertrophic Cardiomyopathy
        9.4.2.   Restrictive Cardiomyopathy
        9.4.3.   Feline Dilated Cardiomyopathy
        9.4.4.   Arrhythmogenic Cardiomyopathy
        9.4.5.   Unclassified Cardiomyopathies
9.5.   Pericardium and Pericardiocentesis
        9.5.1.   Idiopathic Pericarditis
        9.5.2.   Constrictive Pericarditis
        9.5.3.   Other Pericardial Diseases
        9.5.4.   Pericardiocentesis
        9.5.5.   Pericardiectomy.

9.6. Cardiac Neoplasms

    9.6.1. Hemangiosarcoma

    9.6.2. Cardiac-based Tumors

    9.6.3. Lymphoma

    9.6.4. Mesothelioma

    9.6.5. Others

9.7. Congenital Heart Diseases I

    9.7.1. Patent Ductus Arteriosus

    9.7.2. Pulmonary Stenosis.

    9.7.3. Subaortic Stenosis

    9.7.4. Interventricular and Interatrial Defects

    9.7.5. Valvular Dysplasia

9.8. Congenital Heart Diseases II

    9.8.1. Interventricular and Interatrial Defects

    9.8.2. Valvular Dysplasia

    9.8.3. Tetralogy of Fallot

    9.8.4. Others

9.9. Dirofilariasis and Other Cardiopulmonary Worms

    9.9.1. Canine and Feline Dirofilariasis

    9.9.2. Canine Angiostrongylosis

    9.9.3. Complementary Tests

9.10. Transesophageal Echocardiography and 3D Echocardiography

    9.10.1. Transesophageal Echocardiogram: Basics

    9.10.2. Transesophageal Echocardiogram: Indications

    9.10.3. 3D Echocardiogram: Basics

    9.10.4. 3D Echocardiogram: Indications

Module 10. Preparing an Ultrasound Report

10.1. Ultrasound Jargon I

    10.1.1. Nomenclature, Description and the Diagnostic Uses of Different Artifacts

    10.1.2. Relative Echogenicity

    10.1.3. Comparative Echogenicity

10.2. Ultrasound Jargon II

    10.2.1. Structural Description of Selected Organs

    10.2.2. Using the Movement of Structures and Organs for Assessing the Latter

    10.2.3. Location of Each Organ in Space and Its Relation to Anatomical Landmarks

10.3. Registering a Study

    10.3.1. How Should an Image Study be Recorded and Stored?

    10.3.2. Study Validity Period

    10.3.3. Which Images and How Should I Attach Them to the Report?

10.4. Report Templates

    10.4.1. What is the Purpose of an Ultrasound report?

    10.4.2. Basic Outline of a Professional Ultrasound Report

    10.4.3. Specific Outline of Selected Ultrasound Reports

10.5. Indices

    10.5.1. Distances

    10.5.2. Volumes

    10.5.3. Ratios or Indices

    10.5.4. Speeds

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

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.
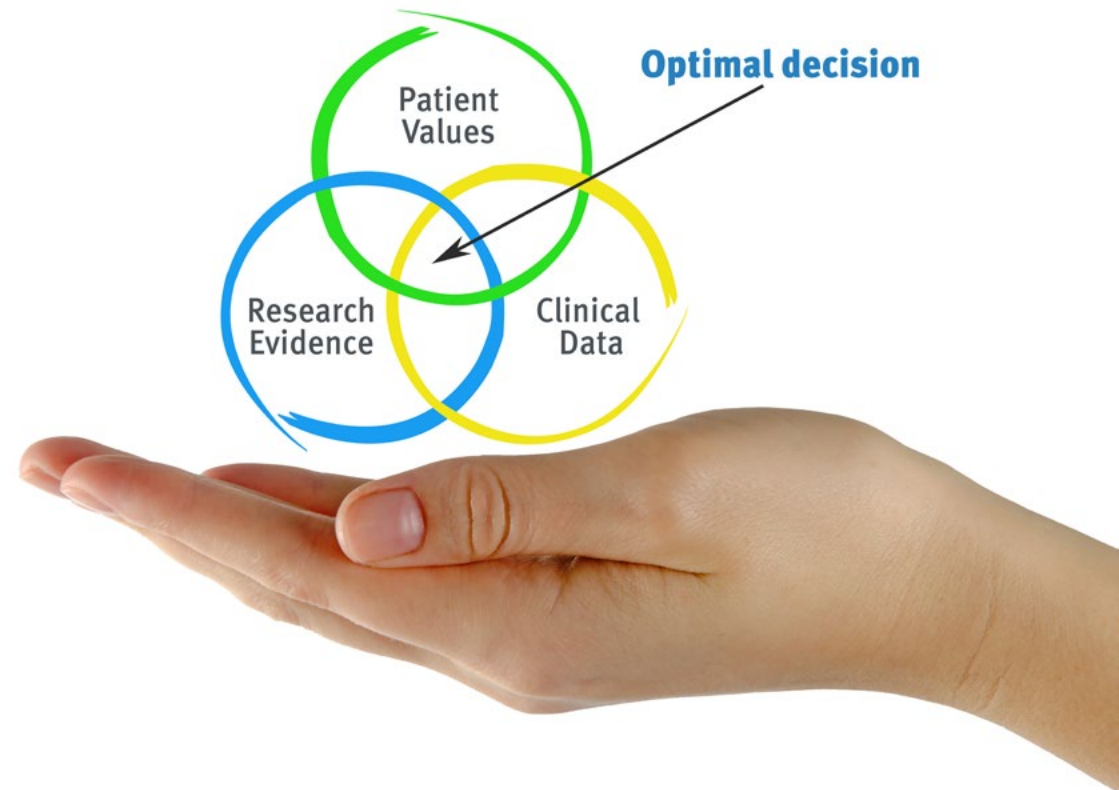
According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that 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.

01
learning from evidence

02
relearning from evidence

03
testing

04
learning from an expert

05
neurocognitive context dependent learning

06
Von-Restorff effect

07
case based learning through storytelling

08
competencies testing (retesting)

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.

20%

15%

15%

3%

20%

17%

7%

3%

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.

Certificate

The Professional Master's Degree in Ultrasound in Small Animals guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree certificate issued by TECH Technological University.

"*Include the Professional Master's Degree in Ultrasound in Small Animals on your résumé: A high-quality added value for any professional in the field*"
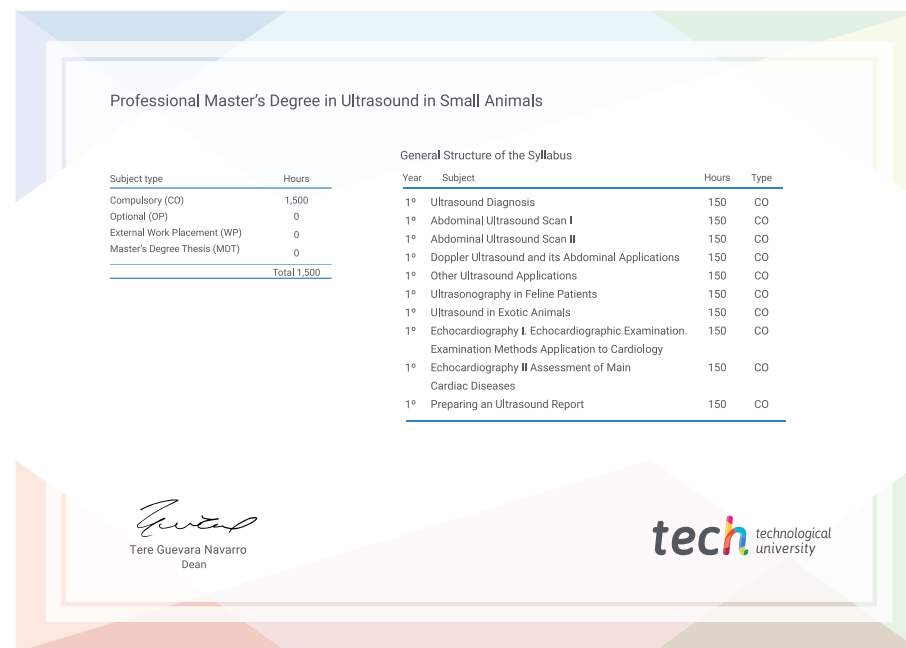
This **Professional Master's Degree in Ultrasound in Small Animals** contains the most complete and up-to-date scientific program on the market.

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

The certificate 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 Ultrasound in Small Animals**

Official Nº of Hours: **1,500 hours.**

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tech technological university

Awards the following
CERTIFICATE
to

Mr./Ms. _____ with identification number _____.
For having successfully passed and accredited the following program

PROFESSIONAL MASTER'S DEGREE
in

Ultrasound in Small Animals

This is a qualification awarded by this University, equivalent to 1,500 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

Professional Master's Degree in Ultrasound in Small Animals

Subject type	Hours
Compulsory (CO)	1,500
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
Total	1,500

General Structure of the Syllabus

Year	Subject	Hours	Type
1º	Ultrasound Diagnosis	150	CO
1º	Abdominal Ultrasound Scan I	150	CO
1º	Abdominal Ultrasound Scan II	150	CO
1º	Doppler Ultrasound and its Abdominal Applications	150	CO
1º	Other Ultrasound Applications	150	CO
1º	Ultrasonography in Feline Patients	150	CO
1º	Ultrasound in Exotic Animals	150	CO
1º	Echocardiography I. Echocardiographic Examination. Examination Methods Application to Cardiology	150	CO
1º	Echocardiography II Assessment of Main Cardiac Diseases	150	CO
1º	Preparing an Ultrasound Report	150	CO

Tere Guevara Navarro
Dean

tech technological university

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

Professional Master's Degree

Ultrasound in Small Animals

Course Modality: **Online**

Duration: **12 months.**

Certificate: **TECH Technological University**

Official Nº of hours: **1,500 h.**

Professional Master's Degree
Ultrasound in Small Animals

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