Hybrid Professional Master's Degree

Veterinary Radiology in Small Animals

tech technological university

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Hybrid Professional Master's Degree

Veterinary Radiology in Small Animals

Modality: **Hybrid (Online + Clinical Internship)**
Duration: **12 months**
Certificate: **TECH Technological University**
Teaching Hours: **1,620 h.**
Website: **www.techtitute.com/us/veterinary-medicine/hybrid-professional-master-degree/hybrid-professional-master-degree-veterinary-radiology-small-animals**

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01

Introduction

The diagnosis of numerous ailments and therapeutic situations that arise in the small animal veterinarian's office frequently relies on the use of diagnostic technology, in particular radiology. The Hybrid Professional Master's Degree in Veterinary Radiology in Small Animal is a careful selection of the most useful and up-to-date radiological diagnostic procedures of the moment, in a complete review created to provide the professional with the necessary capacity to make the most accurate diagnosis with the performance and interpretation of the tests. This process will be completed with the analysis of other diagnostic alternatives that will complete the pathology detection process, collaborating directly in the most appropriate approach in each case.

A highly qualified Hybrid Professional Master's Degree that will allow you to acquire the most advanced knowledge in its theoretical part and put it to the test in the field, in its practical part"

In recent years, and thanks to new care and better nutrition, the life expectancy of pets has increased considerably. As a result, as pets age, they face a wide range of pathologies that affect their health and quality of life. For this reason, the veterinary sector is constantly innovating, searching for more complete diagnostic methods. Based on this need, radiology has become a valuable tool that is gaining more and more advocates in animal medicine. Research in this educational field has led to the emergence of new strategies to identify cardiorespiratory and gastrointestinal problems or the appearance of tumors.

In this context, TECH has designed a study modality that covers the theoretical and practical dimensions of Veterinary Radiology in Small Animals. Through an up-to-date Hybrid Professional Master's Degree, the student will be able to delve into new discoveries related to radiodiagnosis and the most innovative protection measures against ionizing radiation. In the first phase, the contents will be taught 100% online, on a learning platform with high interactive features and multimedia resources of great teaching value.

Through part of the pathway, the program strives to develop new skills in the student for the handling of complex tools and techniques. This will take place through a 3-week intensive classroom practice at a prestigious veterinary clinic. The institutions chosen by TECH for this training are leaders in the field of veterinary radiology. In this way, the student will be accompanied during the educational process by the most distinguished experts in a demanding educational field and will acquire holistic knowledge about the day-to-day work in this type of facilities, the most frequent pathologies to be detected and the most effective methods for their identification.

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

- Development of more than 100 clinical cases presented by veterinary surgery professionals and university professors with extensive experience in minimally invasive techniques
- 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
- Veterinary patient assessment and monitoring, the latest international recommendations in minimally invasive surgery
- Comprehensive syllabus of surgical approach for small animals
- Presentation of practical workshops on procedures, diagnosis, and treatment techniques in veterinary patients
- An algorithm-based interactive learning system for decision-making in the clinical situations presented throughout the course
- Practical clinical guides on approaching different pathologies
- Special emphasis on test-based medicine and most effective methodologies in Veterinary Surgery for small animals
- All of this will be complemented by theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is available from any fixed or portable device with an Internet connection
- In addition, you will be able to carry out a clinical internship in one of the best veterinary centers in the world

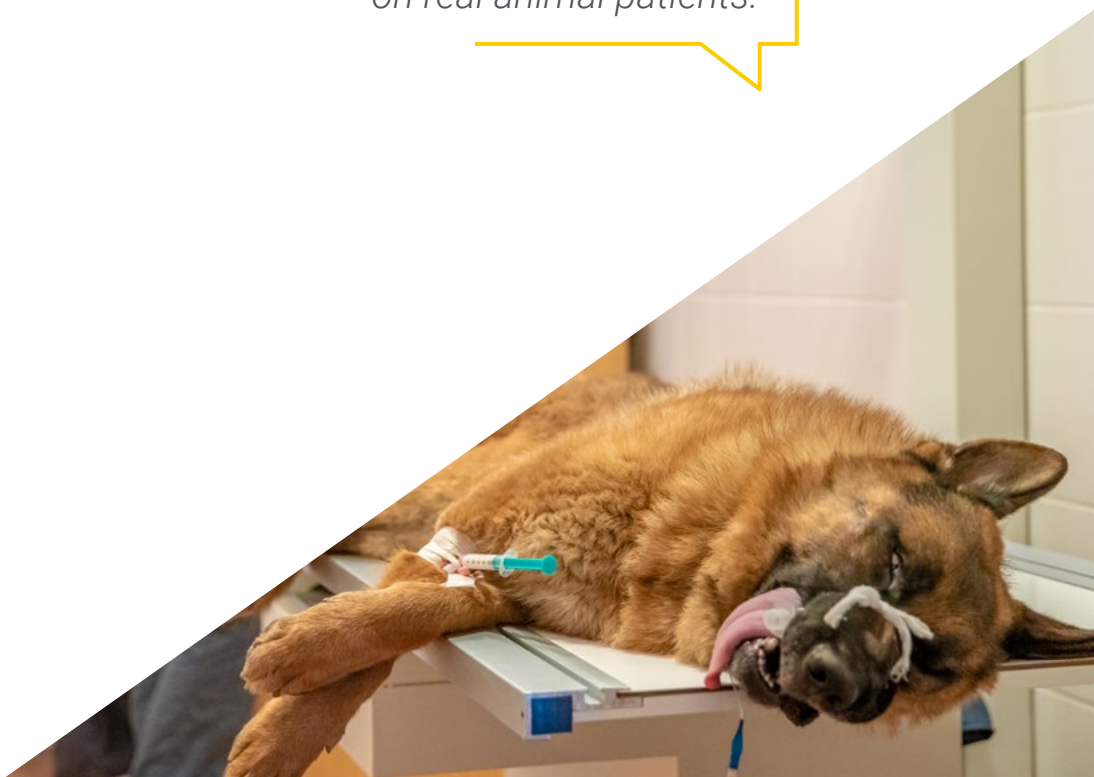
TECH offers you all its educational resources so that you can acquire the necessary specialization to use the new veterinary radiodiagnostic technologies"

A complete, high-intensity process that will allow you to bring the use of new technology in this field to your diagnostics.

Thanks to this Hybrid Professional Master's Degree you will be able to test yourself in the field, acting on real animal patients.

In this proposal for a Hybrid Professional Master's Degree, of a professionalizing nature and blended learning modality, the program is aimed at updating veterinarians who require a high-level of qualification to work in veterinary radiology units. The contents are based on the latest scientific evidence, and oriented in an educational way to integrate theoretical knowledge into practice, and the theoretical-practical elements will facilitate knowledge update and decision-making in patient management.

Thanks to its multimedia content developed with the latest educational technology, they will allow the professional to learn in a contextual and situated learning environment, i.e., a simulated environment that will provide immersive learning programmed to train in real situations. The design of this program is focused on Problem-Based Learning, through which the student will have to try to solve the different professional practice situations that will arise throughout the program. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.



02

Why Study this Hybrid Professional Master's Degree?

Nowadays, it is essential that radiographic studies are performed with specific solutions for each animal. In this way, more accurate measurements are obtained, according to your complexion, size, and shape of your limbs. For this reason, Veterinary Radiology, specialized in Small Animals, demands more and more qualified professionals, with a deep knowledge of all the particularities of this scientific area. For the pedagogical updating of these future experts, TECH has created an innovative program that combines excellence in theoretical learning with the acquisition of practical skills that will facilitate the graduate's exceptional work practice.

Through this study program, you will gain access to prestigious institutions in the veterinary field, under the personalized supervision of great specialists"

1. Updating from the Latest Technology Available

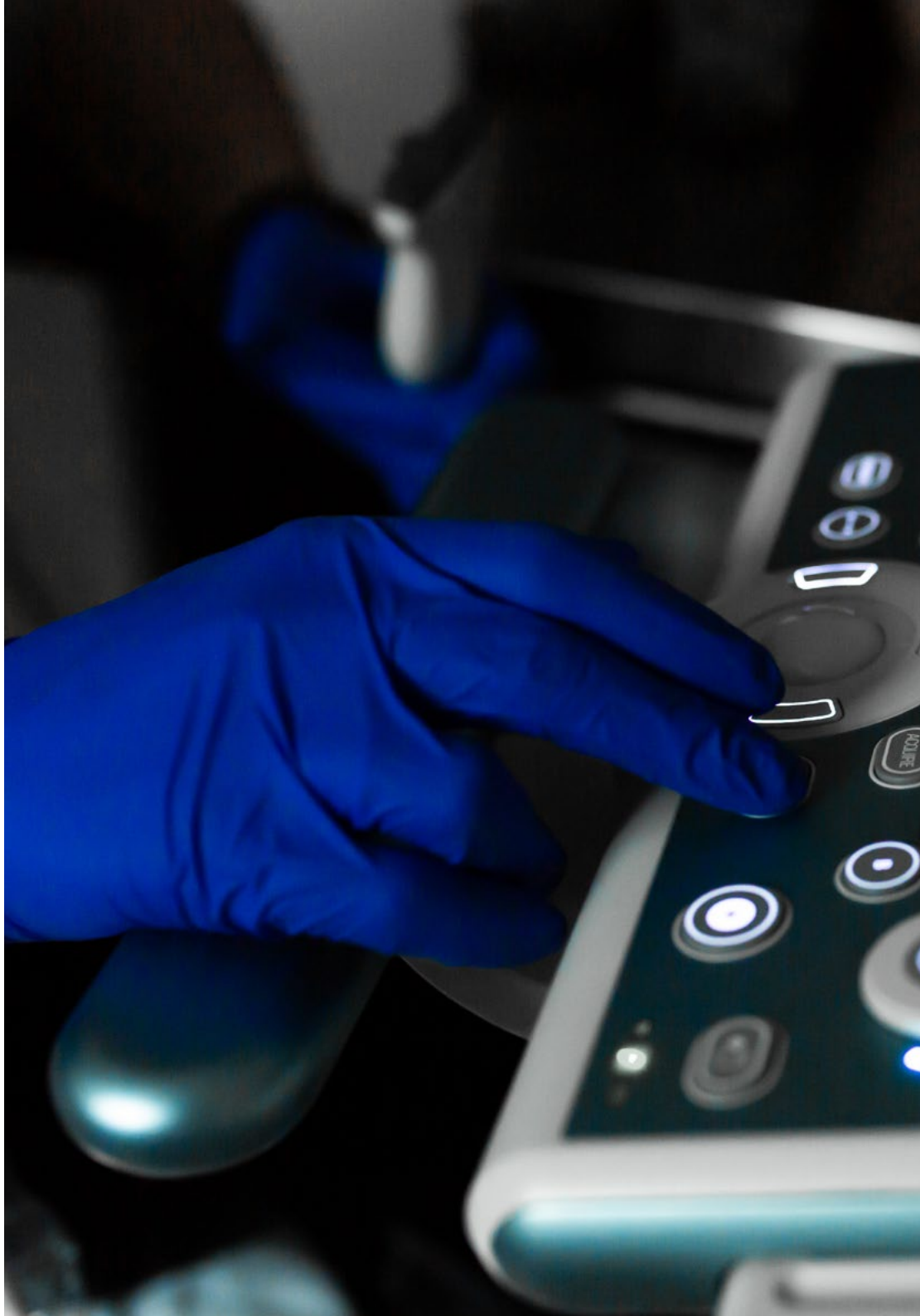
TECH's Hybrid Professional Master's Degree in Veterinary Radiology in Small Animals offers a unique opportunity to approach the latest technologies for radiodiagnosis from a theoretical perspective. In turn, the program facilitates a holistic understanding of how these innovations are applied in daily professional practice, through a dynamic and demanding on-site stay.

2. Gaining In-depth Knowledge from the Experience of Top Specialists

During this study program, TECH students will be accompanied by a large team of experts. With their help, graduates will develop complex theoretical knowledge and discuss real cases. In addition, during the in-person internship, students will have a designated tutor to complement their skills and provide them with personalized guidance.

3. Entering first-class Veterinary environments

TECH carefully selects all the centers available for the professional internship that is integrated to this Hybrid Professiona Master's Degree. In this way, students will be able to access the most competitive and demanding work environments in the market. In these spaces, they will find the best experts and the most up-to-date technologies.



4. Combining the Best Theory with State-of-the-Art Practice

In an educational market plagued by programs with excessive academic loads, TECH stands out for its innovative offerings. In this way, the students interested in mastering veterinary radiology will have access to an excellent theoretical pedagogical preparation complemented by an intensive and exhaustive 3-week in-person practice.

5. Expanding the Boundaries of Knowledge

The professional internships of this Hybrid Professional Master's Degree will allow students to access renowned medical centers, located in different latitudes. In this way, each of them will be able to expand their horizons based on international standards. This opportunity is unique in its kind and is possible thanks to the network of contacts and collaborators within TECH's reach.

You will have full practical immersion at the center of your choice"

03

Objectives

The objectives of the Hybrid Professional Master's Degree Veterinary Radiology in Small Animals are aimed at facilitating the performance of the veterinary professionals with the latest advances in the field of radiological diagnosis, therefore boosting the veterinarian's professional career by expanding their capacity. In addition, the student will develop the skills acquired in a practical way in a veterinary center of reference, guided by the best experts.

Take a step towards excellence with a Hybrid Professional Master's Degree that will allow you to learn and integrate in a practical way the most interesting innovations in radiology-supported diagnostics"

General Objective

- For this program, TECH has set several general objectives. Among them is the development of skills to enable the expert to determine which radiological technique best suits the object to be radiographed. On the other hand, it examines in depth the different means and actions for protection against ionizing radiation. In addition, it also covers the strategies to write the diagnostic report for the final exercise of this specialty of veterinary medicine

Be at the cutting-edge with the intervention capacity of a specialist and be at the forefront of competitiveness in the sector"

Specific Objectives

Module 1. Ionizing Radiation for Diagnostic Purposes

- Analyze the Bremsstrahlung effect
- Interpret the cause of radiological defects and distortions
- Reproduce the systematic interpretation of the radiological image
- Differentiate the different types of radiological image processing
- Examine the concept of radiological distortion, the concept of pareidolia and the concept of limiting factor

Module 2. Radioprotection

- Analyze the members of a radiology team
- Establish the different types of receivers of the generated radiation
- Present the existing types of dosimeters
- Assume the annual quality controls of the UTPR
- Examine the various consequences of correct and incorrect use of the installation and legal its legal repercussions
- Present the legislation in force for the use of radiodiagnostic equipment

Module 3. Radiodiagnosis of the Cardiovascular System

- Identify enlargements of the different cardiac chambers
- Examine the anatomy of the large vessels
- Determine the limits of radiology to assess cardiac function
- Analyze normal morphological variations as a function of the cardiac cycle
- List the projections necessary to visualize the cardiac silhouette optimally
- Address the assessment of arteries and veins of the pulmonary lobes
- Identify radiographic signs of cardiac alterations

Module 4. Radiodiagnostics of the Respiratory System and Other Intrathoracic Structures

- Determine the main limiting factors in the interpretation of thoracic radiographs
- Determine which projection(s) are the most appropriate according to the reason for the radiographic study
- Examine the normal and pathologic radiological image of the rib cage, the mediastinum, and its structures and of the structures present inside the thoracic cage
- Analyze the different pulmonary patterns and their main differential diagnoses
- Establish the radiological picture of the main congenital diseases affecting the thorax

Module 5. Radiodiagnosis of the Digestive System

- Radiological assessment of the most frequent pathologies of the esophagus, stomach, small intestine and colon
- Improve the radiological technique by means of the most frequent positionings
- Determine the limitations of radiology and the uses of complementary techniques to make accurate diagnosis

Module 6. Radiodiagnosis of the Rest of Abdominal Structures

- Define the normal and pathological radiological image of the liver, spleen and pancreas
- Analyze the physiological and pathological radiological image of the excretory system and genital apparatus
- Examine the radiological image of the retroperitoneal space and peritoneum
- Determine the oncological image of each of these structures

Module 7. Radiological Diagnosis in Neurology

- Propose the use of plain radiography and contrast radiological studies for the approach to the diagnosis of some inflammatory diseases of the central nervous system: infectious and non-infectious
- Establish radiological signs compatible with herniated discs and other degenerative diseases
- Justify the use of radiography as a diagnostic tool for the initial evaluation of the patient with spinal cord trauma
- Define the radiological patterns of myelography for the diagnosis of intradural (meningioma) and extradural (ependymoma and astrocytoma) tumors
- Identify radiologic signs secondary to metabolic and nutritional pathologies that cause encephalopathy
- Present the congenital anomalies of the central nervous system and surrounding bony structures that can be identified by radiographic study
- Examine the normal anatomical image of each spinal segment and the skull
- Improve the radiographic technique and positioning of the animal for the assessment of the neurological system
- Identify the congenital pathologies that can be observed in the spine
- Determine the different limitations encountered when assessing the skull
- Examine the cranial pathologies that can be observed by radiography
- Define the normal anatomical image of each spinal segment and the skull

Module 8. Orthopedic Radiological Diagnosis I

- Determine the organization of the growth plate to understand its impact on radiological imaging
- Examine the blood supply to the bone in order to extrapolate radiologically to the bone and its cicatricial evolution
- Visualize bone and fibrocartilaginous components radiologically
- Determine the stages of fracture repair and identify them radiographically in order to be able to apply this knowledge during a postoperative recovery period
- Anticipate possible complications in the bone healing phase by means of radiological monitoring
- Correctly visualize the different types of complications and differentiate between them
- Examine radiographically a case understanding its clinical significance, as well as the evolution of the arthritis/arthrosis
- Differentiate the various orthopedic diseases through radiographic study
- Correctly diagnose and classify orthopedic diseases associated with the knee, hip and elbow
- Recognize radiographically the different types of surgical procedures of choice to treat these diseases

Module 9. Orthopedic Radiological Diagnosis II

- Determine how to differentiate stable/unstable hip fractures and consider medical or surgical treatment
- Recognize femur fractures, and their importance in early diagnosis to avoid serious complications
- Examine the structures of the skull, jaw and teeth, emphasizing the importance of correct projections and showing the limitations of radiology in the structures of the the skull
- Identify tibial fractures
- Analyze the importance of radiographs in the forelimb by examining its anatomy and analyzing the most typical fractures in this area
- Examine radiologically the different pathologies of the distal extremity
- Improve radiological positioning for the assessment of dislocations
- Differentiate between the different types of joint dislocations
- Correctly diagnose and classify the different fractures at the level of the growth nucleus and involving the adjacent epiphysis and metaphysis
- Identify the different muscle, tendon and ligament pathologies by radiological imaging and understand their limitations

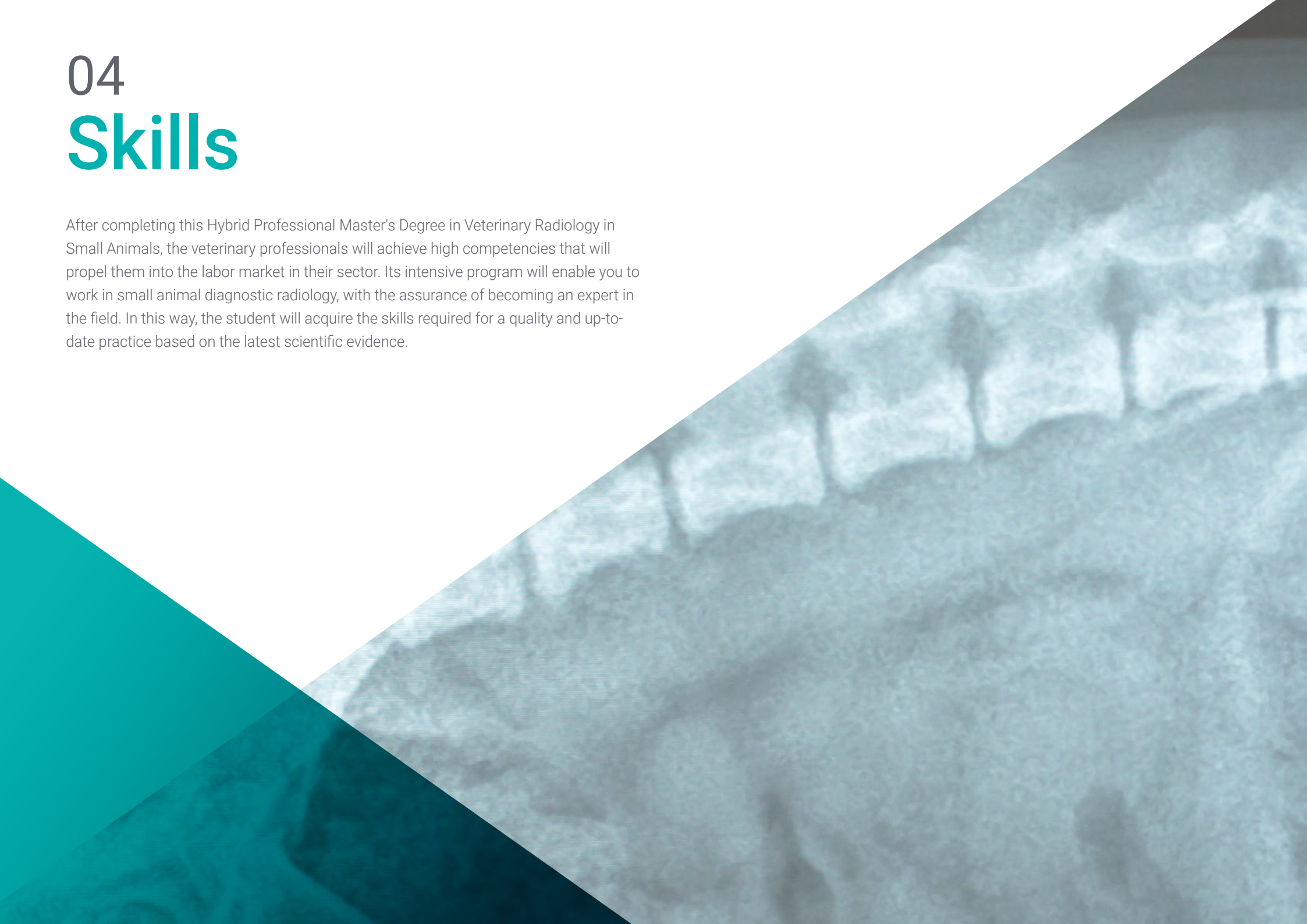
Module 10. Other Diagnostic Imaging Methods. Diagnosis in Other Species. Exotic Animals

- Develop specialized knowledge to perform ultrasound scans quickly, identifying the main pathologies
- Examine the ecofast technique in the emergency department
- Determine the performance and image acquisition of a CT scanner and how that helps me in my daily work
- Identify which pathologies are more recommendable for MRI (Magnetic Resonance Imaging) studies
- Diagnose the pathologies of the cranium, celomic and thoracic cavity, orthopedic and abdominal pathologies in birds, small mammals and reptiles common in the small animal clinic

04

Skills

After completing this Hybrid Professional Master's Degree in Veterinary Radiology in Small Animals, the veterinary professionals will achieve high competencies that will propel them into the labor market in their sector. Its intensive program will enable you to work in small animal diagnostic radiology, with the assurance of becoming an expert in the field. In this way, the student will acquire the skills required for a quality and up-to-date practice based on the latest scientific evidence.



This Hybrid Professional Master's Degree will provide you with the professional skills you need to work safely and accurately in small animal diagnostics"

General Skills

- Develop specific skills to successfully carry out the professional activity in the broad environment of diagnostic imaging
- Knowing the reality and daily practice of the veterinary hospital
- Attend veterinary emergencies using radiology tools to detect the pathologies of the animal

Acquire the necessary skills to perform and interpret diagnostic tests supported by radiology in a wide range of pathologies"

Specific Skills

- Safe handling of radiology equipment
- Perform an adequate radiological examination
- Recognize small animal diseases with appropriate images, but also with deficient images
- Perform radiographic evaluation of the cardiac chambers
- Understand the deficiency of radiological imaging and understand the need to order other omplementary imaging tests
- Perform radiographs to evaluate the neurological system under sedation, using appropriate positioning accessories
- Use imaging to identify trauma problems
- Use diagnostic imaging methods in exotic animals
- Interpret radiological images
- Know the legal regulations for using radiology equipment
- Develop with responsibility the monitoring and supervision of their work, as well as communication skills within the essential teamwork

05

Course Management

The faculty of this Hybrid Professional Master's Degree has an excellent and extensive educational and professional background, synonymous with the quality of TECH. In this way, the professors will give the veterinary professional a complete and global vision of the work to be carried out in a small animal practice, with the support of the most interesting diagnostic innovations in radiology.

Our faculty will give you the keys to learn in a safe and efficient way, with the most real, and close vision of this intervention"

Management

Dr. Gómez Poveda, Bárbara

- Veterinarian specialist in Small Animals
- Veterinary Director at Barvet Home Veterinary
- General Veterinarian at Parque Grand Veterinary Clinic
- Veterinary Emergency and Hospitalization at the Las Rozas Veterinary Emergency Center
- Emergency and Hospitalization Veterinarian at the Parla Sur Veterinary Hospital
- Degree in Veterinary Medicine, Complutense University Madrid
- Postgraduate in Small Animals Medicine from Improve International
- Specialization in Diagnostic Imaging in Small Animals in Autonomous University of Barcelona
- Specialization in Medicine and Diagnostic Imaging in Exotic Animals, in Autonomous University of Barcelona

Professors

Dr. Nieto Aldeano, Damián

- Head of the Radiology Service at the Diagnosfera Veterinary Reference Center
- Degree in Veterinary Medicine from the University of Murcia
- *General Practitioner Certificate* in Diagnostic Imaging by the ESVPS
- Training in Abdominal Ultrasound in small animals and Cytology of Internal Organs, Eyes, Ears and Ganglia

Ms. Moreno Sánchez, Lorena

- Head of the Surgery and Anesthesia Department of the Momo Veterinary Hospital
- Head of the Dentistry and Neurology Service of the Momo Veterinary Hospital
- Veterinarian at the Sierra Oeste Veterinary Hospital in San Martín de Valdeiglesias
- Degree in Veterinary Medicine from the Complutense University Madrid
- Postgraduate Course in Small Animal Surgery and Anesthesia at the UAB

Dr. Guerrero Campuzano, María Luisa

- Director of Petiberia Veterinary Clinic
- Bird Veterinary in Puy du Fou Spain
- Veterinarian at the Oasis Wildlife Fuerteventura Zoo
- Animal Facility Technician at the Spanish National Cancer Research Center (CNIO)
- Volunteer in the Feline Colony Spay/Neuter Campaign at the ALBA Animal Protection Agency
- Co-author of clinical trials and scientific knowledge pills
- Graduate in Veterinary Medicine from the Alfonso X El Sabio University
- Master´s Degree in Soft Tissue Surgery and Anesthesia in Small Animals by the Autonomous University of Barcelona
- Master's Degree in Medicine and Surgery Exotic and Wild Animals from the Complutense University of Madrid
- Member of: AVEPA, GMCAE

Dr. Calzado Sánchez, Isabel

- Veterinarian at the Miramadrid Veterinary Hospital
- Small animal veterinarian at CV Sansepet
- Volunteer veterinarian at the CIAAM Animal Shelter Center
- Degree in Veterinary Medicine from the Alfonso X El Sabio University
- Master's Degree in Exotic Animal Clinic by Improve International

Dr. Conde Torrente, María Isabel

- Specialist veterinarian in Diagnostic Imaging
- Head of the Diagnostic Imaging and Cardiology Service at Alcor Veterinary Hospital
- Medical Director and head of the Advanced Diagnostic Imaging Service at Peñagrande Veterinarian Group
- Head of the Diagnostic Imaging Canary Islands Health at Mejorada Veterinary Center
- Responsible for diagnostic services at Hospital Veterinario Alberto Alcocer
- Collaborator with the Research Group of the Department of Animal Pathology of the University of Santiago de Compostela
- Degree in Veterinary Medicine from the University of Santiago de Compostela
- Advanced Postgraduate Course in Diagnostic Imaging (Computerized Axial Tomography) General Practitioner Advanced Certificate (GPcert)
- Postgraduate in *General Practitioner Certificate* in Diagnostic Imaging (GPCert- DI)

Ms. Gandía, Ana

- Veterinarian at Mallorca Veterinaris
- Veterinarian at the Removed Veterinary Hospital
- Veterinarian at El Pinar Veterinary Clinic
- Graduate in Veterinary Medicine from Alfonso X el Sabio University
- Degree in Technical Architecture the European University
- Training in diagnosis of alopecia in the dog and canine cutaneous mastocytoma

Ms. Lázaro González, María

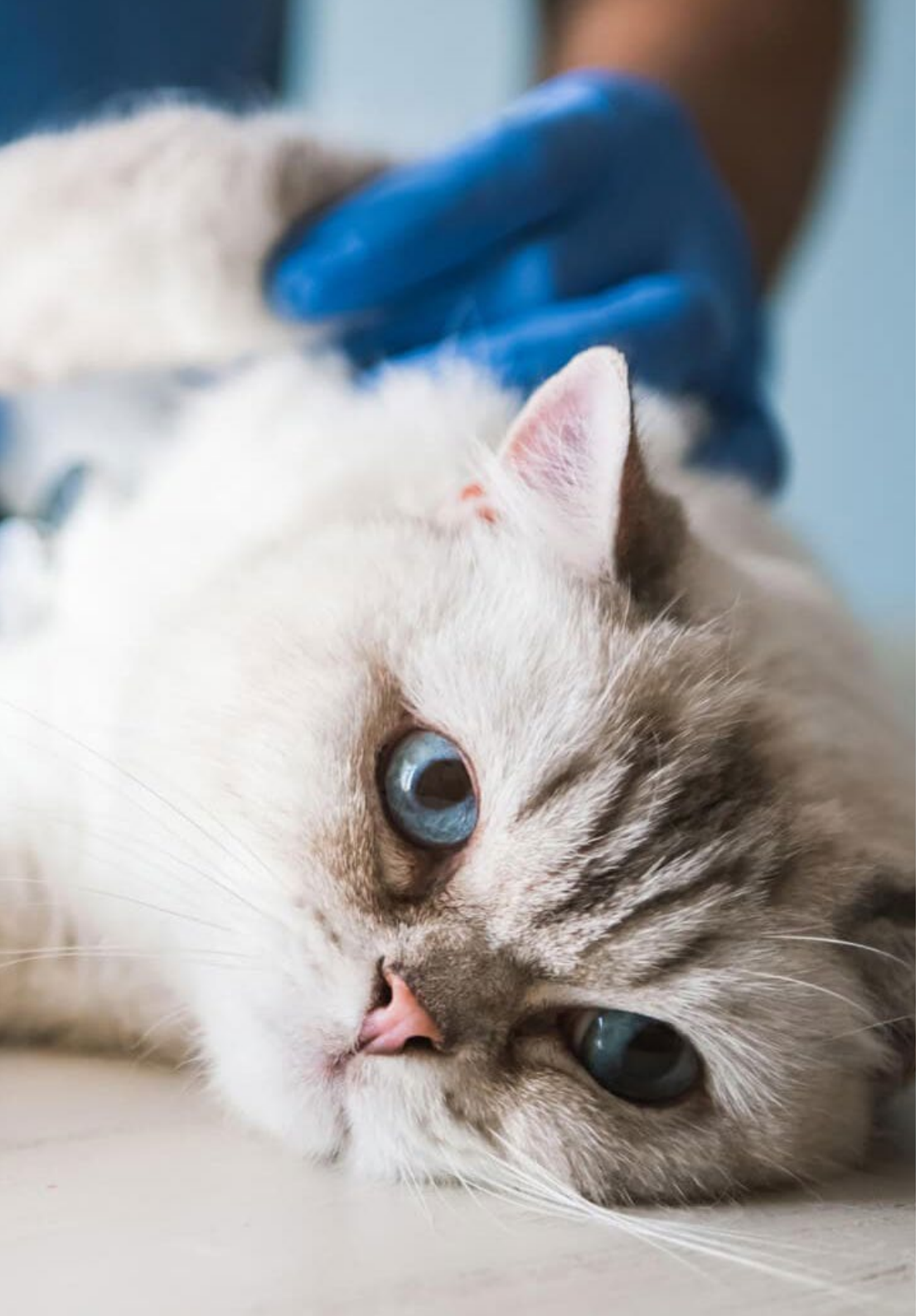
- Veterinarian at ICON
- Veterinary Clinical Researcher
- Responsible for the Emergency, Internal Medicine, Radiology and Ultrasound Fields at Gattos Feline Clinical Center
- General Veterinarian at El Quiñon Veterinary Clinic
- Degree in Veterinary Medicine from the Alfonso X El Sabio University from Madrid
- Master's Monitoring in Clinical Trials
- GPCert in Feline Medicine
- Postgraduate in Diagnostic Imaging by Improve Veterinary
- Postgraduate in Feline Clinics Improve Veterinary

Ms. Moliní Aguiar, Gabriela

- Head of the Radiology and Anesthesia Department of the Petiberi Veterinary Clinic
- Degree in Veterinary Medicine from the Complutense University Madrid
- Master in Microbiology and Parasitology: research and development
- Neurology in the Feline and Canine patient by Novotech
- Internal medicine in the Feline patient by Novotech
- Update on companion animal dermatology by the Veterinarians College of Madrid
- Training in radiological Interpretation in small animals by the Veterinary College of Madrid

Dr. Aroca Lara, Lucía

- Equine veterinarian to the areas of field clinic, veterinary emergencies, reproductive management and documentation
- Internship in Equine Clinic at the Medicine, Surgery and Reproduction Services of the Clinical Veterinary Hospital of the University of Córdoba (HCV-UCO)
- Faculty collaboration for student internships at the Clinical Veterinary Hospital of the University of Cordoba (HCV-UCO)
- Veterinary Assistant to the Veterinary Commission, the Treatment Veterinarian and the Doping Control Veterinarian at the CEI 3rd Madrid International Endurance in Capitals Challenge, CEI 2nd Copa de S.M. El Rey de Raid, CEI 2nd YJ and CEI 1st Raids
- Collaboration in Veterinary Emergencies Department of Animal Medicine and Surgery of the Veterinary Clinic Hospital of the Complutense University of Madrid, in the Area of Equine Medicine and Surgery
- Degree in Veterinary Medicine, Complutense University Madrid
- Specialty in Equine Veterinary Medicine from the University of Córdoba
- Accreditation of Radiodiagnostic Facility Manager by the Nuclear Safety Council (CSN)
- Master's Degree in Equine Rehabilitation by TECH Technological University



Dr. García Montero, Javier

- Surgeon of the Traumatology and Orthopedics Service at the Cruz Verde Vetsum Veterinary Hospital
- Veterinarian specialist at El Pinar Veterinary Clinic
- Degree in Veterinary Medicine from the University of Córdoba
- Surgeon of the Traumatology and Orthopedics Service at the Cruz Verde Vetsum Veterinary Hospital
- Postgraduate in Surgery and Anesthesia at the Autonomous University of Barcelona
- Member of: AO, VET Foundation

The faculty of this program will offer you personalized guidance at all times, so that you can clarify doubts and concepts of interest in the veterinary activity"

06

Educational Plan

The contents of this program have been developed by different experts, with the objective of that students acquire each and every one of the skills necessary to become true specialist in Veterinary Radiology in Small Animals. Its structure and internship plan make this program the most complete on the market today, as it covers all the relevant knowledge for the veterinarian to develop successfully in a more habitual environment.

A comprehensive syllabus designed to provide the student with a broad compendium of knowledge that will propel them to the forefront of their profession"

Module 1. Ionizing Radiation for Diagnostic Purposes

1.1. General Principles
- 1.1.1. Electron Acceleration
- 1.1.2. Electrical Current Intensity
- 1.1.3. The Anode, Where the Anions Collide

1.2. Photon Formation with Diagnostic Effects
- 1.2.1. Types of Photons
- 1.2.2. Photon Energy
- 1.2.3. Orientation of Emitted Photons
- 1.2.4. Scattering of the Energy Generated by Photons

1.3. Scattered Radiation
- 1.3.1. Anode Dispersion
- 1.3.2. Patient Dispersion
- 1.3.3. Implications for Clinical Imaging
- 1.3.4. Dispersion of Objects in the Radiodiagnostic Room

1.4. The Formation of Radiological Imaging
- 1.4.1. Radiological Chassis
- 1.4.2. Radiological Films
- 1.4.3. RC Processing
- 1.4.4. DR Processing

1.5. Radiological Film Processing
- 1.5.1. Development in Automatic Processors and Development Vats
- 1.5.2. Liquid Recycling
- 1.5.3. Processing with Digital Chassis
- 1.5.4. Digital Direct Processing

1.6. Factors Affecting Radiological Imaging
- 1.6.1. Time
- 1.6.2. Voltage
- 1.6.3. Amperage

1.7. Alterations in the Perception of the Radiological Image
- 1.7.1. Pareidolia
- 1.7.2. Magnification
- 1.7.3. Distortion

1.8. Radiological Interpretation
- 1.8.1. Systematization of Interpretation
- 1.8.2. Validity of the Image Obtained
- 1.8.3. Differences between Tissues
- 1.8.4. Identification of Healthy Organs
- 1.8.5. Identification of Radiological Alterations
- 1.8.6. Typical Diseases of the Different Anatomical Regions

1.9. Limiting Factors in Radiological Diagnosis, Time
- 1.9.1. Regions in Motion
- 1.9.2. Still Regions
- 1.9.3. Fuzziness
- 1.9.4. Anesthesia in Radiology
- 1.9.5. Radiological Positioners
- 1.9.6. Anatomical Regions in Which Time Has To Be Taken into Consideration

1.10. Limiting Factors in Radiological Diagnosis, Voltage
- 1.10.1. Density of the Radiographic Region
- 1.10.2. Contrast
- 1.10.3. Sharpness
- 1.10.4. Anatomical Regions in Which the Energy of Photons Must Be taken into Consideration

Module 2. Radioprotection

2.1. Radiation Physics
- 2.1.1. Atomic Structure
- 2.1.2. Interaction of Radiation with Matter
- 2.1.3. Radiological Units

2.2. X-ray Equipment Characteristics
- 2.2.1. Tube Elements
- 2.2.2. Devices
- 2.2.3. Radiation Produced
- 2.2.4. Radiological Imaging

2.3. Measurement of Ionizing Radiation
- 2.3.1. Personal Dosimetry
- 2.3.2. Environmental Dosimetry

2.4. Detectors Used in Radiodiagnostic Installations
- 2.4.1. General Principles
- 2.4.2. Detectors in the Room
- 2.4.3. Detectors Outside the Room
- 2.4.4. Personnel Detectors

2.5. Radiobiology
- 2.5.1. Cellular Response to Ionizing Radiation
- 2.5.2. Systemic and Organic Response
- 2.5.3. Diseases Caused by Radiation

2.6. Protection Against Ionizing Radiation
- 2.6.1. General Criteria
- 2.6.2. Operational Radiation Protection
- 2.6.3. ALARA Principle

2.7. Specific Radiological Protection in Radiodiagnostic
- 2.7.1. Personal Protectors
- 2.7.2. Shielding of the Room
- 2.7.3. Distance
- 2.7.4. The Workload

2.8. General Requirements for a Radiodiagnostic Facility
- 2.8.1. Location
- 2.8.2. Power Supply
- 2.8.3. Shielding

2.9. Quality Control of the Radiodiagnostic Installation
- 2.9.1. Shielding
- 2.9.2. The X-ray Emission Tank
- 2.9.3. The Collimator
- 2.9.4. The X-ray Table
- 2.9.5. Leaded Aprons

2.10. Legislation
- 2.10.1. European Legislation
- 2.10.2. Legislation of the Room
- 2.10.3. Medical Checkups
- 2.10.4. Other Considerations

Module 3. Radiodiagnosis of the Cardiovascular System

3.1. Positioning in Cardiovascular Radiological Diagnosis
- 3.1.1. Right Lateral Projection
- 3.1.2. Dorsoventral Projection
- 3.1.3. Differences with Other Projections

3.2. Physiological Radiological Imaging of the Cardiovascular System
- 3.2.1. Cardiac Silhouette
- 3.2.2. Cardiac Chambers
- 3.2.3. Large Vessels

3.3. Altered Radiological Image of the Cardiovascular System
- 3.3.1. Cardiac Size Alteration
- 3.3.2. Vascular Alteration
- 3.3.3. Radiographic Signs of Heart Failure

3.4. Acquired Heart Diseases I
- 3.4.1. Mitral Degenerative Disease
- 3.4.2. Canine Cardiomyopathy
- 3.4.3. Pericardial Diseases

3.5. Acquired Heart Diseases II
- 3.5.1. Feline Cardiomyopathies
- 3.5.2. Dirofilariasis
- 3.5.3. Systemic Diseases with Cardiac Implications

3.6. Oncology
- 3.6.1. Neoplasia of the Right Atrium
- 3.6.2. Cardiac-based Neoplasm
- 3.6.3. Congenital Heart Diseases

3.7. Patent Ductus Arteriosus
- 3.7.1. Introduction
- 3.7.2. Existing Forms
- 3.7.3. Radiological Characteristics
- 3.7.4. CAP with D-I Shunt

3.8. Vascular Ring Anomalies
- 3.8.1. Introduction
- 3.8.2. Types
- 3.8.3. Radiological Characteristics

3.9. Other Congenital Diseases
- 3.9.1. Pulmonary Stenosis
- 3.9.2. Atrioventricular Septal Defect
- 3.9.3. Tetralogy of Fallot
- 3.9.4. Aortic Stenosis
- 3.9.5. Interatrial Septal Defect
- 3.9.6. Mitral Dysplasia
- 3.9.7. Tricuspid Dysplasia
- 3.9.8. Microcardia

3.10. Radiological Diagnosis of Pericardial Diseases
- 3.10.1. Radiological Diagnosis of Pericardial Diseases
  - 3.10.1.1. Pericardial Effusion
  - 3.10.1.2. Introduction
  - 3.10.1.3. Radiological Characteristics
- 3.10.2. Peritoneopericardial Diaphragmatic Hernia
  - 3.10.2.1. Introduction
  - 3.10.2.2. Radiological Characteristics

Module 4. Radiodiagnostics of the Respiratory System and Other Intrathoracic Structures

4.1. Positioning for Thorax Radiology
- 4.1.1. Ventrodorsal and Dorsoventral Positioning
- 4.1.2. Right and Left Laterolateral Positioning

4.2. Physiological Imaging of the Thorax
- 4.2.1. Trachea Physiological Imaging
- 4.2.2. Mediastinum Physiological Imaging

4.3. Pathologic Imaging in Thoracic Radiology
- 4.3.1. Alveolar Pattern
- 4.3.2. Bronchial Pattern
- 4.3.3. Interstitial Pattern
- 4.3.4. Vascular Pattern

4.4. Radiological Diagnosis of Acquired Pulmonary Diseases I
- 4.4.1. Structural Pathologies
- 4.4.2. Infectious Pathologies

4.5. Radiological Diagnosis of Acquired Pulmonary Diseases II
- 4.5.1. Inflammatory Pathology
- 4.5.2. Neoplasms

4.6. Feline-specific Thoracic Radiology
- 4.6.1. Radiology of the Heart in the Cat
  - 4.6.1.1. Radiographic Anatomy of the Heart
  - 4.6.1.2. Radiographic Diagnosis of Cardiac Pathologies
- 4.6.2. Radiology of the Thoracic Wall and Diaphragm of the Cat
  - 4.6.2.1. Anatomy of the Thoracic Cage
  - 4.6.2.2. Radiographic Diagnosis of Thoracic Wall and Diaphragm Pathologies
    - 4.6.2.2.1. Congenital Skeletal Malformations
    - 4.6.2.2.2. Fractures
    - 4.6.2.2.3. Neoplasms
    - 4.6.2.2.4. Alterations of the Diaphragm
- 4.6.3. Radiology of the Pleura and Pleural Cavity of the Cat
  - 4.6.3.1. Radiographic Diagnosis of the Pleura and Pleural Cavity Pathologies
    - 4.6.3.1.1. Pleural Effusion
    - 4.6.3.1.2. Pneumothorax
    - 4.6.3.1.3. Hydropneumothorax
    - 4.6.3.1.4. Pleural Masses
- 4.6.4. Radiology of the Cat Mediastinum
  - 4.6.4.1. Radiographic Anatomy of the Mediastinum
  - 4.6.4.2. Radiographic Diagnosis of Pathologies of the Mediastinum and the Organs it Contains
    - 4.6.4.2.1. Pneumomediastinum
    - 4.6.4.2.2. Mediastinal Masses
    - 4.6.4.2.3. Esophageal Diseases
    - 4.6.4.2.4. Tracheal Diseases
- 4.6.5. Pulmonary Radiology of the Cat
  - 4.6.5.1. Normal Pulmonary Radiologic Anatomy
  - 4.6.5.2. Radiographic Diagnosis of Pulmonary Pathologies
    - 4.6.5.2.1. Pulmonary Patterns
    - 4.6.5.2.2. Decreased Pulmonary Opacity

4.7. Radiology of the Mediastinum
- 4.7.1. Radiographic Anatomy of the Mediastinum
- 4.7.2. Mediastinal Effusion
- 4.7.3. Pneumomediastinum
- 4.7.4. Mediastinal Masses
- 4.7.5. Mediastinal Deviation

4.8. Congenital Thoracic Diseases
- 4.8.1. Patent Ductus Arteriosus
- 4.8.2. Pulmonary Stenosis
- 4.8.3. Aortic Stenosis
- 4.8.4. Ventricular Septal Defect
- 4.8.5. Tetralogy of Fallot

4.9. Oncology
- 4.9.1. Pleural Masses
- 4.9.2. Mediastinal Masses
- 4.9.3. Cardiac Tumors
- 4.9.4. Pulmonary Tumors

4.10. Radiology of the Thoracic Cage
- 4.10.1. Anatomy Radiologic of the Thoracic Cage
- 4.10.2. Radiological Alterations of the Ribs
- 4.10.3. Radiological Alterations of the Sternum

Module 5. Radiodiagnosis of the Digestive System

5.1. Radiological Diagnosis of the Esophagus
- 5.1.1. Radiology of the Normal Esophagus
- 5.1.2. Radiology of the Pathologic Esophagus

5.2. Radiology of the Stomach
- 5.2.1. Radiology and Positioning for the Diagnosis of Gastric Diseases
- 5.2.2. Volvulus of Stomach
- 5.2.3. Hiatal Hernias
- 5.2.4. Gastric Tumors
- 5.2.5. Foreign Bodies

5.3. Small Bowel Radiology
- 5.3.1. Duodenum
- 5.3.2. Jejunum
- 5.3.3. Ileum

5.4. Ileocecal Valve Radiology
- 5.4.1. Physiological Imaging of the Valve
- 5.4.2. Pathological Imaging
- 5.4.3. Common Pathologies

5.5. Colon Radiology
- 5.5.1. Radiological Anatomy of the Colon
- 5.5.2. Oncologic Diseases of the Colon
- 5.5.3. Megacolon

5.6. Rectal Radiology
- 5.6.1. Anatomy
- 5.6.2. Diverticula
- 5.6.3. Neoplasms
- 5.6.4. Displacements

5.7. Radiological Imaging of Perineal Hernia
- 5.7.1. Anatomical Structuring
- 5.7.2. Abnormal Radiological Images
- 5.7.3. Contrasts

5.8. Radiological Oncology of Perineal Region
- 5.8.1. Structures Affected
- 5.8.2. Lymph Node Examination

5.9. Radiological Contrasts Applied to the Digestive System
- 5.9.1. Barium Swallowing
- 5.9.2. Barium Intake
- 5.9.3. Nemogastrography
- 5.9.4. Barium Enema and Double Contrast Enema
- 5.9.5. Radiological Assessment of the Surgical Progression of Diseases of the Stomach

5.10. Radiological Assessment of the Surgical Progression of Diseases of the Stomach
- 5.10.1. Future Dehiscence
- 5.10.2. Transit Alterations
- 5.10.3. Surgical Reintervention Decision-Making
- 5.10.4. Other Complications

Module 6. Radiodiagnosis of the Rest of Abdominal Structures

6.1. Hepatic Radiological Diagnosis
- 6.1.1. Radiological Imaging of the Physiological Liver
- 6.1.2. Liver Disease
- 6.1.3. Radiological Examination of the Biliary Tract
- 6.1.4. Portosystemic Shunts
- 6.1.5. Oncology

6.2. Pancreatic Radiology
- 6.2.1. Radiological Imaging of the Physiological Pancreas
- 6.2.2. Pancreatic Disease
- 6.2.3. Oncology

6.3. Spleen Radiology
- 6.3.1. Physiological Radiological Imaging of the Spleen
- 6.3.2. Diffuse Splenomegaly
- 6.3.3. Focal Splenomegaly

6.4. Radiology of the Excretory System
- 6.4.1. Renal Radiology
- 6.4.2. Radiology of the Ureters
- 6.4.3. Radiology of the Bladder
- 6.4.4. Radiology of the Urethra
- 6.4.5. Oncology of the Excretory System

6.5. Radiology of the Genital System
- 6.5.1. Normal Radiological Imaging of the Female Genital System
- 6.5.2. Pathological Radiological Imaging of Female Genital System
- 6.5.3. Normal Radiological Imaging of the Male Genital System
- 6.5.4. Pathologic Radiological Imaging of the Male Genital System

6.6. Radiology of the Retroperitoneal Space
- 6.6.1. Normal Appearance of the Retroperitoneum
- 6.6.2. Retroperitonitis
- 6.6.3. Masses in the Retroperitoneal Space

6.7. Radiology of the Peritoneum
- 6.7.1. Peritoneal CAV Pathology
- 6.7.2. Retroperitoneal Space
- 6.7.3. Abdominal Masses

6.8. Radiology of the Adrenal Glands
- 6.8.1. Normal Appearance of the Adrenal Gland
- 6.8.2. Techniques and Benign/Malignant Diagnosis
- 6.8.3. Frequent Adrenal Injuries

6.9. Oncologic Radiology
- 6.9.1. Detection of Clinically Undetectable Tumors
- 6.9.2. Primary Masses vs. Metastasis
- 6.9.3. Radiological Signs of Malignancy

6.10. Radiology of Diseases of the Abdominal Wall and Abdominal Boundaries
- 6.10.1. Hernias and Diaphragmatic Diseases
- 6.10.2. Abdominal Hernias
- 6.10.3. Perineal Hernias
- 6.10.4. Pelvic Fractures
- 6.10.5. Obliterating Flow Diseases

Module 7. Radiological Diagnosis in Neurology

7.1. Radiological Anatomy
- 7.1.1. Structures Assessable by Radiology
- 7.1.2. Normal Radiological Anatomy of the Spine
- 7.1.3. Normal Radiological Anatomy of the Skull and its Structures

7.2. Radiological Examination of the Spine
- 7.2.1. C1-C6
- 7.2.2. T1-T13
- 7.2.3. L1-L7
- 7.2.4. S1-Cd

7.3. Contrast Examination
- 7.3.1. Cisternal Myelography
- 7.3.2. Lumbar Myelography
- 7.3.3. Pathological Alterations Observed by Myelography

7.4. Diagnosis of Vascular Pathologies
- 7.4.1. Vascular Pathologies: How Far Can We Go with Conventional Radiology
- 7.4.2. Assessment of Vascular Pathologies by Contrast Techniques
- 7.4.3. Assessment of Vascular Pathologies by Other Imaging Techniques

7.5. Cerebral and Meningeal Malformations
- 7.5.1. Hydrocephalus
- 7.5.2. Meningocele

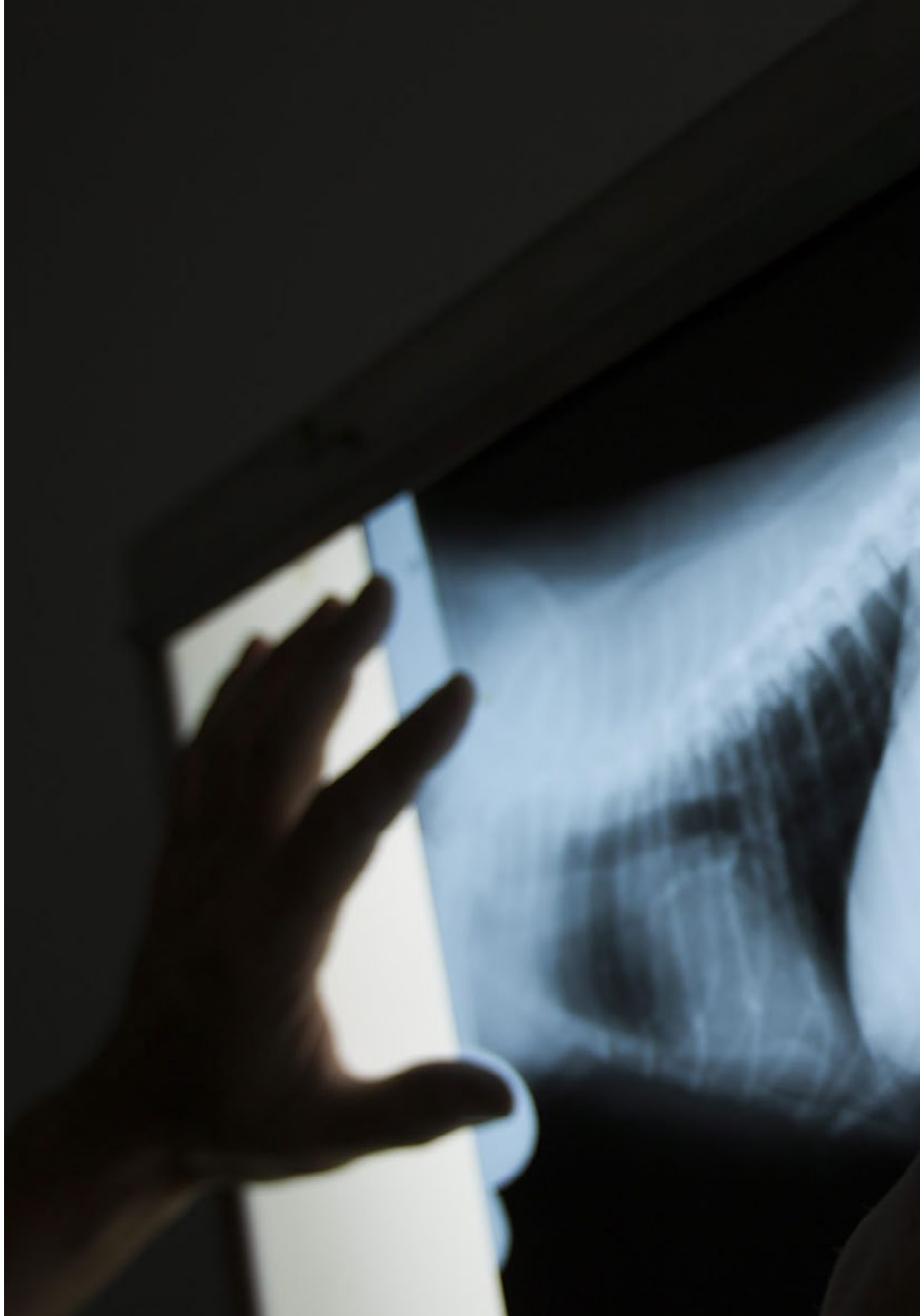
7.6. Inflammatory Pathology
- 7.6.1. Infectious
- 7.6.2. Non-infectious
- 7.6.3. Disc Spondylitis

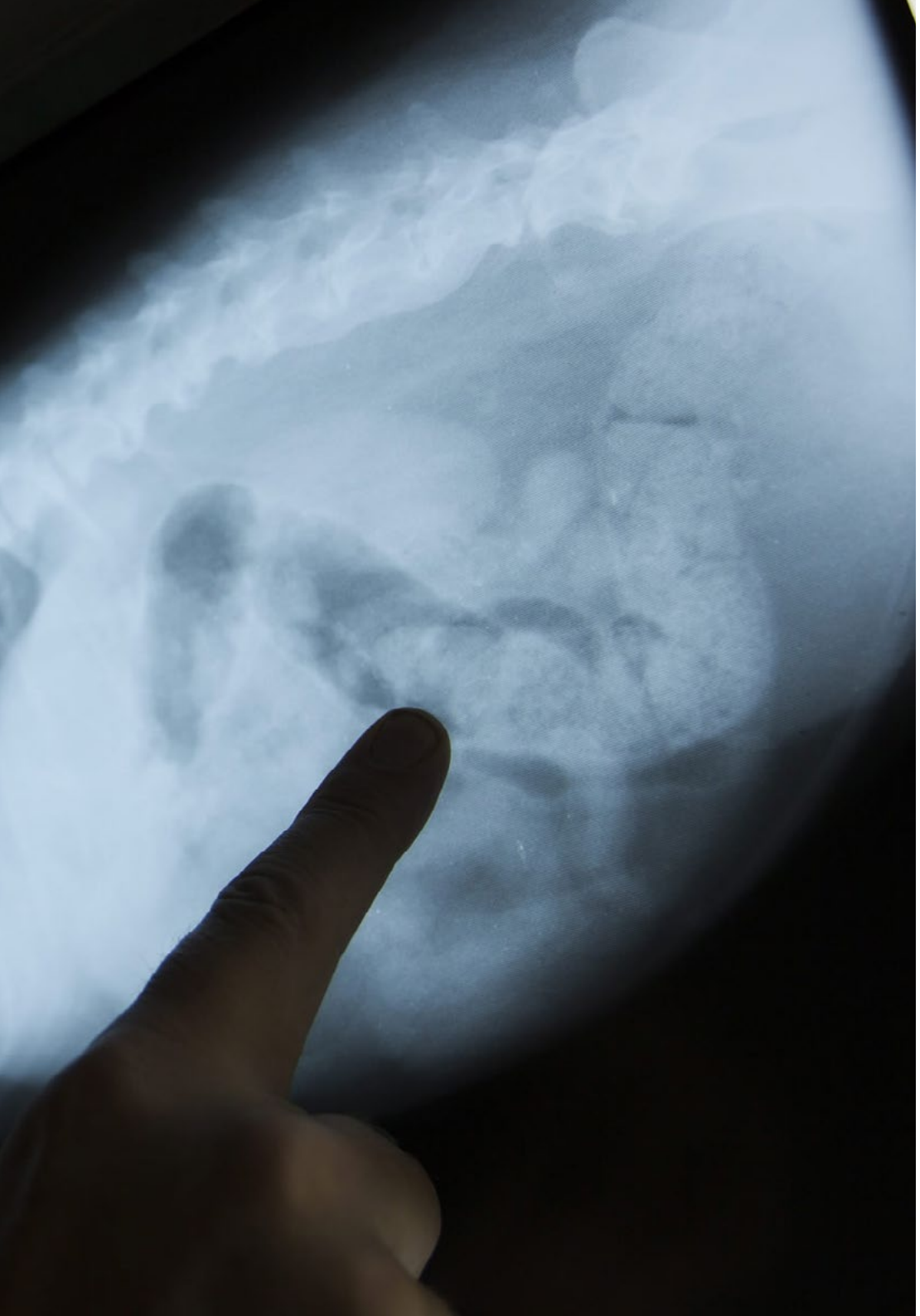
7.7. Degenerative Pathologies
- 7.7.1. Degenerative Disc Disease
- 7.7.2. Wobbler Syndrome
- 7.7.3. Lumbosacral Instability, Cauda Equina Syndrome

7.8. Spiral Trauma
- 7.8.1. Pathophysiology
- 7.8.2. Fractures

7.9. Oncology
- 7.9.1. Primary Neoplastic Diseases
- 7.9.2. Secondary Metastatic Diseases

7.10. Other Neurological Diseases
- 7.10.1. Metabolic
- 7.10.2. Nutritional
- 7.10.3. Congenital





Module 8. Orthopedic Radiological Diagnosis I

8.1. The Growth Plate
- 8.1.1. Organization of the Growth Plate and its Impact on Radiological Imaging
- 8.1.2. Blood Supply of the Growth Plate
- 8.1.3. Structure and Function of the growth plate. Cartilaginous Components
  - 8.1.3.1. Reserve Zone
  - 8.1.3.2. Proliferative Zone
  - 8.1.3.3. Hypertrophic Zone
- 8.1.4. Bone Components (Metaphysis)
- 8.1.5. Fibrous and Fibrocartilaginous Components
- 8.1.6. Radiological Imaging of the Growth Plate at Different Stages of Growth
  - 8.1.6.1. Epiphysiolysis
  - 8.1.6.2. Other Growth Disorders

8.2. Fracture Repair
- 8.2.1. Radiological Response of Traumatized Bone
- 8.2.2. Phased Fracture Repair
  - 8.2.2.1. Inflammatory Phase
  - 8.2.2.2. Repair Phase
  - 8.2.2.3. Remodelling Phase
  - 8.2.2.4. Callus formation
  - 8.2.2.5. Fracture Healing
  - 8.2.2.6. First Intention Repair
  - 8.2.2.7. Second Intention Repair
  - 8.2.2.8. Clinical Union
  - 8.2.2.9. Clinical Union Ranges

8.3. Fracture Complications
- 8.3.1. Delayed Union
- 8.3.2. Non-union
- 8.3.3. Bad Union
- 8.3.4. Osteomyelitis

8.4. Radiologic Imaging of Arthritis and Polyarthritis
- 8.4.1. Types of Arthritis and Polyarthritis
- 8.4.2. Clinical diagnosis
- 8.4.3. Differential Diagnosis Radiology

8.5. Radiological Imaging of Osteoarthritis
- 8.5.1. Etiology
- 8.5.2. Radiological Diagnosis
- 8.5.3. Prognosis According to Radiological Imaging

8.6. Decision-making in Traumatology and Orthopedics Based on Radiologic Diagnosis
- 8.6.1. Fulfilled Clinical Function
- 8.6.2. Implant Ruptures
- 8.6.3. Implant Bends
- 8.6.4. Implant Migrates
- 8.6.5. Rejection
- 8.6.6. Infections
- 8.6.7. Thermal Interference

8.7. Radiology of Orthopedic Diseases
- 8.7.1. Radiology of Osteochondritis Dissecans
- 8.7.2. Panosteitis
- 8.7.3. Retained Cartilaginous Nucleus
- 8.7.4. Hypertrophic Osteodystrophy
- 8.7.5. Craniomandibular Osteopathy
- 8.7.6. Bone Tumors
- 8.7.7. Other Bone Diseases

8.8. Radiology of Hip Dysplasia
- 8.8.1. Physiological Hip Radiology
- 8.8.2. Pathological Hip Radiology
- 8.8.3. Gradation of Hip Dysplasia
- 8.8.4. Surgical Treatments for Hip Dysplasia
- 8.8.5. Clinical/Radiographic Progression of Hip Dysplasia

8.9. Radiology of Elbow Dysplasia
- 8.9.1. Physiological Elbow Radiology
- 8.9.2. Pathological Elbow Radiology
- 8.9.3. Types of Elbow Dysplasia
- 8.9.4. Surgical Treatments for Elbow Dysplasia
- 8.9.5. Clinical/Radiographic Progression of Elbow Dysplasia

8.10. Radiology of the Knee
- 8.10.1. Radiology of Anterior Cruciate Ligament Rupture
  - 8.10.1.1. Surgical Treatment of Anterior Cruciate Ligament Rupture
- 8.10.2. Radiology of Patellar Dislocation
  - 8.10.2.1. Gradation of Patellar Dislocation
  - 8.10.2.2. Surgical Treatment of Patellar Dislocation

Module 9. Orthopedic Radiological Diagnosis II

9.1. Anatomy Radiology of the Pelvis
- 9.1.1. General Considerations
- 9.1.2. Radiologic Assessment of Stable Hip Fractures
- 9.1.3. Surgical Radiological Indication
  - 9.1.3.1. Intra-Articular Fracture
  - 9.1.3.2. Closure of the Pelvic Canal
  - 9.1.3.3. Joint Instability of a Hemipelvis
- 9.1.4. Fracture Separation of the Sacro-Iliac Joint
- 9.1.5. Fractures of the Acetabulum
- 9.1.6. Fracture of the Ilium
- 9.1.7. Ischial Fractures
- 9.1.8. Pubic Symphysis Fractures
- 9.1.9. Fractures of the Ischial Tuberosity

9.2. Radiological Imaging of Femur Fractures
- 9.2.1. Proximal Femoral Fractures
- 9.2.2. Fractures of the Medium Third of the Femur
- 9.2.3. Fractures of the Distal Third of the Femur

9.3. Radiological Imaging of Tibial Fractures
- 9.3.1. Fractures of the Proximal Third
- 9.3.2. Fractures of the Middle Third of the Tibia
- 9.3.3. Fractures of the Distal Third of the Tibia
- 9.3.4. Fractures of the Tibial Malleoli

9.4. Anterior Member
- 9.4.1. Radiological Imaging of the Scapula Fractures
- 9.4.2. Radiological Imaging of the Humerus Fractures
- 9.4.3. Radiological Imaging of the Radius and Ulnar Fractures

9.5. Fractures of the Maxilla and Mandible, Radiological Imaging of the Skull
- 9.5.1. Jaw Radiology
  - 9.5.1.1. Rostral Jaw
  - 9.5.1.2. Dental Radiology
  - 9.5.1.3. Temporomandibular Joint (TMJ)
- 9.5.2. Radiology of the Maxilla
  - 9.5.2.1. Dental Radiology
  - 9.5.2.2. Radiology of the Maxilla
- 9.5.3. Radiology to the Paranasal Sinus
- 9.5.4. Radiology of the Skull
- 9.5.5. Oncology

9.6. Radiology of Fractures and Other Alterations Resulting in Incongruence of the Articular Surface
- 9.6.1. Fractures Affecting the Growth Nucleus
- 9.6.2. Classification of the Epiphysis Based on its Type
- 9.6.3. Classification of Slipped or Split Fractures Involving the Growth Nucleus and Adjacent Epiphyseal Metaphysis
- 9.6.4. Clinical Assessment and Treatment of Damage to Nucleus Growth
- 9.6.5. Radiology of Joint Fractures in Adult Animals

9.7. Joint Dislocations, Radiology
- 9.7.1. Radiological Positioning
- 9.7.2. Nomenclature
- 9.7.3. Traumatic Dislocations
- 9.7.4. Scapulohumeral Instability

9.8. Interventional Radiology in Traumatology
- 9.8.1. Radiology of the Fractures Affecting the Growth Nucleus
- 9.8.2. Radiology of Fractures Involving the Epiphysis based on Their Type
- 9.8.3. Radiology of Slipped or Split Fractures Involving the Growth Nucleus, Epiphysis and Adjacent Metaphysis
- 9.8.4. Radiology of Joint Fractures in Adult Animals

9.9. Radiology of Muscular, Tendinous and Ligamentous Diseases
- 9.9.1. Radiology of Muscular Diseases
- 9.9.2. Radiology of Tendinous and Ligamentous Diseases
- 9.9.3. Other Alternatives for Diagnostic Imaging of these Pathologies

9.10. Radiology of Metabolic and Nutritional Disorders
- 9.10.1. Introduction
- 9.10.2. Radiologic Imaging in Secondary Nutritional Hyperparathyroidism
- 9.10.3. Radiologic Imaging in Secondary Renal Hyperparathyroidism
- 9.10.4. Radiological Imaging in Hypervitaminosis A
- 9.10.5. Radiologic Imaging in Pituitary Dwarfism

Module 10. Other Diagnostic Imaging Methods Diagnosis in Other Species. Exotic Animals

10.1. Ultrasound Diagnosis
- 10.1.1. Abdominal Cavity Ultrasound
  - 10.1.1.1. Introduction to The Ultrasound Method
  - 10.1.1.2. Examination Routine and Protocol for Performing the Ultrasound Examination
  - 10.1.1.3. Identification of the Main Abdominal Structures
  - 10.1.1.4. ECOFAST Technique
  - 10.1.1.5. Abdominal Cavity Pathologies
- 10.1.2. Cardiac Ultrasound
  - 10.1.2.1. Introduction to Cardiac Study Doppler Ultrasound
  - 10.1.2.2. Examination Protocol
  - 10.1.2.3. B-Mode and M-Mode
  - 10.1.2.4. Acquired Cardiac Diseases
  - 10.1.2.5. Congenital Cardiac Diseases
  - 10.1.2.6. Pericardium
- 10.1.3. Ultrasound of the Musculoskeletal System
  - 10.1.3.1. Scanning Technique
  - 10.1.3.2. Assessment of Muscle Fibers and Tendons
  - 10.1.3.3. Ultrasound Assessment of the Bone
  - 10.1.3.4. Ultrasound Assessment of Joints
  - 10.1.3.5. Ultrasound Assessment of the Neck
- 10.1.4. Thoracic Cavity Ultrasound
  - 10.1.4.1. Introduction
  - 10.1.4.2. Thoracic Wall
  - 10.1.4.3. Pulmonary Parenchymal Diseases
  - 10.1.4.4. Diaphragm Diseases
  - 10.1.4.5. Mediastinal Diseases
- 10.1.5. Fistulous Tracts and Ultrasound of Masses of Unknown Origin

10.2. Computerized Axial Tomography
- 10.2.1. Introduction
- 10.2.2. CT Equipment
- 10.2.3. Nomenclature. Hounsfield Units
- 10.2.4. Diagnosis in Neurology
  - 10.2.4.1. Head
  - 10.2.4.2. Nasal Cavity and Cranial Cavity
  - 10.2.4.3. Spinal Column Mielotac
- 10.2.5. Orthopedic Diagnosis
  - 10.2.5.1. Skeletal System
  - 10.2.5.2. Joint Diseases
  - 10.2.5.3. Developmental Disorders
- 10.2.6. Oncology
  - 10.2.6.1. Masses Assessment
  - 10.2.6.2. Pulmonary Metastases
  - 10.2.6.3. Lymphatic System Assessment
- 10.2.7. Abdominal Diagnosis
  - 10.2.7.1. Abdominal Cavity
  - 10.2.7.2. Urinary System
  - 10.2.7.3. Pancreas
  - 10.2.7.4. Vascularization
- 10.2.8. Thoracic Diagnosis
  - 10.2.8.1. Lung and Respiratory Tract
  - 10.2.8.2. Thoracic Wall
  - 10.2.8.3. Pleural Space
  - 10.2.8.4. Mediastinum, Heart and Great Vessels

10.3. Nuclear Magnetic Resonance Imaging
- 10.3.1. Introduction
- 10.3.2. Advantages Inconveniences
- 10.3.3. Nuclear Magnetic Resonance Imaging Equipment Interpretation Principles
- 10.3.4. Diagnosis in Neurology
  - 10.3.4.1. Central Nervous System
  - 10.3.4.2. Peripheral Nervous System
  - 10.3.4.3. Spinal Column
- 10.3.5. Orthopedic Diagnosis
  - 10.3.5.1. Developmental Disorders
  - 10.3.5.2. Joint Diseases
  - 10.3.5.3. Bone Infections and Neoplasms
- 10.3.6. Oncology
  - 10.3.6.1. Abdominal Masses
  - 10.3.6.2. Lymphonodes
  - 10.3.6.3. Vascularization
- 10.3.7. Abdominal Diagnosis
  - 10.3.7.1. Abdominal Cavity
  - 10.3.7.2. Main Pathologies

10.4. Diagnosis by Minimally Invasive and Interventional Techniques
- 10.4.1. Endoscopy
  - 10.4.1.1. Introduction
  - 10.4.1.2. Equipment
  - 10.4.1.3. Patient Preparation
  - 10.4.1.4. Examination Routine
  - 10.4.1.5. Identifiable Pathologies
- 10.4.2. Arthroscopy
  - 10.4.2.1. Introduction
  - 10.4.2.2. Patient Preparation
  - 10.4.2.3. Identifiable Pathologies
- 10.4.3. Laparoscopy
  - 10.4.3.1. Introduction
  - 10.4.3.2. Patient Preparation
  - 10.4.3.3. Identifiable Pathologies
- 10.4.4. Catheterization
  - 10.4.4.1.Introducción
  - 10.4.4.2. Technique and Equipment
  - 10.4.4.3. Diagnostic Uses

10.5. Radiographic Examination of Exotic Animals
- 10.5.1. Positioning and Projections
  - 10.5.1.1. Birds
  - 10.5.1.2. Small Mammals
  - 10.5.1.3. Reptiles

10.6. Radiographic Pathological Findings of the Skull and Axial Skeleton in Exotic Animals
- 10.6.1. Radiographic Pathological Findings of the Skull
  - 10.6.1.1. Birds
  - 10.6.1.2. Small Mammals
  - 10.6.1.3. Reptiles
- 10.6.2. Pathological Findings of the Axial Skeleton
  - 10.6.2.1. Birds
  - 10.6.2.2. Small Mammals
  - 10.6.2.3. Reptiles

10.7. Radiographic Pathological Findings of the Thorax in Exotic Animals
- 10.7.1. Birds
  - 10.7.1.1. Nasal Passages and Sinuses
  - 10.7.1.2. Trachea and Syrinx
  - 10.7.1.3. Lungs
  - 10.7.1.4. Air Sacs
  - 10.7.1.5. Heart and Blood Vessels
- 10.7.2. Small Mammals
  - 10.7.2.1. Pleural Cavity
  - 10.7.2.2. Trachea
  - 10.7.2.3. Esophageal
  - 10.7.2.4. Lungs
  - 10.7.2.5. Heart and Blood Vessels
- 10.7.3. Reptiles
  - 10.7.3.1. Respiratory Tract
  - 10.7.3.2. Heart

10.8. Radiographic Pathological Findings of the Abdomen in Exotic Animals
- 10.8.1. Birds
  - 10.8.1.1. Proventricle, Ventricle and Intestine
  - 10.8.1.2. Liver, Gallbladder and Spleen
  - 10.8.1.3. Urogenital Tract
- 10.8.2. Small Mammals
  - 10.8.2.1. Stomach, Appendix, Small and Large Intestines
  - 10.8.2.2. Pancreas, Liver and Spleen
  - 10.8.2.3. Urogenital Tract
- 10.8.3. Reptiles
  - 10.8.3.1. Gastrointestinal Tract and Liver
  - 10.8.3.2. Urinary Tract
  - 10.8.3.3. Genital Tract

10.9. Radiographic Pathological Findings in Fore and Hind Limbs in Exotic Animals
- 10.9.1. Forelimbs
  - 10.9.1.1. Birds
  - 10.9.1.2. Small Mammals
  - 10.9.1.3. Reptiles
- 10.9.2. Hind Limbs
  - 10.9.2.1. Birds
  - 10.9.2.2. Small Mammals
  - 10.9.2.3. Reptiles

10.10. Other Diagnostic Processes in Exotic Animals
- 10.10.1. Ultrasound
  - 10.10.1.1. Birds
  - 10.10.1.2. Small Mammals
  - 10.10.1.3. Reptiles
- 10.10.2. Computed Tomography (CT)
  - 10.10.2.1. Birds
  - 10.10.2.2. Small Animals
  - 10.10.2.3. Reptiles
- 10.10.3. Magnetic Resonance Imaging (MRI)

07

Clinical Internship

After passing the online teaching period, the program includes a practical training period in a veterinary clinical center of reference. The student will have at their disposal the support of a tutor who will accompany them during the whole process, both in the preparation and in the development of the clinical practice.

This program will allow you to learn while seeing real patients in a specialized clinic, equipped with the best radiodiagnostic technology"

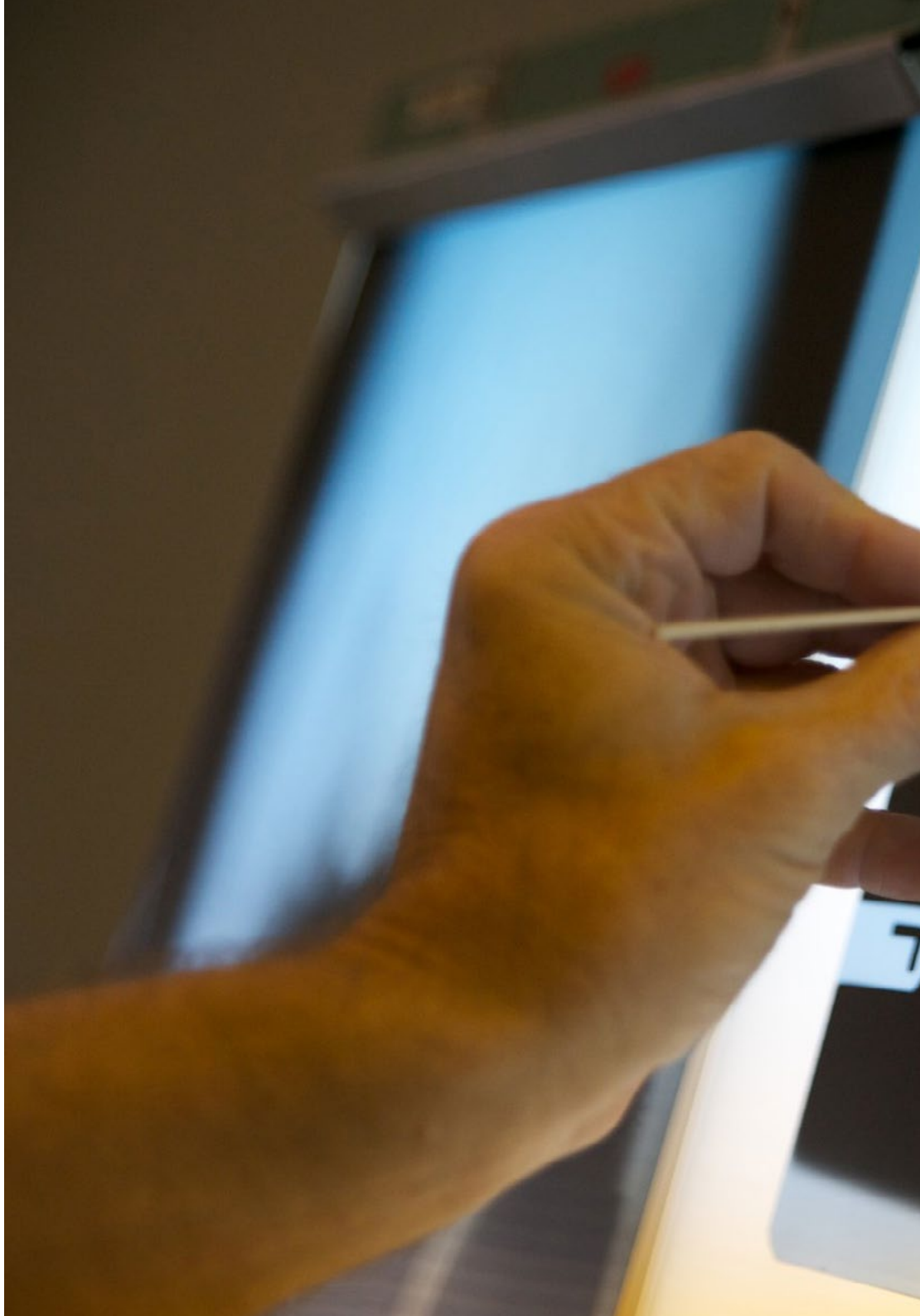
The Internship Program of this course in Veterinary Radiology in Small Animals consists of a practical stay in a reference veterinary center, lasting 3 weeks, from Monday to Friday, with 8 consecutive hours of practical learning. This stay will allow you to see real cases alongside a professional team of reference in the veterinary area, applying the most innovative cutting-edge procedures.

In this training proposal, completely practical in nature, the activities are aimed at developing and perfecting the skills necessary for the provision of veterinary care in areas and conditions that require a high-level of qualification, and are oriented towards specific training for the exercise of the activity, in a safe environment and high professional performance.

Throughout the program, the student will be accompanied by a highly regarded adjunct tutor. This specialist will be responsible for supervising their educational and practical progress within a rigorous and demanding veterinary environment that will provide students with direct access to real cases. In this way, they will learn in a holistic way how to obtain quality diagnoses from innovative radiological equipment.

The student will actively participate by performing activities and procedures related to each area of competence (learning to learn and learning to do), with the support and guidance of the teachers and other classmates to facilitate teamwork and multidisciplinary integration as transversal skills for the practice of veterinary radiology (learning to be and learning to relate to others).

The procedures described below will be the basis of the practical part of the training, and their implementation will be subject to the center's own availability and workload, the proposed activities being the following:



Module	Practical Activity
Implementation of the Ionizing Radiation for Diagnostic Purposes	Interpret diagnostic findings from veterinary radiology
	Process the radiological film to obtain better quality images
Factors limiting radiological diagnosis	Identify alterations in radiological image perception: pareidolia, magnification, and distortion
	Address limitations in radiological diagnosis based on the time factor: moving regions, still regions, blurring, anesthesia in radiology, radiological positioners, among others
	Master the limitations in radiological diagnosis based on the voltage factor: density of the radiographed region, contrast, sharpness, anatomical regions, among others
Trends in Radiation Protection in Small Animal Veterinary Care	Use shielding, collimator, and leaded aprons to control safety in the veterinary radiological facility
	Safe handling of X-ray equipment
	Implement Specific Radiological Protection in Radiodiagnostic
Radiodiagnostics in different parts of the animal body	Evaluate the Physiological Radiological Imaging of the Cardiovascular System
	Diagnose radiologically acquired pulmonary diseases: structural pathologies, infectious pathologies, inflammatory pathologies, and neoplasms
	Address neurological diseases with radiology methods such as metabolic, nutritional, and congenital diseases
	Use radiological imaging to diagnose animal arthritis and polyarthritis
Other current diagnostic imaging methods and their applications for exotic animals	Apply ultrasound diagnosis to the abdominal cavity, cardiac, thoracic, fistulous tracts, and for masses of unknown origin
	Perform radiographic examination of exotic animals, in particular of their skull and axial skeleton
	Use computed tomography and magnetic resonance imaging to reinforce radiological diagnostic findings

Civil Liability Insurance

This institution's main concern is to guarantee the safety of the trainees and other collaborating agents involved in the internship process at the company. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, this entity commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the course of the internship at the center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the practical training period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.

General Conditions of the Internship Program

The general terms and conditions of the internship agreement for the program are as follows:

1. TUTOR: During the Hybrid Professional Master's Degree, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned with an academic tutor whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

2. DURATION: The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

3. ABSENCE: If the students does not show up on the start date of the Hybrid Professional Master's Degree, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

4. CERTIFICATION: Professionals who pass the Hybrid Professional Master's Degree will receive a certificate accrediting their stay at the center.

5. EMPLOYMENT RELATIONSHIP: the Hybrid Professional Master's Degree shall not constitute an employment relationship of any kind.

6. PRIOR EDUCATION: Some centers may require a certificate of prior education for the Hybrid Professional Master's Degree. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

7. DOES NOT INCLUDE: The Hybrid Professional Master's Degree will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.

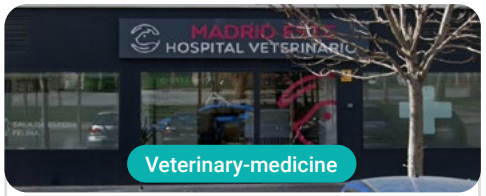
08

Where Can I Do the Clinical Internship?

In its maxim of offering a unique experience where the student can put into practice the theoretical knowledge acquired, TECH gives the student the opportunity to choose among several renowned veterinary centers to undertake this internship program. In this way, it adapts to the needs and preferences of the student, in addition to contributing to the specialization in veterinary radiology in different areas of the national territory.

Take your career to the next level by specializing in Veterinary Radiology in Small Animals at a prestigious veterinary center with this Internship Program from TECH"

The student will be able to do this program at the following centers:



Veterinary-medicine

Madrid Este Hospital Veterinario

Country: Spain
City: Madrid

Address: Paseo de la Democracia, 10

Veterinary center offering 24-hour care with surgery, ICU, hospitalization, and diagnostic imaging services

Related internship programs:
- Veterinary Anesthesiology
- Veterinary Surgery in Small Animals

Veterinary-medicine

Hospital Artemisa Cañaveral

Country: Spain
City: Madrid

Address: Francisco Grande Covian, local 1, 28052 Madrid

Veterinary hospital specialized in general care and 24-hour emergency assistance

Related internship programs:
-Veterinary Anesthesiology
- Veterinary Surgery in Small Animals

Veterinary-medicine

Supervet

Country: Spain
City: Madrid

Address: Calle de Fermín Caballero, 56, 28034 posterior, Madrid

Center specialized in alternative therapies such as homeopathy, acupuncture, physiotherapy, laser, or magnetotherapy

Related internship programs:
- Infectious Diseases in Small Animals
- Veterinary Radiology in Small Animals

Veterinary-medicine

Hospital Veterinario Conde Orgaz

Country: Spain
City: Madrid

Address: Av. de Machupichu, 59, 28043 Madrid

Veterinary Hospital with 24 hour attention and specialized in cutting-edge techniques in animal care

Related internship programs:
- Veterinary Radiology in Small Animals
- Veterinary Emergencies in Small Animals

Veterinary-medicine

Hospital Veterinario Mon Can MiVet

Country: Spain
City: Madrid

Address: Av. de Montecarmelo, 55, 28049 Madrid

Veterinary hospital specializing in the comprehensive care of sick animals and clinical problems that are difficult to diagnose

Related internship programs:
- Veterinary Traumatology and Orthopedic Surgery
- Veterinary Emergencies in Small Animals

Pharmacodynamics.

Hospital Veterinario Alberto Alcocer

Country: Spain
City: Madrid

Address: Av. de Alberto Alcocer, 45, 28016 Madrid

General and 24-hour veterinary hospital located in the center of Madrid

Related internship programs:
- Management and Administration of Veterinary Centers
- Veterinary Radiology in Small Animals

Veterinary-medicine

Hospital Veterinario Avenida MiVet

Country: Spain
City: Vizcaya

Address: Sabino Arana Etorbidea, 18 48013 Bilbao, Bizkaia

General veterinary clinic with 24-hour service

Related internship programs:
- Veterinary Anesthesiology
- Veterinary Emergencies in Small Animals

Veterinary-medicine

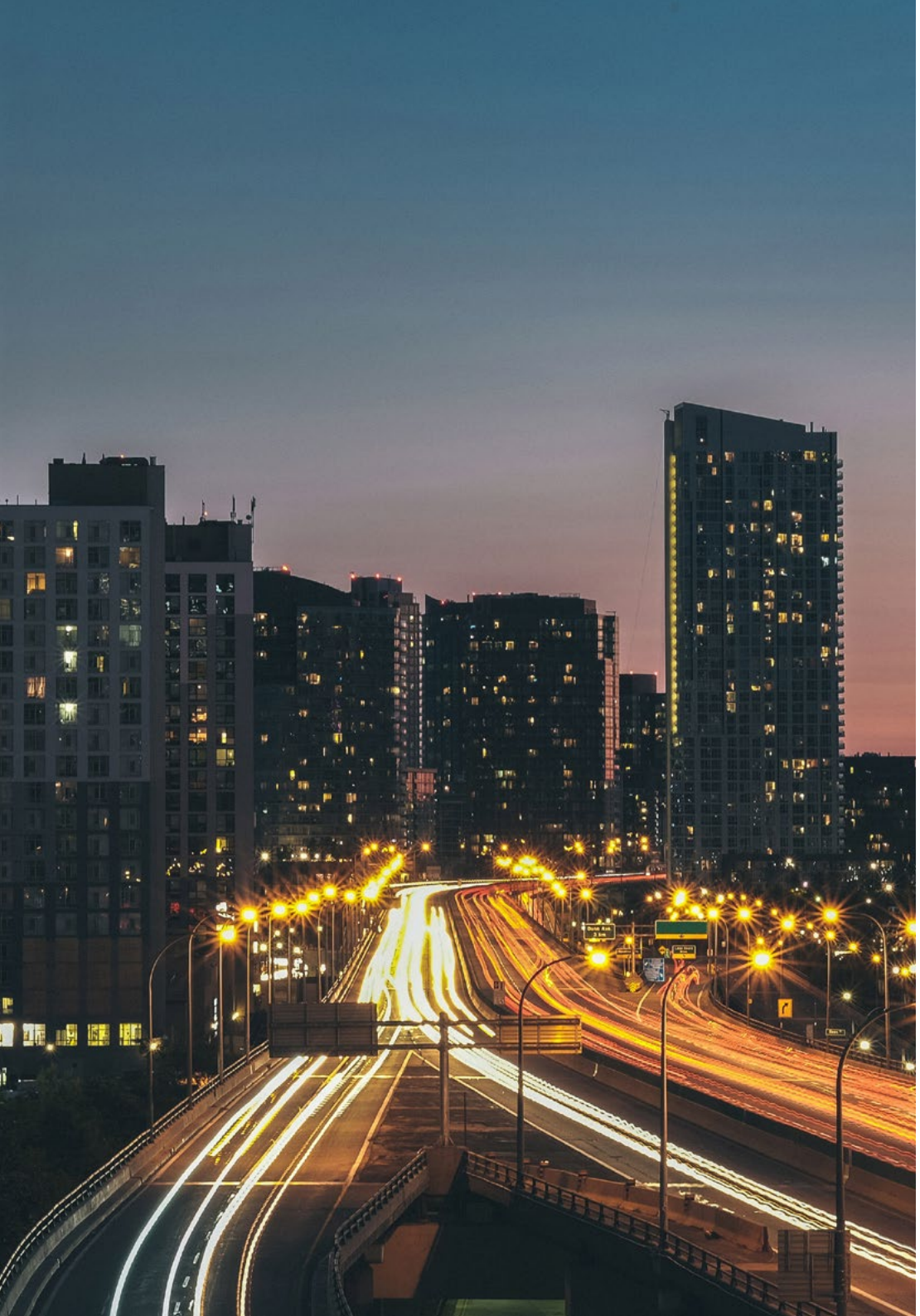
Centro Veterinario Animal-Vetx El Saladillo

Country: Spain
City: Huelva

Address: Cam. del Saladillo, 3, 21007 Huelva

AnimalVetx El Saladillo Veterinary Center in Huelva is a complete and innovative veterinary center since 2014

Related internship programs:
- Veterinary Surgery in Small Animals
- Small Animal Ultrasonography



Veterinary-medicine

Happy Can Camp

Country: Mexico
City: Puebla

Address: Km 4.5 lateral Recya a Cholula Col. Bella Horizonte Puebla C.P. 72170

Veterinary clinic and hotel

Related internship programs:
Veterinary Radiology in Small Animals
- Veterinary Ophthalmology in Small Animals

Veterinary-medicine

Pets, life & Care

Country: Mexico
City: Nuevo León

Address: Av. Cabezada 10701-L12 Barrio acero C.P 64102

Comprehensive Care Veterinary Hospital

Related internship programs:
- Small Animal Ultrasonography
- Veterinary Emergencies in Small Animals

Veterinary-medicine

Hospital Veterinario Reynoso

Country: Mexico
City: Mexico

Address: Guillermo roja No.201 Col. Federal Toluca Edomex

High specialty veterinary hospital

Related internship programs:
- Anesthesiology and Veterinary
- Management and Administration of Veterinary Centers

Veterinary-medicine

Centro Veterinario CIMA

Country: Mexico
City: Mexico City

Address: Av. Vía Adolfo López Mateos 70, Jardines de San Mateo, 53240 Naucalpan de Juárez,CDMX, Méx.

Clinical pet care center

Related internship programs:
- Small Animal Internal Medicine
- Veterinary Oncology in Small Animals

Veterinary-medicine

Clínica Veterinaria Panda

Country	City
Argentina	Autonomous City of Buenos Aires

Address: Ruiz Huidobro 4771 Saavedra, Ciudad de Buenos Aires

Panda Veterinary Clinic with 25 years of experience and five locations in the City of Buenos Aires.

Related internship programs:
- Small Animal Internal Medicine
- Veterinary Emergencies in Small Animals

Boost your career path with holistic teaching, allowing you to advance both theoretically and practically"

09

Methodology

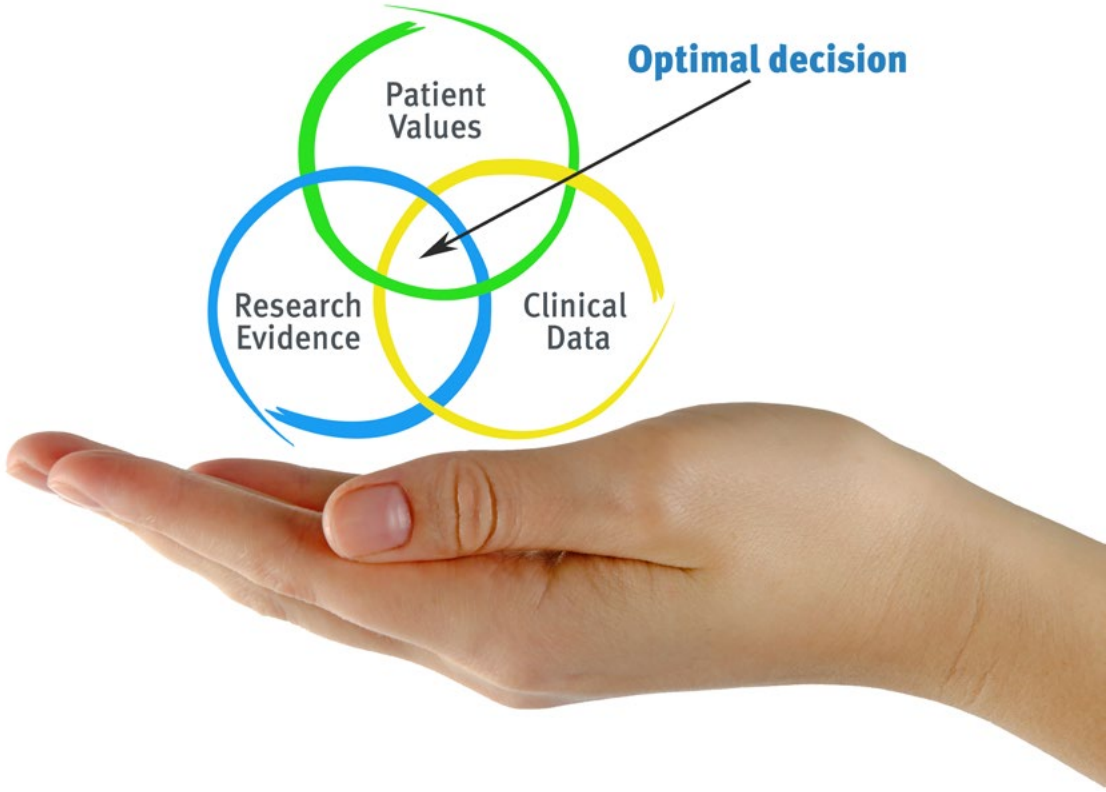
This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

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

At TECH we use the Case Method

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

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



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

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

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

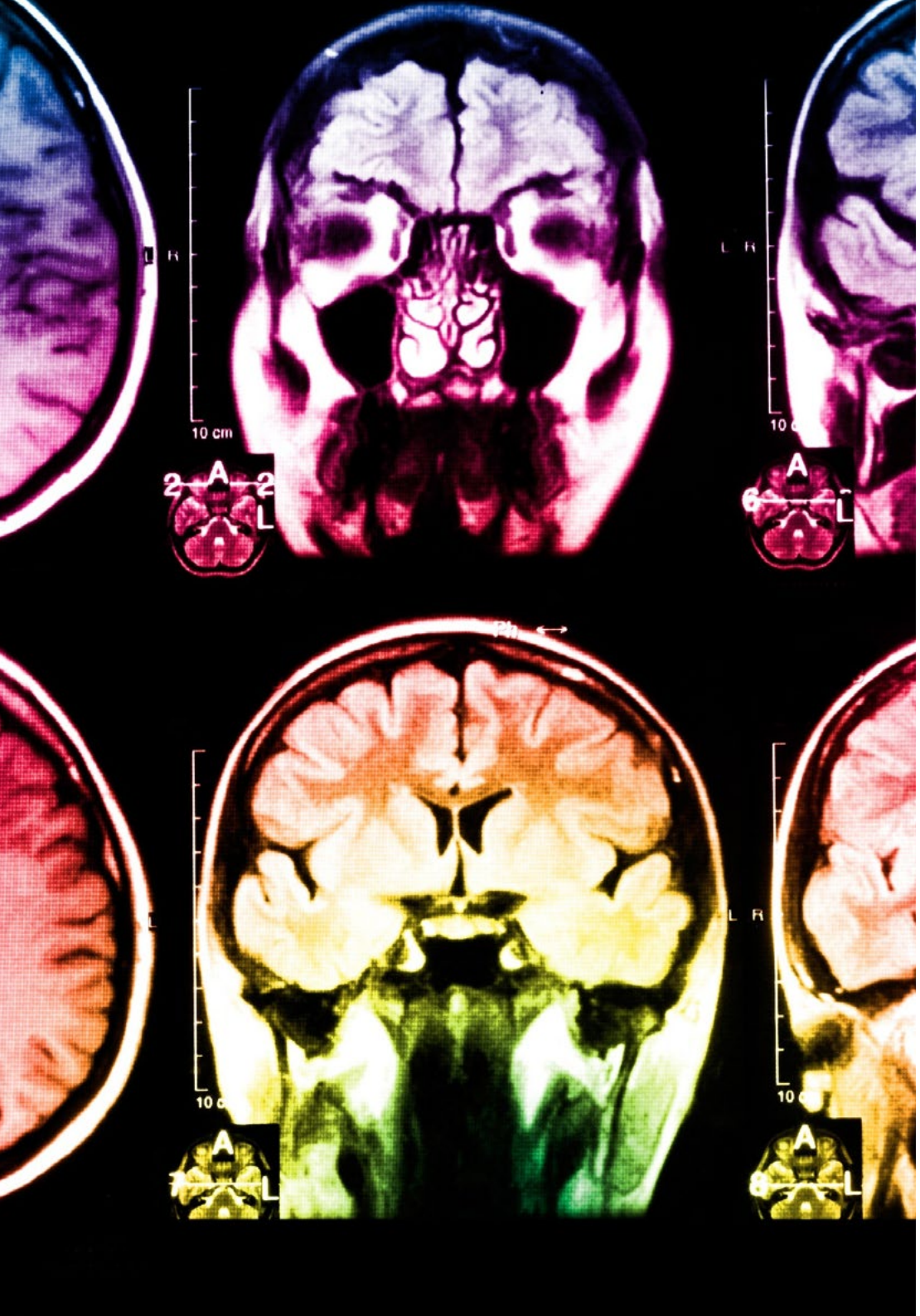
1. Veterinarians who follow this method not only manage to assimilate concepts, but also develop their mental capacity through exercises to evaluate real situations and knowledge application
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real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

Relearning Methodology

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

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

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



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

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

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

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and 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.

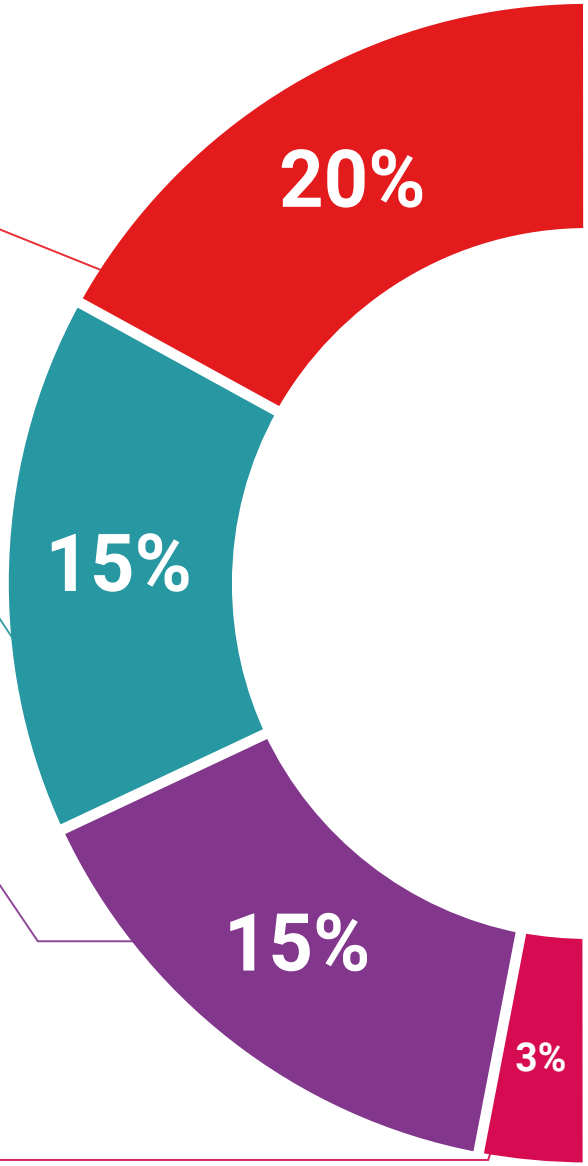
Interactive Summaries

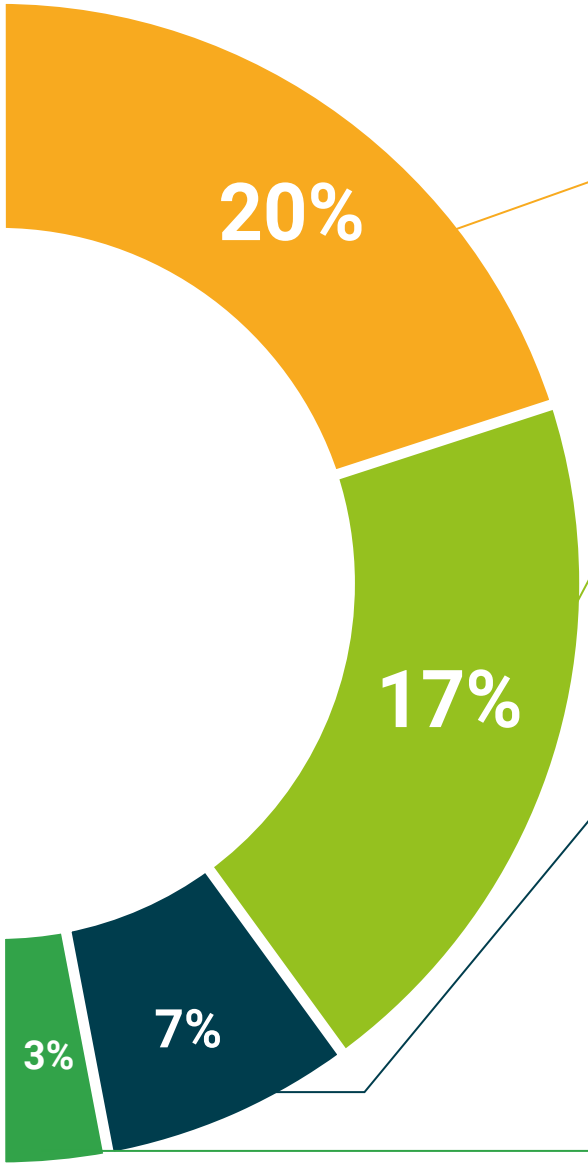
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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.

10

Certificate

This Hybrid Professional Master's Degree in Veterinary Radiology in Small Animals guarantees students, in addition to the most rigorous and up-to-date education, access to a Hybrid Professional Master's Degree diploma issued by TECH Technological University.

Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"

This **Hybrid Professional Master's Degree in Veterinary Radiology in Small Animals** contains the most complete and up-to-date program on the professional and educational field.

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

In addition to the diploma, students will be able to obtain an academic transcript, as well as a certificate outlining the contents of the program. In order to do so, students should contact their academic advisor, who will provide them with all the necessary information.

Title: **Hybrid Professional Master's Degree in Veterinary Radiology in Small Animals**

Modality: **Hybrid (Online + Clinical Internship)**

Duration: **12 months**

Certificate: **TECH Technological University**

Teaching Hours: **1,620 h.**

tech technological university

Awards the following

DIPLOMA

to

Mr./Ms. _____, with identification number _____.

For having successfully passed and accredited the following program

HYBRID PROFESSIONAL MASTER'S DEGREE

in

Veterinary Radiology in Small Animals

This is a qualification awarded by this University, with a duration of 1,620 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

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

Hybrid Professional Master's Degree in Veterinary Radiology in Small Animals

Subject type	Hours
Compulsory (CO)	1,500
Optional (OP)	0
External Work Placement (WP)	120
Master's Degree Thesis (MDT)	0
	Total 1,620

General Structure of the Syllabus

Year	Subject	Hours	Type
1	Ionizing Radiation for Diagnostic Purposes	150	CO
1	Radioprotection	150	CO
1	Radiodiagnosis of the Cardiovascular System	150	CO
1	Radiodiagnostics of the Respiratory System and Other Intrathoracic Structures	150	CO
1	Radiodiagnosis of the Digestive System	150	CO
1	Radiodiagnosis of the Rest of Abdominal Structures	150	CO
1	Radiological Diagnosis in Neurology	150	CO
1	Orthopedic Radiological Diagnosis I	150	CO
1	Orthopedic Radiological Diagnosis II	150	CO
1	Other Diagnostic Imaging Methods. Diagnosis in Other Species. Exotic Animals	150	CO

Tere Guevara Navarro
Dean

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*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.

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Hybrid Professional Master's Degree

Veterinary Radiology in Small Animals

Modality: **Hybrid (Online + Clinical Internship)**
Duration: **12 months**
Certificate: **TECH Technological University**
Teaching Hours: **1,620 h.**

Hybrid Professional Master's Degree

Veterinary Radiology in Small Animals

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