

# Professional Master's Degree Clinical Ultrasound in Primary Care





## Professional Master's Degree Clinical Ultrasound in Primary Care

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 8h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/medicine/professional-master-degree/master-clinical-ultrasound-primary-care](http://www.techtute.com/us/medicine/professional-master-degree/master-clinical-ultrasound-primary-care)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Skills

---

*p. 12*

04

Course Management

---

*p. 16*

05

Structure and Content

---

*p. 22*

06

Methodology

---

*p. 30*

07

Certificate

---

*p. 38*

# 01

# Introduction

In the last 50 years, ultrasound has been extremely relevant to advances in medical care, becoming an indispensable tool for health professionals when physically examining patients. This discipline has evolved in recent decades, from being restricted to radiodiagnostic services, to being included in all healthcare environments.

In this context, the Professional Master's Degree in Clinical Ultrasound in Primary Care arises from the need for physicians to get up-to-date knowledge in this discipline, which is used in numerous clinical situations in routine practice. It is, therefore, essential that physicians integrate the latest techniques into their daily practice.



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*With the Professional Master's Degree in Clinical Ultrasound in Primary Care, you will learn to master advanced ultrasound procedures and improve your resolution capacity"*

Clinical Ultrasonography or "point-of-care ultrasonography" (POCUS) is the technique of examining the body using ultrasound that is used for medical practice, related to the direct observation of the patient and their treatment. It enhances the ability to diagnose and treat patients. As such, it has become a popular and valuable tool for guiding diagnostic and therapeutic interventions.

Technological advances have made it possible to reduce the size of the equipment, making it cheaper and more portable. In addition, they have helped to increase the potential of Clinical Ultrasound, achieving a notable increase in its applications.

Primary care is undoubtedly one of the areas where clinical ultrasound is most widely used. The family physician can benefit from Clinical Ultrasound to favorably influence each of the six fundamental domains of the current concept of quality of care: patient safety, effectiveness, efficiency, equity, timeliness, and humanization.

- ♦ Patient safety, by reducing waiting times for diagnosis, diagnostic errors, time intervals between diagnosis and treatment, and errors in therapeutic procedures
- ♦ Effectiveness and efficiency, by improving the success rate at the first attempt in the procedures, with a cost/benefit ratio that very few other healthcare technologies are able to surpass
- ♦ Equity, because it can be applied uniformly in a short period of time to all patients who need it
- ♦ Timeliness, for its ability to provide the right answers "here and now" to the questions required to improve patient care
- ♦ Humanization, by promoting the doctor-patient relationship with the direct action that Clinical Ultrasound implies, without having to travel to remote and unknown places for the patient or without the intervention of other specialists who are not usually involved in the patient's care

This **Professional Master's Degree in Clinical Ultrasound in Primary Care** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ More than 75 clinical cases presented by experts in clinical ultrasound
- ♦ The graphic, schematic, and practical contents with which they are created provide scientific and practical information on the disciplines that are essential for professional
- ♦ New diagnostic-therapeutic developments on evaluation, diagnosis, and intervention in problems or disorders that can be addressed with ultrasound
- ♦ Contains practical exercises where the self-evaluation process can be carried out to improve learning
- ♦ An algorithm-based interactive learning system for decision-making in the clinical situations presented throughout the course
- ♦ With special emphasis on evidence-based medicine and research methodologies in ultrasound processes
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*You will learn the latest developments in Clinical Ultrasound from distinguished experts in the field"*

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*This Professional Master's Degree may be the best investment you can make when choosing a refresher program for two reasons: in addition to updating your knowledge in Clinical Ultrasound in Primary Care, you will obtain a Professional Master's Degree from TECH Technological University”*

Its teaching staff is made up of prestigious and renowned professionals, with extensive experience in healthcare, teaching, and research in various countries, contributing their extensive professional and teaching experience to this Professional Master's Degree.

The methodological design of this Professional Master's Degree, developed by a multidisciplinary team of elearning experts, integrates the latest advances in educational technology in order to create numerous multimedia tools that allow the professional to solve real-life situations in their daily practice. These will enable you to advance by both acquiring knowledge and developing new skills in your future professional work.

The contents generated for this Professional Master's Degree, as well as the videos, self-exams, clinical cases, and modular exams, have been thoroughly reviewed, updated, and integrated by the professors and the team of experts that make up the working group, in order to facilitate, in a gradual and educational manner, a learning process that allows the objectives of the teaching program to be achieved.

*Increase your visibility, excellence, and professional development by updating your knowledge through this master's degree.*

*Don't miss the opportunity and get up to date on the advances ultrasound diagnostics to incorporate them into your daily medical practice.*



# 02

# Objectives

The main objective of the Professional Master's Degree is the acquisition of the most updated and innovative scientific knowledge in the field of diagnostic ultrasound, which will allow you to develop the skills that will make your daily clinical practice conform to the standards of the best available scientific evidence, with a critical, innovative, multidisciplinary, and integrative sense.







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*At the end of this Professional Master's Degree you will have the necessary scientific skills to perform the tasks of a Clinical Ultrasound specialist"*

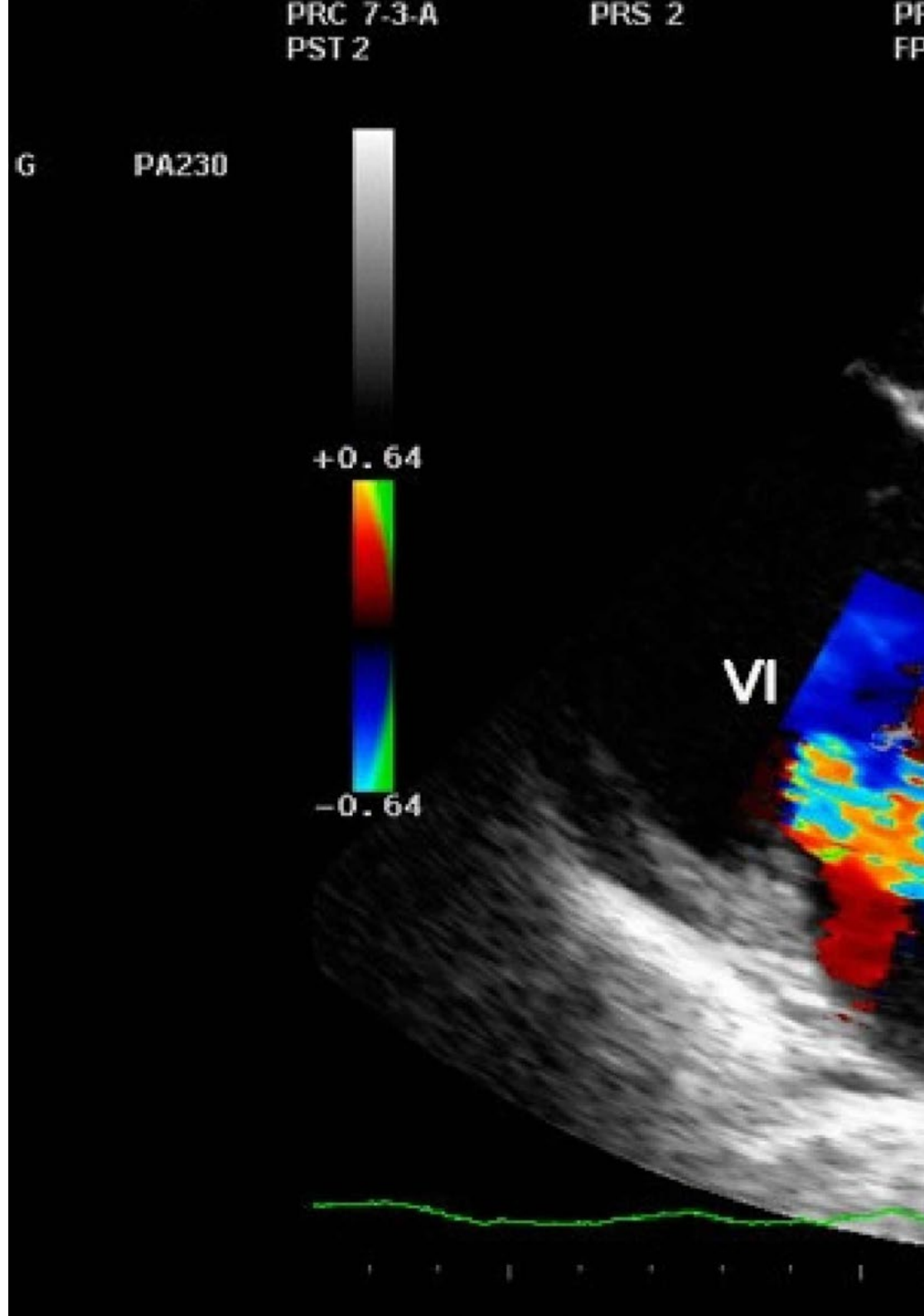


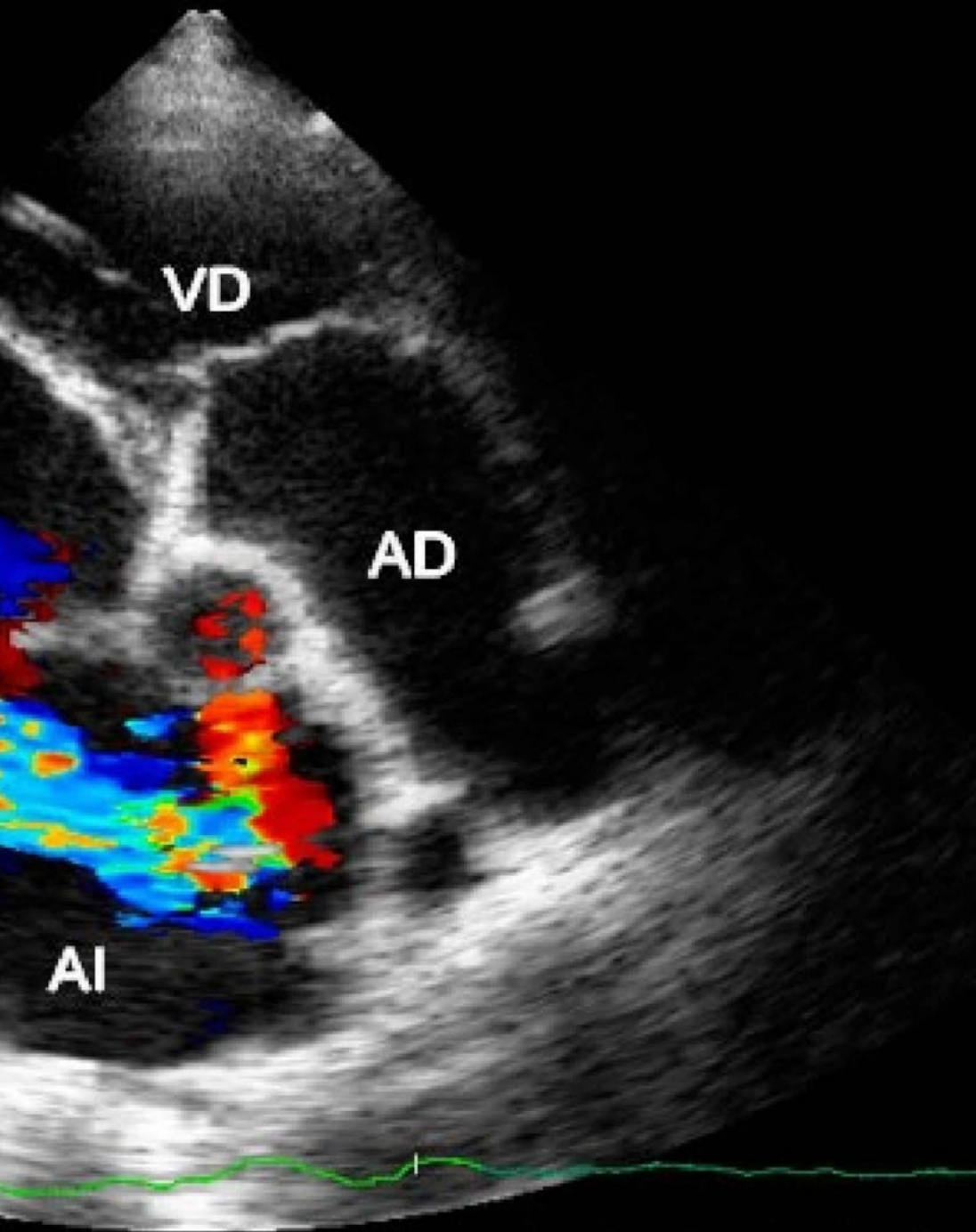
## General Objectives

- Acquire the necessary knowledge in the use of ultrasound, in order to manage the routine situations of their practical use in healthcare
- Apply the skills acquired while performing the duties of an ultrasound specialist
- Use the latest clinical developments in the day-to-day work of a medical professional



*Make the most of the opportunity and take the step to get up to date on the latest developments in Clinical Ultrasound in Primary Care"*





## Specific Objectives

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- Optimize ultrasound imaging through in-depth knowledge of the physical principles of ultrasound and the controls and operation of ultrasound scanners
- Master the basic and advanced procedures of Ultrasound, both at diagnostic and therapeutic level
- Excel in spatial orientation or "econavigation"
- Practice all ultrasound modes in the safest way for the patient
- Know the indications and limitations of Clinical Ultrasound, and its application in the most common clinical situations
- Predict the results of invasive diagnostic procedures non-invasively by using ultrasound, with the possibility of replacing them
- Guiding invasive therapeutic procedures to minimize their risks
- Understand how to extend the concept of Clinical Ultrasound to healthcare, research, and academic environments

# 03 Skills

Once all the contents have been studied and the objectives of the Professional Master's Degree in Clinical Ultrasound in Primary Care have been achieved, the health professional will possess superior skill and performance in this area. Integrating the use of ultrasound in primary care practice will allow you to evolve in your daily medical practice.



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*With this program you will be able to master the new diagnostic and treatment procedures in Clinical Ultrasound in Primary Care”*



## General Skills

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- ♦ Apply the contents learned in resolving the main health problems in the field of Clinical Ultrasound
- ♦ Develop learning to learn as one of the most important skills for any professional nowadays, who is obliged to constant professional training and improvement due to the speed at which scientific knowledge is being produced
- ♦ Increase diagnostic abilities through the use of ultrasound for their patients' healthcare
- ♦ Develop skills for self-improvement, in addition to being able to provide training and professional improvement activities due to the high level of scientific and professional preparation acquired with this program





## Specific Skills

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- ♦ Use ultrasound imaging with sufficient ability to integrate common diagnostic processes in primary care
- ♦ Operate ultrasound scanners and their controls with ease
- ♦ Understand basic and advanced ultrasound procedures, both diagnostic and therapeutic
- ♦ Master all ultrasound procedures in the safest way for the patient
- ♦ Determine the indications and limitations of clinical ultrasound and its application in the most common clinical situations
- ♦ Replace the results of invasive diagnostic procedures non-invasively by using ultrasound
- ♦ Guiding invasive therapeutic procedures to minimize their risks
- ♦ Extend the concept of Clinical Ultrasound to healthcare, research, and academic environments

# 04

# Course Management

The program's teaching staff includes leading specialists in clinical ultrasound and other related areas, who bring their years of work experience to this training. Additionally, other recognized specialists participate in its design and preparation, which means that the program is developed in an interdisciplinary manner.







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*Learn from leading professionals, who will contribute all their experience to a quality Professional Master's Degree"*

## Management



### Dr. Fumadó Queral, Josep

- ◆ Family physician at Els Muntells Primary Care Center (Amposta, Tarragona)
- ◆ Graduate in Clinical Ultrasound and Training of Trainers Technological University University of Montpellier-Nîmes (France)
- ◆ Lecturer at the Associació Mediterrània of General Medicine
- ◆ Teacher at the Spanish School of Ultrasound of the Spanish Society of General and Family Physicians (SEMG)
- ◆ Honorary Member of the Canary Society of Ultrasound (SOCANECO) and Professor of its Annual Symposium
- ◆ Lecturer on the Master's Degree in Clinical Ultrasound for Emergencies and Critical Care at the CEU Cardenal Herrera University



### Dr. Pérez Morales, Luis Miguel

- ◆ Family physician at the Primary Care Center of Arucas (Gran Canaria, Canary Islands)
- ◆ Diploma in Ultrasound in Primary Care. Univ. Rovira i Virgili. Catalan Institute of Health
- ◆ Expert in Thoracic Ultrasound. University of Barcelona
- ◆ Expert in Abdominal and Musculoskeletal Clinical Ultrasound for Emergency and Critical Care CEU Cardenal Herrera , University
- ◆ President and Professor of the Canary Society of Ultrasound (SOCANECO) and Director of its Annual Symposium
- ◆ Lecturer on the Master's Degree in Clinical Ultrasound for Emergencies and Critical Care at the CEU Cardenal Herrera University

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- ♦ Specialist in Intensive Care Medicine
- ♦ Department of Intensive Care Medicine and Major Burns, Getafe University Hospital. Getafe, Madrid
- ♦ Head of the Master's Degree in Clinical Ultrasound in Emergency and Critical Care, CEU Cardenal Herrera University
- ♦ Head of the Master's Degree in Clinical Imaging in Emergency and Critical Care, CEU Cardenal Herrera University
- ♦ Teacher on the Postgraduate Diploma in Thoracic Ultrasound, University of Barcelona

**Dr. Arancibia Zemelman, Germán**

- ♦ Radiology Department Specialis at Clínica Meds. Santiago de Chile (Chile)

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## Professors

### Dr. Fabián Feroso, Antonio

- ♦ Global Clinical Insights Leader Point of Care. General Electric Healthcare. Madrid

### Dr. Gálvez Gómez, Francisco Javier

- ♦ Ultrasound Portfolio Solutions Manager España. SIEMENS Healthcare. Madrid

### Dr. García García, Nicasio

- ♦ Family Physician (Schamann Health Center)

### Dr. Herrera Carcedo, Carmelo

- ♦ Family Physician and Head of the Ultrasound Unit at the Briviesca Health Center (Burgos)
- ♦ Tutor at the Family and Community Medicine Teaching Unit in Burgos
- ♦ Teacher at the Spanish School of Ultrasound of the Spanish Society of General and Family Physicians (SEMG)
- ♦ Member of the Spanish Society of Ultrasound (SEECO) and the Spanish Association of Prenatal Diagnosis (AEDP)

### Dr. Herrero Hernández, Raquel

- ♦ Specialist in the Intensive Care and Major Burns Department, Getafe University Hospital. Madrid

### Dr. Igeño Cano, José Carlos

- ♦ Head of the Emergency and Intensive Care Department, San Juan de Dios Hospital. Córdoba

### Dr. Jiménez Díaz, Fernando

- ♦ Specialist in Sports Medicine
- ♦ Professor in the Faculty of Sports Sciences at the University of Castilla La Mancha. Toledo
- ♦ Director of the International Chair of Musculoskeletal Ultrasound of the Catholic University of Murcia
- ♦ Teacher on the Master's Degree in Clinical Imaging in Emergency and Critical Care, CEU Cardenal Herrera University

### Dr. León Ledesma, Raquel

- ♦ Specialist in General and Digestive System Surgery and Obstetrics and Gynecology. Getafe University Hospital. Madrid

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- ◆ Radiodiagnosis Specialist
- ◆ Director of the Integrated Diagnostic Imaging Management Area and Intrahospital Coordinator of the Breast Cancer Early Detection Program, Poniente Hospital. El Ejido, Almería
- ◆ Teacher on the Postgraduate Diploma in Clinical Ultrasound for Family Physicians at the University of Barcelona

**Dr. Wagüemert Pérez, Aurelio**

- ◆ Specialist in Pulmonology. San Juan de Dios Hospital. Santa Cruz de Tenerife (Canary Islands)

05

# Structure and Content

The structure of the contents has been designed by a team of professionals from leading hospitals, who have taken into account the need to update the content that will be taught, as well as the use of quality teaching through new educational technologies.





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*This program will help you to prevent, detect, and intervene in diseases that can be diagnosed using ultrasound”*

## Module 1. Ultrasound Imaging

- 1.1. Physical Principles
  - 1.1.1. Sounds and Ultrasound
  - 1.1.2. The Nature of Sound
  - 1.1.3. Interaction of Sound with Matter
  - 1.1.4. The Concept of Ultrasound
  - 1.1.5. Ultrasound Safety
- 1.2. Ultrasound Sequence
  - 1.2.1. Ultrasound Emission
  - 1.2.2. Tissue Interaction
  - 1.2.3. Echo Formation
  - 1.2.4. Ultrasound Reception
  - 1.2.5. Ultrasound Image Generation
- 1.3. Ultrasound Modes
  - 1.3.1. Modes A and M
  - 1.3.2. Mode B
  - 1.3.3. Doppler Modes (color, angio, and spectral)
  - 1.3.4. Combined Modes
- 1.4. Ultrasound Scanners
  - 1.4.1. Common Components
  - 1.4.2. Classification
  - 1.4.3. Transducers
- 1.5. Ultrasound Maps and Echolocation
  - 1.5.1. Spatial Layout
  - 1.5.2. Ultrasound Maps
  - 1.5.3. Transducer Movements
  - 1.5.4. Practical Advice
- 1.6. Trends in Ultrasound
  - 1.6.1. 3D/4D Ultrasound
  - 1.6.2. Sonoelastography
  - 1.6.3. Echopotentiality
  - 1.6.4. Other Modes and Techniques

## Module 2. Clinical Ultrasound of the Head and Neck

- 2.1. Anatomy Recap
  - 2.1.1. Cranium and Face
  - 2.1.2. Tubular Structures
  - 2.1.3. Glandular Structures
  - 2.1.4. Vascular Structures
- 2.2. Ocular Ultrasound
  - 2.2.1. Ultrasound Anatomy of the Eye
  - 2.2.2. Ocular Ultrasound Technique
  - 2.2.3. Indications and Contraindications of Ocular Ultrasonography
  - 2.2.4. Ultrasound Report
- 2.3. Ultrasound of Salivary Glands
  - 2.3.1. Regional Sonoanatomy
  - 2.3.2. Technical Aspects
  - 2.3.3. Most Common Tumor and Non-Tumor Pathologies
- 2.4. Thyroid Ultrasound
  - 2.4.1. Ultrasound Technique
  - 2.4.2. Indications
  - 2.4.3. Normal and Pathological Thyroid
  - 2.4.4. Diffuse Goiter
- 2.5. Ultrasound Examination of Adenopathies
  - 2.5.1. Reactive Lymph Nodes
  - 2.5.2. Non-Specific Inflammatory Diseases
  - 2.5.3. Specific Lymphadenitis (Tuberculosis)
  - 2.5.4. Primary Lymph Node Diseases (Sarcoidosis, Hodgkin's Lymphoma, Non-Hodgkin's Lymphoma)
  - 2.5.5. Lymph Node Metastases
- 2.6. Ultrasound of the Supra-Aortic Trunks
  - 2.6.1. Sonoanatomy
  - 2.6.2. Scanning Protocol
  - 2.6.3. Extracranial Carotid Pathology
  - 2.6.4. Vertebral Pathology and Subclavian Artery Steal Syndrome



**Module 3. Thoracic Ultrasound**

- 3.1. Thoracic Ultrasound Fundamentals
  - 3.1.1. Anatomy Recap
  - 3.1.2. Echoes and Artifacts in the Thorax
  - 3.1.3. Technical Requirements
  - 3.1.4. Exploration Systematics
- 3.2. Ultrasound of the Chest Wall, Mediastinum, and Diaphragm
  - 3.2.1. Soft Tissues
  - 3.2.2. Thoracic Cage
  - 3.2.3. Mediastinum
  - 3.2.4. Diaphragm
- 3.3. Pleural Ultrasound
  - 3.3.1. Normal Pleura
  - 3.3.2. Pleural Effusion
  - 3.3.3. Pneumothorax
  - 3.3.4. Solid Pleural Pathology
- 3.4. Pulmonary Ultrasound
  - 3.4.1. Pneumonia and Atelectasis
  - 3.4.2. Pulmonary Neoplasms
  - 3.4.3. Diffuse Lung Disease
  - 3.4.4. Pulmonary Infarction
- 3.5. Cardiac Ultrasound and Basic Hemodynamics
  - 3.5.1. Normal Cardiac Sonoanatomy and Hemodynamics
  - 3.5.2. Examination Technique
  - 3.5.3. Structural Alterations
  - 3.5.4. Hemodynamic Alterations
- 3.6. Trends in Thoracic Ultrasound
  - 3.6.1. Pulmonary Sonoelastography
  - 3.6.2. 3D/4D Thoracic Ultrasound
  - 3.6.3. Other Modes and Techniques

## Module 4. Clinical Ultrasound of the Digestive Tract and Major Vessels

- 4.1. Hepatic Ultrasound
  - 4.1.1. Anatomy
  - 4.1.2. Liquid Focal Lesions
  - 4.1.3. Solid Focal Lesions
  - 4.1.4. Diffuse Liver Disease
  - 4.1.5. Chronic Liver Disease
- 4.2. Ultrasound of Gallbladder and Bile Ducts
  - 4.2.1. Anatomy
  - 4.2.2. Cholelithiasis and Biliary Sludge
  - 4.2.3. Vesicular Polyps
  - 4.2.4. Cholecystitis
  - 4.2.5. Bile Duct Dilatation
  - 4.2.6. Bile Duct Malformations
- 4.3. Pancreatic Ultrasound
  - 4.3.1. Anatomy
  - 4.3.2. Acute Pancreatitis
  - 4.3.3. Chronic Pancreatitis
- 4.4. Ultrasound of the Major Vessels
  - 4.4.1. Abdominal Aortic Disease
  - 4.4.2. Vena Cava Pathology
  - 4.4.3. Pathology of Celiac Trunk, Hepatic Artery, and Splenic Artery
  - 4.4.4. Aorto-Mesenteric Clamp Pathology
- 4.5. Ultrasound of the Spleen and Retroperitoneum
  - 4.5.1. Spleen Anatomy
  - 4.5.2. Splenic Focal Lesions
  - 4.5.3. Study of Splenomegaly
  - 4.5.4. Adrenal Gland Anatomy
  - 4.5.5. Adrenal Pathology
  - 4.5.6. Retroperitoneal Lesions
- 4.6. The Digestive Tract
  - 4.6.1. Ultrasound Examination of the Stomach
  - 4.6.2. Ultrasound Examination of the Small Intestine
  - 4.6.3. Ultrasound Examination of the Colon

## Module 5. Clinical Genitourinary Ultrasound

- 5.1. Kidneys and Urinary Tract
  - 5.1.1. Anatomy Recap
  - 5.1.2. Structural Alterations
  - 5.1.3. Hydronephrosis. Urinary Tract Dilation
  - 5.1.4. Kidney Stones, Cysts, and Tumors
  - 5.1.5. Renal Insufficiency
- 5.2. Urinary Bladder
  - 5.2.1. Anatomy Recap
  - 5.2.2. Ultrasound Characteristics
  - 5.2.3. Benign Bladder Pathology
  - 5.2.4. Malignant Bladder Pathology
- 5.3. Prostate and Seminal Vesicles
  - 5.3.1. Anatomy Recap
  - 5.3.2. Ultrasound Characteristics
  - 5.3.3. Benign Prostatic Pathology
  - 5.3.4. Malignant Prostatic Pathology
  - 5.3.5. Benign Seminal Pathology
  - 5.3.6. Malignant Seminal Pathology
- 5.4. The Scrotum
  - 5.4.1. Anatomy Recap
  - 5.4.2. Ultrasound Characteristics
  - 5.4.3. Benign Scrotal Pathology
  - 5.4.4. Malignant Scrotal Pathology
- 5.5. The Uterus
  - 5.5.1. Anatomy Recap
  - 5.5.2. Ultrasound Characteristics
  - 5.5.3. Benign Uterine Pathology
  - 5.5.4. Malignant Uterine Pathology
- 5.6. The Ovaries
  - 5.6.1. Anatomy Recap
  - 5.6.2. Ultrasound Characteristics of the Ovaries
  - 5.6.3. Benign Ovarian Pathology
  - 5.6.4. Malignant Ovarian Pathology

## Module 6. Musculoskeletal Clinical Ultrasound

- 6.1. Anatomy Recap
  - 6.1.1. Anatomy of the Shoulder
  - 6.1.2. Anatomy of the Elbow
  - 6.1.3. Anatomy of the Wrist and Hand
  - 6.1.4. Anatomy of the Hip and Thigh
  - 6.1.5. Anatomy of the Knee
  - 6.1.6. Anatomy of the Ankle, Foot, and Leg
- 6.2. Technical Requirements
  - 6.2.1. Introduction
  - 6.2.2. Musculoskeletal Ultrasound Equipment
  - 6.2.3. Ultrasound Imaging Methods
  - 6.2.4. Validation, Reliability, and Standardization
  - 6.2.5. Ultrasound-Guided Procedures
- 6.3. Examination Technique
  - 6.3.1. Basic Concepts in Ultrasound
  - 6.3.2. Rules for Correct Examination
  - 6.3.3. Examination Technique in Ultrasound Study of the Shoulder
  - 6.3.4. Examination Technique in Ultrasound Study of the Elbow
  - 6.3.5. Examination Technique in Ultrasound Study of the Wrist and Hand
  - 6.3.6. Examination Technique in Ultrasound Study of the Hip
  - 6.3.7. Examination Technique in Ultrasound Study of the Thigh
  - 6.3.8. Examination Technique in Ultrasound Study of the Knee
  - 6.3.9. Examination Technique in Ultrasound Study of the Leg and Ankle
- 6.4. Sonoanatomy of the Musculoskeletal System: I. Upper Extremities
  - 6.4.1. Introduction
  - 6.4.2. Shoulder Ultrasound Anatomy
  - 6.4.3. Elbow Ultrasound Anatomy
  - 6.4.4. Wrist and Hand Ultrasound Anatomy
- 6.5. Sonoanatomy of the Musculoskeletal System: II. Lower Extremities
  - 6.5.1. Introduction
  - 6.5.2. Hip Ultrasound Anatomy

- 6.5.3. Thigh Ultrasound Anatomy
- 6.5.4. Knee Ultrasound Anatomy
- 6.5.5. Ultrasound Anatomy

- 6.6. Ultrasound in the Most Frequent Acute Injuries of the Musculoskeletal System
  - 6.6.1. Introduction
  - 6.6.2. Muscle Injuries
  - 6.6.3. Tendon Injuries
  - 6.6.4. Ligament Injuries
  - 6.6.5. Subcutaneous Tissue Injuries
  - 6.6.6. Bone Injuries and Joint Injuries
  - 6.6.7. Peripheral Nerve Injuries

## Module 7. Clinical Vascular Ultrasound

- 7.1. Vascular Ultrasound
  - 7.1.1. Description and Applications
  - 7.1.2. Technical Requirements
  - 7.1.3. Procedure
  - 7.1.4. Interpretation of Results. - Risks and Benefits
  - 7.1.5. Limitations
- 7.2. Doppler
  - 7.2.1. Fundamentals
  - 7.2.2. Applications
  - 7.2.3. Types of Echo-Doppler
  - 7.2.4. Color Doppler
  - 7.2.5. Power Doppler
  - 7.2.6. Dynamic Doppler
- 7.3. Normal Ultrasound of the Venous System
  - 7.3.1. Anatomy Recap: Venous System of the Upper Extremities
  - 7.3.2. Anatomy Recap: Venous System of the Lower Extremities
  - 7.3.3. Normal Physiology
  - 7.3.4. Regions of Interest
  - 7.3.5. Functional Tests
  - 7.3.6. Report. Vocabulary

- 7.4. Upper Extremity Chronic Venous Disease
  - 7.4.1. Definition
  - 7.4.2. CEAP Classification
  - 7.4.3. Morphological Criteria
  - 7.4.4. Examination Technique
  - 7.4.5. Diagnostic Manoeuvres
  - 7.4.6. Type of Report
- 7.5. Acute/Subacute Vascular Thrombosis of the Upper Extremities
  - 7.5.1. Anatomy Recap
  - 7.5.2. Manifestations of Vascular Thrombosis of the Upper Extremities
  - 7.5.3. Ultrasound Characteristics
  - 7.5.4. Examination Technique
  - 7.5.5. Diagnostic Manoeuvres
  - 7.5.6. Technical Limitations
- 7.6. Acute/Subacute Vascular Thrombosis of the Lower Extremities
  - 7.6.1. Description
  - 7.6.2. Manifestations of Vascular Thrombosis of the Lower Extremities
  - 7.6.3. Ultrasound Characteristics
  - 7.6.4. Examination Technique
  - 7.6.5. Differential Diagnosis
  - 7.6.6. Vascular Report

## Module 8. Clinical Ultrasound in Emergencies

- 8.1. Ultrasound in Respiratory Failure
  - 8.1.1. Spontaneous Pneumothorax
  - 8.1.2. Bronchospasm
  - 8.1.3. Pneumonia
  - 8.1.4. Pleural Effusion
  - 8.1.5. Heart Failure
- 8.2. Ultrasound in Shock and Cardiac Arrest
  - 8.2.1. Hypovolemic Shock
  - 8.2.2. Obstructive Shock
  - 8.2.3. Cardiogenic Shock
  - 8.2.4. Distributive Shock
  - 8.2.5. Cardiac Arrest

- 8.3. Ultrasound in Polytrauma: Eco-FAST
  - 8.3.1. Pericardial Effusion
  - 8.3.2. Hemothorax and Pneumothorax
  - 8.3.3. Hepatorenal or Perihepatic Effusion
  - 8.3.4. Splenorenal or Perisplenic Effusion
  - 8.3.5. Perivesical Effusion
  - 8.3.6. Post-Traumatic Aortic Dissection
  - 8.3.7. Musculoskeletal Injuries
- 8.4. Genitourinary Emergencies
  - 8.4.1. Obstructive Uropathy
  - 8.4.2. Uterine Emergencies
  - 8.4.3. Ovarian Emergencies
  - 8.4.4. Bladder Emergencies
  - 8.4.5. Prostatic Emergencies. - Scrotal Emergencies
- 8.5. Acute Abdomen
  - 8.5.1. Cholecystitis
  - 8.5.2. Pancreatitis
  - 8.5.3. Mesenteric Ischemia
  - 8.5.4. Appendicitis
  - 8.5.5. Perforation of the Hollow Viscus
- 8.6. Ultrasound in Sepsis
  - 8.6.1. Hemodynamic Diagnosis
  - 8.6.2. Source Detection
  - 8.6.3. Handling of Liquids

## Module 9. Ultrasound-Guided Procedures

- 9.1. Ultrasound-Guided FNA
  - 9.1.1. Indications/Contraindications
  - 9.1.2. Material
  - 9.1.3. Informed Consent
  - 9.1.4. Procedure
  - 9.1.5. Results
  - 9.1.6. Complications
  - 9.1.7. Quality Control

- 9.2. Ultrasound-Guided Percutaneous Biopsy
  - 9.2.1. Informed Consent
  - 9.2.2. Biopsy Materials (Types of Biopsy Needles)
  - 9.2.3. Procedure
  - 9.2.4. Complications
  - 9.2.5. Care
  - 9.2.6. Quality Control
- 9.3. Drainage of Abscesses and Fluid Collections
  - 9.3.1. Indications and Contraindications
  - 9.3.2. Informed Consent
  - 9.3.3. Requirements and Materials
  - 9.3.4. Technique and Approach Route: Direct Puncture (Trocar) vs. Step to Step (Seldinger)
  - 9.3.5. Catheter Management and Patient Care
  - 9.3.6. Side Effects and Complications
  - 9.3.7. Quality Control
- 9.4. Ultrasound-Guided Thoracentesis, Pericardiocentesis, and Paracentesis
  - 9.4.1. Indications and Advantages over the Anatomical Reference Technique
  - 9.4.2. Basic Aspects: Specifications and Ultrasound Anatomy
  - 9.4.3. Ultrasound Specifications and Pericardial Drainage Technique
  - 9.4.4. Ultrasound Specifications and Thoracic Drainage Technique
  - 9.4.5. Ultrasound Specifications and Abdominal Drainage Technique
  - 9.4.6. Common Problems, Complications, and Practical Advice
- 9.5. Ultrasound-Guided Vascular Cannulation
  - 9.5.1. Indications and Advantages over the Anatomical Reference Technique
  - 9.5.2. Current Evidence on Ultrasound-Guided Vascular Cannulation
  - 9.5.3. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 9.5.4. Ultrasound-Guided Central Venous Cannulation Technique
  - 9.5.5. Single Peripheral Catheter and Peripherally Inserted Central Catheter (PICC) Cannulation Technique
  - 9.5.6. Arterial Cannulation Technique

- 9.6. Ultrasound-Guided Infiltration and Chronic Pain Treatment
  - 9.6.1. Infiltrations and Pain
  - 9.6.2. Large Joints: Intra-articular and Myotendinous
  - 9.6.3. Small Joints: Intra-articular and Myotendinous
  - 9.6.4. Spinal Column

## Module 10. Other Uses of Clinical Ultrasound

- 10.1. Radial Breast Ultrasound
  - 10.1.1. Anatomy Recap
  - 10.1.2. Technical Requirements
  - 10.1.3. Ultrasound Slices
  - 10.1.4. Ultrasound Characteristics. - Breast Pathology
  - 10.1.5. Breast Elastography
- 10.2. Dermatological Ultrasound
  - 10.2.1. Echoanatomy of the Skin and Appendages
  - 10.2.2. Ultrasound of Skin Tumors
  - 10.2.3. Ultrasound of Inflammatory Skin Diseases
  - 10.2.4. Ultrasound in Dermoesthetics and its Complications
- 10.3. Ultrasound in Diabetes
  - 10.3.1. Aortic/Carotid Atheromatosis in Diabetics
  - 10.3.2. Parenchymal Echogenicity in Diabetic Patients
  - 10.3.3. Biliary Lithiasis in Diabetic Patients
  - 10.3.4. Neurogenic Bladder in Diabetic Patients
  - 10.3.5. Cardiomyopathy in Diabetic Patients
- 10.4. Ultrasound Report
  - 10.4.1. Ultrasound Note
  - 10.4.2. Ultrasound Derivation
  - 10.4.3. Ultrasound Report in PC
- 10.5. Ultrasound Safety during the COVID-19 Pandemic

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.



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*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, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately 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. Gervas, 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, trying to recreate the real conditions in the physician's professional practice.



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

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

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
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. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more 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.

*Professionals 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 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

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

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

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



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



#### Study Material

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

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



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical 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 on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



**Quick Action Guides**

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



# 07 Certificate

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





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

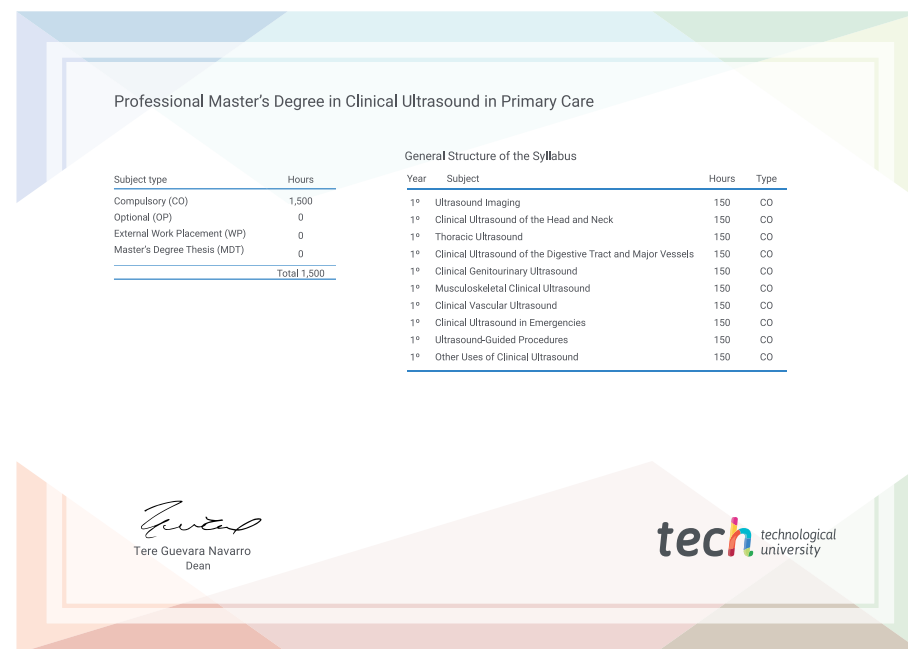
This **Professional Master's Degree in Clinical Ultrasound in Primary Care** contains the most complete and updated scientific program on the market.

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

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

Title: **Professional Master's Degree in Clinical Ultrasound in Primary Care**

Official N° of hours: **1,500 h.**



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



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



## Professional Master's Degree

Clinical Ultrasound  
in Primary Care

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 8h/week
- » Schedule: at your own pace
- » Exams: online

# Professional Master's Degree

## Clinical Ultrasound in Primary Care

