

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

Endorsed by:





## Professional Master's Degree

### Clinical Ultrasound in Primary Care for Nursing

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Schedule: at your own pace
- » Exams: online

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

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# 01

# Introduction

The program in Clinical Ultrasound in Primary Care for Nursing arises from the need to update the knowledge of this discipline, used in numerous clinical situations of routine practice. It is, therefore, essential that nursing professionals integrate the latest techniques into their daily practice.



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*This Professional Master's Degree will train nurses in the use of Clinical Ultrasound, providing them with the skills they require to carry out their professional work"*

Ultrasound is a safe, fast, reliable, innocuous and non-invasive test, well tolerated by the patient, relatively low-cost, which has evolved with new, smaller and more accessible devices.

In the last 50 years, ultrasound has been of great relevance for the advances in health care, becoming an indispensable tool for health professionals in the physical examination of the patient. This discipline has evolved in recent decades, from being restricted to radiodiagnostic services, to being included in all healthcare environments.

It has now become a popular and valuable tool for guiding diagnostic and therapeutic interventions. Additionally, it has increased the capabilities of Clinical Ultrasound, achieving a notable increase in its applications.

Primary Care is undoubtedly one of the areas of preferential use of Clinical Ultrasound. The nursing professional can benefit from Clinical Ultrasound to favorably influence the diagnosis and treatment of different pathologies, improving patient safety, reducing waiting times and possible errors.

Undoubtedly, Clinical Ultrasound offers an opportunity, because of its ability to instantly provide the right answers to the questions needed for better patient care.

In Clinical Ultrasound there is a great dependence on the operator and the method of performance, and numerous studies have shown the need and desire for regulated training for the specialists who practice it.

The implementation of ultrasound scanners in Primary Care Centers has multiplied in recent years, leading different organizations to train a large number of family physicians in basic and advanced levels of ultrasound practice.

Currently, there is no university teaching program at the Master's Degree level, independent of scientific societies, that completes the educational itinerary necessary for the practice of clinical ultrasound in the field of Primary Care.

Therefore, with this Professional Master's Degree, students will have the opportunity to take a teaching program that brings together the most advanced and in-depth knowledge of Clinical Ultrasound, where a group of teachers of high scientific rigor and extensive international experience offers the most complete and up-to-date information on the use of ultrasound as a complement to the physical examination in Primary Care.

This **Professional Master's Degree in Clinical Ultrasound in Primary Care for Nursing** 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 practice
- ◆ New diagnostic-therapeutic developments on evaluation, diagnosis, and intervention in problems or disorders that can be addressed with ultrasound
- ◆ It contains practical exercises where the self-assessment 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 health and research methodologies in ultrasound processes
- ◆ 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 accessible from any fixed or portable device with an internet connection



*Technological advances have led to improved ultrasound scanners, which are becoming more useful and can be used in more situations"*

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

The methodological design of this Professional Master's Degree, developed by a multidisciplinary team of e-learning 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, up-to-date, 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.

*This program has the latest advances in educational technology, based on e-learning methodology"*

*You will be provided with multimedia tools meticulously designed by experts which will favor the speed of assimilation and learning.*



# 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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*Our programs have the best teaching methodology and the latest educational tools, which will allow you to study from home, without losing the possibilities offered by on-site classes.*



## General Objectives

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- 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 for Nursing*





## Specific Objectives

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### Module 1. Ultrasound Imaging

- ◆ 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

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

- ◆ Inquire about the correct processes for performing ultrasound on the upper part of the patient
- ◆ Know the main reasons and diseases that require a brain ultrasound
- ◆ Manage the correct postures to carry out the due process of ultrasound acquisition
- ◆ Identify and recognize the possible results of the ultrasound sample
- ◆ Delve into fast-acting treatments to prevent possible brain diseases on ultrasound scans

### **Module 3. Thoracic Ultrasound**

- ♦ Identify respiratory and cardiological problems for which ultrasound examinations are necessary
- ♦ Perform the due process of taking examinations for rapid diagnosis of possible thoracic problems
- ♦ Identify lung problems in elderly patients through ultrasound
- ♦ Identifying the risks of infarction from the ultrasound scan
- ♦ Delve into the practice of emergency procedures after the diagnosis of a serious disease following ultrasound

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

- ♦ Analyze whether digestive and great vessels problems can be identified from a first ultrasound picture
- ♦ Ultrasound for appendicitis, peritonitis and its medical due process
- ♦ Act in an emergency manner when a digestive problem requires emergency diagnosis
- ♦ Identify the main anomalies involving the digestive system and large vessels
- ♦ Perform ultrasound procedures for pregnant women
- ♦ Identify by ultrasound the gestational periods of babies in maternal wombs and possible anomalies

### **Module 5. Clinical Genitourinary Ultrasound**

- ♦ Identify the lower zone within the ultrasound process and identify possible genitourinary problems
- ♦ Diagnose by ultrasound the problems affecting the lower area of patients
- ♦ Perform ultrasound procedures as a protocol for prevention of urinary diseases
- ♦ Identify through diagnostic imaging possible anomalies affecting the genitourinary system

### **Module 6. Musculoskeletal Clinical Ultrasound**

- ♦ Recognize and identify the muscles and bones of the human body
- ♦ Perform ultrasound procedures to diagnose trauma, fracture or swelling in patients
- ♦ Identify the main problems and diseases that affect muscles and generate hypertrophy
- ♦ Perform ultrasound examinations as a pre-surgical procedure in fractures and lacerations requiring implants or screw positioning

### **Module 7. Clinical Vascular Ultrasound**

- ♦ Identify vascular problems from ultrasound examinations
- ♦ Know by diagnostic imaging the problems of coagulation and vein tamponade



### **Module 8. Clinical Ultrasound in Emergencies**

- ◆ Identify the medical due process for taking ultrasound examinations in emergency situations
- ◆ Prioritize the critically ill patient for appropriate ultrasound examination
- ◆ Diagnose medically from ultrasound what is an emergency and its proper treatment

### **Module 9. Ultrasound-Guided Procedures**

- ◆ Identify new echogenic materials and devices for echogenic guidance in regional anesthesia
- ◆ Delve into eco-guided blockages during examinations
- ◆ Analyze new procedures to identify diseases in patients

### **Module 10. Other Uses of Clinical Ultrasound**

- ◆ Learn about the latest advances in ultrasound
- ◆ Improve clinical ultrasound diagnostics
- ◆ Ultrasound for pregnant women and infant diagnosis

# 03 Skills

Since clinical ultrasound is so important for the diagnosis of numerous pathologies, TECH has designed this program that will update the nurses' knowledge and will help them to improve their skills in this important area. As a result, after completing the course, the professionals will be prepared to apply the most advanced techniques in this discipline with total success, as well as to use the latest equipment in an appropriate manner.



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*Thanks to this program you will update your knowledge, being able not only to apply the latest techniques, but also to use the most advanced ultrasound scanners”*



## General Skills

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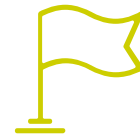
- ♦ Apply the contents learned in resolving the main health problems in the field of Clinical Ultrasound
- ♦ Learn as one of the most important knowledge for any professional nowadays, who is obliged to constant training and professional improvement due to the vertiginous and accelerated process of production of scientific knowledge
- ♦ 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

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*Take the opportunity to learn about the latest advances in this area in order to apply it to your daily practice.”*







## 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
- ♦ Know the basic and advanced procedures of Ultrasound, both at diagnostic and therapeutic level
- ♦ 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
- ♦ Guide 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 program. 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"*

## International Guest Director

Dr. Lauren Ann J. Selame is a recognized professional in the field of **Medicine**, specializing in **Clinical Ultrasound**. Her expertise focuses on the **application of ultrasound in emergency medical, diagnostic imaging, simulation and public health**. With a deep interest in **procedural competence** and in the development of **advanced techniques** to detect various disorders, she has contributed significantly to the use of **Anatomical Ultrasound** to improve response times and accuracy in emergency treatments.

Throughout his career, he has played key roles in prestigious institutions. At **Brigham Women's Hospital**, recognized among the best hospitals in the world by Newsweek magazine, she has been **Director of Ultrasound Education in Emergency Medicine**, in addition to serving as an emergency physician. Her experience also includes her time at **Massachusetts General Hospital** as an Emergency Ultrasound Assistant, and at **Thomas Jefferson Hospital**, where she was a **resident in Emergency Medicine**, after training at the Sidney Kimmel School of Medicine of Thomas Jefferson University.

At the international level, she is noted for her contributions, especially in **Emergency Medicine**. She has worked in some of the most prestigious healthcare centers in the United States, which has allowed her to hone her skills and bring significant advances to the medical community. Her work has earned her a reputation for her expertise in **diagnostic ultrasound**, and she is a reference in the use of this **technology in emergencies**.

As a researcher associated with university institutions, she has written **numerous scientific articles** on its emphasis, addressing both its application in critical situations and its advances in medical diagnosis. Her publications are consulted by professionals worldwide, consolidating her role as one of the most influential voices in the field of **clinical ultrasound**.



## Dr. Selame, Lauren Ann J.

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- Director of Ultrasound in Emergency Medicine Brigham Women's Hospital, Boston, United States
- Emergency Medicine Physician Specialist at Brigham Women's Hospital
- Emergency Ultrasound Physician Specialist at Massachusetts General Hospital, Massachusetts
- Resident Physician in Emergency Medicine at Thomas Jefferson University Hospital
- Research Assistant at the Perelman School of Medicine, University of Pennsylvania
- M.D., Thomas Jefferson University
- Medical Degree, Sidney Kimmel School of Medicine at the Thomas Jefferson University

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

## 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. Autonomous 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.

## Scientific Committee

### Dr. Álvarez Fernández, Jesús Andrés

- ◆ Specialist in Intensive Care Medicine
- ◆ Department of Intensive Care Medicine and Major Burns, Getafe University Hospital, 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. 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. 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. Sánchez Sánchez, José Carlos

- ◆ 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

## Professors

### Dr. Arancibia Zemelman, Germán

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

### Dr. Argüeso García, Mónica

- ♦ Intensive Care Medicine Department. Gran Canaria Maternity Complex. Las Palmas de Gran Canaria (Canary Islands)

### Dr. Barceló Galíndez, Juan Pablo

- ♦ Specialist in Occupational Medicine and medical sonographer of Mutualia. Bilbao

### Dr. Cabrera González, Antonio José

- ♦ Family Physician. Tamaraceite Health Center. Las Palmas de Gran Canaria (Canary Islands).

### Dr. Corcoll Reixach, Josep

- ♦ Family Physician. Tramuntana Health Center (Mallorca, Balearic Islands)

### Dr. De Varona Frolov, Serguei

- ♦ Angiology and Vascular Surgery Specialist. General University Hospital of Gran Canaria Dr. Negrín. Las Palmas de Gran Canaria (Canary Islands)

### Dr. Donaire Hoyas, Daniel

- ♦ Specialist in Orthopedic Surgery and Traumatology. Poniente Hospital. El Ejido, Almería

### Dr. Fabián Feroso, Antonio

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

### Mr. Gálvez Gómez, Francisco Javier

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

### Dr. García García, Nicasio

- ♦ Family Physician (Schamann Health Center).

### 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. León Ledesma, Raquel

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

### Dr. López Cuenca, Sonia

- ♦ Family Physician and Attending in the Intensive Care and Major Burns Departments, Getafe Hospital (Madrid).





**Dr. López Rodríguez, Lucía**

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

**Dr. Martín del Rosario, Francisco Manuel**

- ◆ Rehabilitation Specialist. Insular University Hospital Complex, Maternity and Infant. Las Palmas de Gran Canaria

**Mr. Moreno Valdés, Javier**

- ◆ Business Manager Ultrasound. Cannon (Toshiba) Medical Systems. Madrid

**Dr. Núñez Reiz, Antonio**

- ◆ Especialista del Servicio de Medicina Intensiva, Hospital Universitario Clínico San Carlos. Madrid

**Dr. Santos Sánchez, José Ángel**

- ◆ Specialist in the Radiology Department, Salamanca University Hospital. Salamanca

**Dr. Segura Blázquez, José María**

- ◆ Family Physician. Canalejas Health Center. Las Palmas de Gran Canaria (Canary Islands).

**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 Professional Master's Degree in Clinical Ultrasound for Primary Care for Nursing contains the most complete and up-to-date scientific program on the market"*

## 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 Planes and Echo Navigation
  - 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. Contrast-Enhanced Ultrasound (CEUS)
  - 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 the 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. Fundamentals of Thoracic Ultrasound
  - 3.1.1. Anatomy Recap
  - 3.1.2. Echoes and Artifacts in the Thorax
  - 3.1.3. Technical Requirements
  - 3.1.4. Examination 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 Disorders
  - 3.5.4. Hemodynamic Disorders
- 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 the 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. Celiac Trunk, Hepatic Artery and Splenic Artery Pathology
  - 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 Disorders
  - 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. Leg and Ankle
  - 6.5.6. 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. Lower 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 Maneuvers
  - 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: eFAST
  - 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. Perforated 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. Procedure
  - 9.1.4. Results
  - 9.1.5. Complications
  - 9.1.6. Quality Control
- 9.2. Ultrasound-Guided Percutaneous Biopsy
  - 9.2.1. Biopsy Materials (Types of Biopsy Needles)
  - 9.2.2. Procedure
  - 9.2.3. Complications
  - 9.2.4. Care
  - 9.2.5. Quality Control
- 9.3. Drainage of Abscesses and Fluid Collections
  - 9.3.1. Indications and Contraindications
  - 9.3.2. Requirements and Materials
  - 9.3.3. Technique and Approach Route: Direct Puncture (Trocar) vs. Step to Step (Seldinger)
  - 9.3.4. Catheter Management and Patient Care
  - 9.3.5. Side Effects and Complications
  - 9.3.6. 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: Ultrasound 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. Echo Anatomy 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 Dermoaesthetics and its Complications

- 10.3. Ultrasound in Diabetes
  - 10.3.1. Aortic/Carotid Atheromatosis in Diabetic Patients
  - 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



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

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.



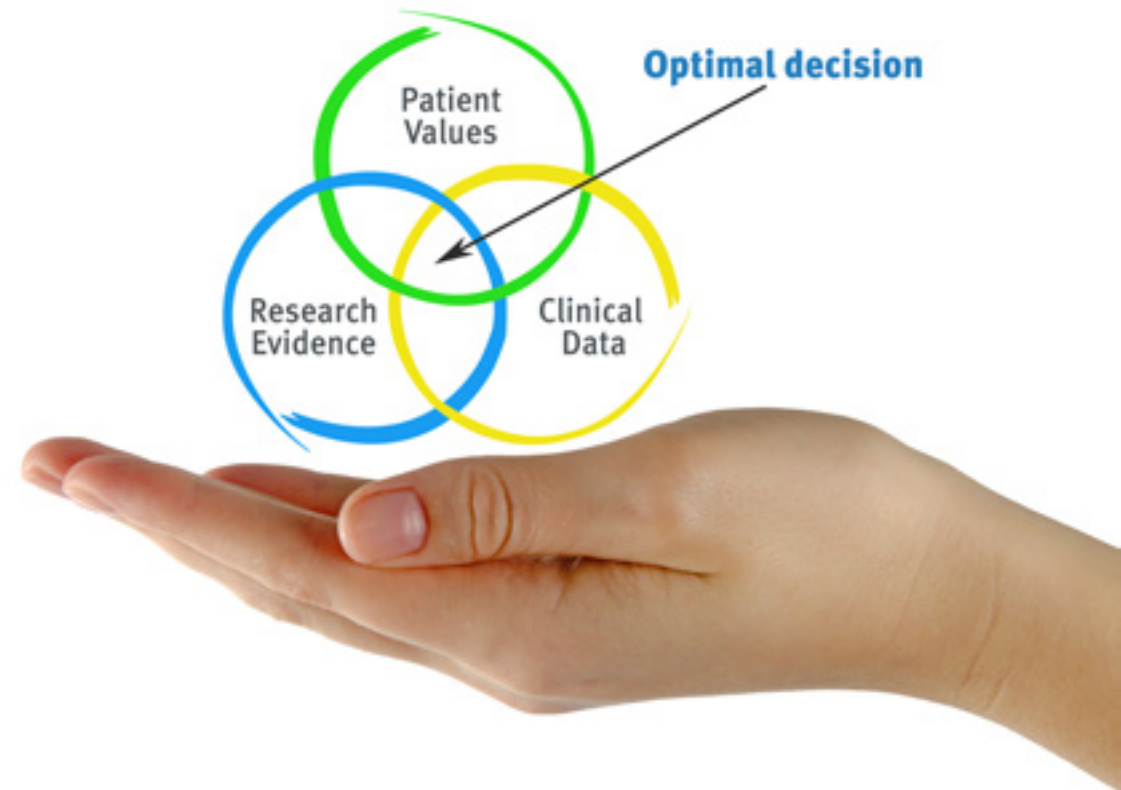
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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH Nursing School we use the Case Method

In a given situation, what should a professional do? 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. Nurses learn better, faster, and more sustainably over time.

*With TECH, nurses can experience a learning methodology 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 real conditions in professional nursing 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. Nurses who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the nursing professional to better integrate knowledge acquisition into the hospital setting or primary care.
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 case studies with a 100% online learning system based on repetition combining a minimum of 8 different elements in each lesson, which is a real revolution compared to the simple study and analysis of cases.



*The nurse will learn through real cases and by solving 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 we have trained more than 175,000 nurses with unprecedented success in all specialities regardless of practical workload. 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 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 really 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.



### Nursing Techniques and Procedures on Video

We introduce you to the latest techniques, to the latest educational advances, 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 them as many times as you want.



### Interactive Summaries

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

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



### Additional Reading

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





#### Expert-Led Case Studies and Case Analysis

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



#### Testing & Retesting

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



#### Classes

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

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



#### Quick Action Guides

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



07

# Certificate

The Professional Master's Degree in Clinical Ultrasound in Primary Care for Nursing guarantees you, in addition to the most rigorous and up-da-ted training, access to a Professional Master's Degree issued by TECH Global University.



“

*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 for Nursing** contains the most complete and up-to-date scientific program on the market.

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

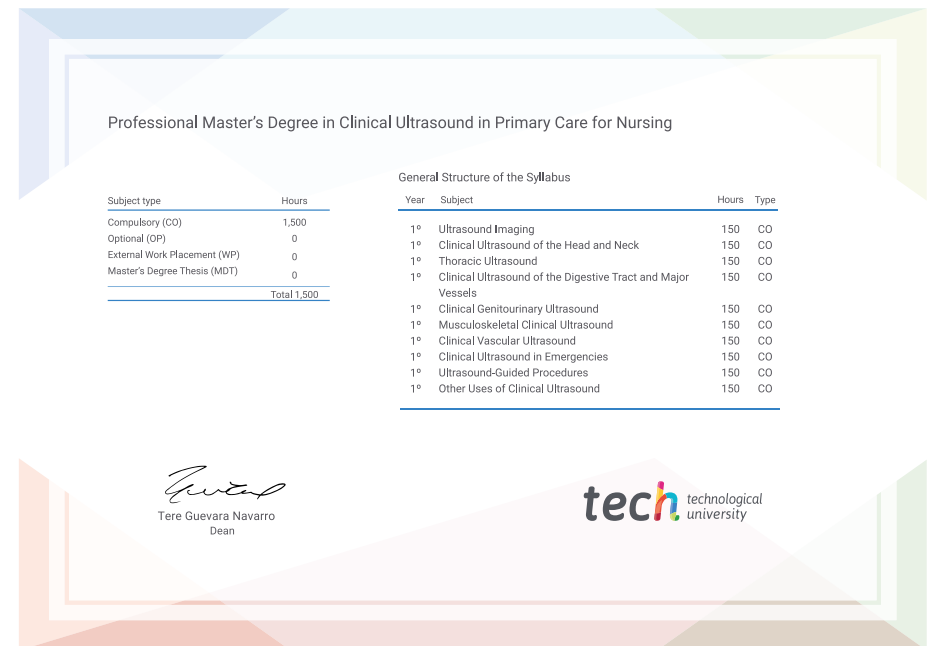
The diploma issued by TECH Technological University will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional career evaluation committees.

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

Modality: **online**

Duration: **12 months**

Endorsed by: **SEUS Spanish Ultrasound Society**



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

**tech** technological  
university

## Professional Master's Degree

Clinical Ultrasound in  
Primary Care for Nursing

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Schedule: at your own pace
- » Exams: online

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

Endorsed by:



**SEUS**  
Sociedad Española de UltraSonidos



**tech** technological  
university