

**Professional Master's Degree**  
Clinical Ultrasound in Emergencies  
and Intensive Care for Nursing





## Professional Master's Degree Clinical Ultrasound in Emergencies and Intensive Care for Nursing

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

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

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# 01

# Introduction

Scientific studies support the need for the healthcare professional to have extensive knowledge about the use of clinical ultrasound, as it reduces the time of care, and improves both the effectiveness and efficiency in the diagnosis of different pathologies. This is undoubtedly an aspect that favors the patient, as well as the improvement of the ultrasound devices themselves thanks to technological development. Given the advances that have taken place in recent years, the professional requires a continuous updating of their knowledge, which can be achieved with this 100% online degree.



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*With this Professional Master's Degree,  
in 12 months you will be up to date with  
the latest studies and techniques used  
in clinical ultrasound"*

Ultrasound scanners have improved in recent years allowing greater mobility and effectiveness, making it one of the most necessary tools for the healthcare professional. The versatility it offers in scans of different parts of the body has also made it appropriate for the nursing professional to have the relevant knowledge for its use. Likewise, time-sensitive situations such as emergency or intensive care require maximum safety and effectiveness in the detection of pathology.

In this context, the role of the nursing professional becomes more relevant, which in turn invites health care professionals to be constantly up to date with their knowledge in this field. This is why this Professional Master's Degree in Clinical Ultrasound in Emergencies and Intensive Care for Nursing has been designed, where students can study in depth ultrasound imaging, echonavigation, as well as the technical requirements and methodologies used for the approach of patients with large syndromes or cardiac, musculoskeletal or abdominal problems.

Likewise, the case studies provided by the specialists who teach this degree will be very useful for nursing professionals in their daily clinical practice. In addition, detailed videos, interactive diagrams or essential readings will add dynamism and provide the up-to-date knowledge that students are looking for.

In this way, TECH offers the nurse an excellent opportunity to obtain the latest information in this field through a quality university degree that is compatible with the most demanding responsibilities. Students will only need a computer or tablet with which to access, at any time, the virtual campus where the syllabus of this Professional Master's Degree is hosted. With no classroom attendance or fixed class schedules, students have the freedom to distribute the course load according to their needs.

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

- ◆ The development of case studies 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
- ◆ Practical exercises where the self-assessment process can be carried out to improve learning
- ◆ Its special emphasis on innovative methodologies in Advanced Practice Nursing
- ◆ 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 improvements have boosted the use of clinical ultrasound. Update your knowledge about it thanks to this Professional Master's Degree"*

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*The specialized teaching team provides you with useful case studies for the examination of patients in Intensive Care”*

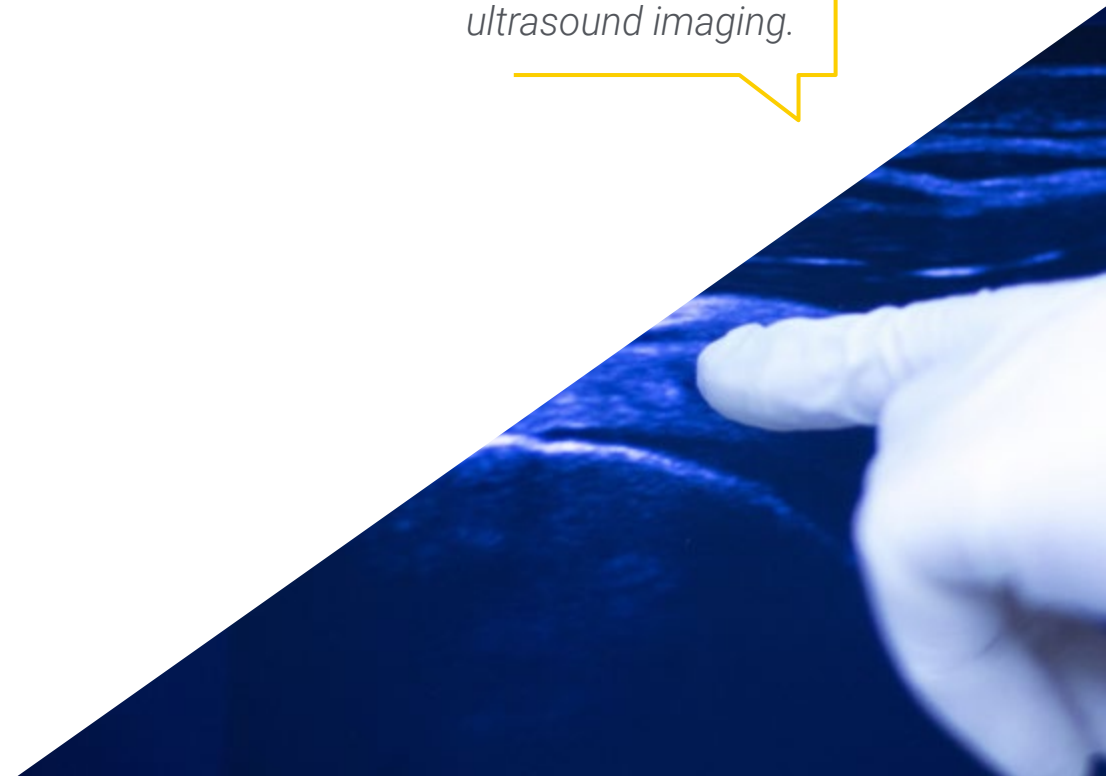
The program’s teaching staff includes professionals from the sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive specialization programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise throughout the program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*With this program you will achieve the up to date knowledge you were looking for about the advantage of using ultrasound in paracentesis and stroke patients.*

*This Professional Master's Degree provides you with the best didactic tools to keep you up to date with improvements in ultrasound and ultrasound imaging.*



# 02 Objectives

Over the course of the 12 months of this program, the nursing professional will become aware of the latest advances in Clinical Ultrasound in Emergencies and Intensive Care for Nursing. An update that will be achieved in a much more agile way thanks to the Relearning system, based on the reiteration of content, which allows to advance in a more natural way through the syllabus while reducing the long hours of study so frequent in other methodologies.







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*TECH brings you the latest innovations in clinical ultrasound and its different applications in patients in emergency situations”*



## General Objectives

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- Complete the educational curriculum by making physicians masters in the use of ultrasound for the management of emergency situations and critical patients, regardless of the environment in which they find themselves
- Update your knowledge on ultrasound imaging and its multiple possibilities



*Acquire the most up-to-date knowledge in this field of work and apply advanced protocols in this intervention in your day-to-day work"*





## Specific Objectives

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### Module 1. Ultrasound Imaging

- ◆ Define the physical principles which are involved in ultrasound imaging
- ◆ Establish an appropriate ultrasound sequence for each examination of a patient
- ◆ Explain the different ultrasound modes
- ◆ Define the different types of sonographs and their applications
- ◆ Describe the different ultrasound planes
- ◆ Explain the principles of echonavigation

### Module 2. Clinical Cardiac Ultrasound

- ◆ Explain the cardiac anatomy
- ◆ Describe the technical requirements of cardiac ultrasound
- ◆ Explain localization and visualization in pericardial windows
- ◆ Describe sonoanatomy and sonophysiology in cardiac ultrasound
- ◆ Explain the different structural alterations to identify in cardiac ultrasound
- ◆ Define the principles of hemodynamic ultrasound

### Module 3. Clinical Thoracic Ultrasound

- ◆ Explain the thoracic anatomy
- ◆ Describe the technical requirements of thoracic ultrasounds
- ◆ Explain the examination technique of thoracic ultrasounds
- ◆ Explain the principles of ultrasounds of the thoracic wall, the pleura and the mediastinum
- ◆ Define the principles of pulmonary ultrasounds
- ◆ Define the principles of diaphragmatic ultrasounds

#### **Module 4. Clinical Vascular Ultrasound**

- ♦ Explain the vascular anatomy
- ♦ Describe the technical requirements of vascular ultrasounds
- ♦ Explain the examination technique for vascular ultrasounds
- ♦ Explain the principles of ultrasound for the main thoracoabdominal vessels
- ♦ Define the principles of ultrasounds of the supra-aortic trunks.
- ♦ Explain the principles of ultrasound of peripheral arterial circulation

#### **Module 5. Clinical Cerebral Ultrasound**

- ♦ Describe cerebral hemodynamics
- ♦ Explain the location and visualization of the windows in cerebral ultrasounds
- ♦ Define the different ultrasound modes in cerebral ultrasounds
- ♦ Explain the examination technique for cerebral ultrasounds.
- ♦ Explain the different structural alterations to identify in cerebral ultrasounds
- ♦ Explain the different hemodynamic alterations to identify in cerebral ultrasound
- ♦ Describe the process for performing an ocular ultrasound

#### **Module 6. Clinical Abdominal Ultrasound**

- ♦ Explain the abdominal anatomy
- ♦ Describe the technical requirements of abdominal ultrasounds
- ♦ Explain the examination technique for abdominal ultrasounds
- ♦ Explain the ECO FAST methodology
- ♦ Explain the principles of ultrasound of the digestive system
- ♦ Explain the principles of genitourinary ultrasound

#### **Module 7. Clinical Musculoskeletal Ultrasound**

- ♦ Explain the anatomy of the musculoskeletal system
- ♦ Describe the technical requirements of musculoskeletal ultrasounds
- ♦ Explain the examination technique for musculoskeletal ultrasounds
- ♦ Define the sonoanatomy of the locomotor system
- ♦ Explain the principles of ultrasounds of the most common acute locomotor system injuries

#### **Module 8. Ultrasonographic Approach to the Major Syndromes**

- ♦ Explain the use of ultrasounds in cardiac arrest
- ♦ Describe the use of ultrasound in cases of shock
- ♦ Explain the use of ultrasounds in respiratory failure
- ♦ Describe the use of ultrasound in cases of sepsis
- ♦ Explain the use of ultrasounds in abdominal pain
- ♦ Describe the use of ultrasound in trauma cases
- ♦ Explain the use of ultrasounds in strokes

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

- ♦ Explain the process of performing ultrasound-guided intubation
- ♦ Describe the technique for vascular cannulation using ultrasound
- ♦ Explain the process of performing thoracentesis using ultrasound
- ♦ Describe the technique of ultrasound-guided pericardiocentesis
- ♦ Explain the process of performing paracentesis with ultrasound support
- ♦ Explain the process of performing ultrasound-guided lumbar puncture
- ♦ Describe the technique for performing ultrasound-guided drainage and probing



### Module 10. Clinical Pediatric Ultrasound

- Describe the technical requirements of pediatric ultrasounds
- Explain the examination technique for pediatric ultrasounds
- Describe pediatric sonoanatomy and sonophysiology
- Explain the use of ultrasound in the major pediatric syndromes

**“** *This 100% online program has been designed so that you can combine quality education with your professional responsibilities with your professional responsibilities”*

# 03 Skills

The syllabus of this university course has been designed with the aim of enhancing the competencies and skills of the nursing professional in the management of clinical ultrasound. In this way, students will be updated on the most advanced diagnostic and therapeutic procedures, the most effective techniques currently used, as well as the advantages of minimizing risks through the use of ultrasound devices. The expert teaching team will guide students to achieve these goals.



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*The Relearning system will allow you to progress more naturally through neonatal, ocular or genito-urinary ultrasound"*



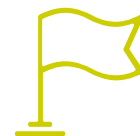
## General Skills

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- ♦ Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
- ♦ Know how to apply acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to the area of study
- ♦ Be able to integrate knowledge and face the complexity of making judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities related to the application of their knowledge and judgments
- ♦ Communicate their conclusions, with the knowledge and rationale behind them, to specialized and non-specialized audiences in a clear and unambiguous manner
- ♦ Acquire the learning skills that will enable them to continue studying in a manner that will be largely self-directed or autonomous







## Specific Skills

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- ◆ Optimize ultrasound imaging through in-depth knowledge of the physical principles of ultrasound and ultrasound machine controls and operation
- ◆ Understand basic and advanced ultrasound procedures, both diagnostic and therapeutic
- ◆ Excel in spatial orientation or "echonavigation"
- ◆ Practice all ultrasound modes in the safest way for the patient
- ◆ Determine 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 and academic environments



*A university degree that allows you access at any time to the most used techniques in echonavigation"*

04

# Course Management

TECH, in its commitment to offer the most up to date and quality knowledge to all nursing professionals, has selected a leading multidisciplinary management and teaching staff. This allows students taking this Professional Masters Degree to obtain the most recent and comprehensive information on the use of clinical ultrasound. Likewise, the proximity of the teaching staff will allow students to resolve any doubts that may arise regarding the syllabus that makes up this degree.





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*TECH has selected a relevant and multidisciplinary faculty that will provide you with the latest trends in clinical ultrasound”*

## Management



### Dr. Álvarez Fernández, Jesús Andrés

- ◆ Attending Physician of Intensive Care Medicine and Major Burns Unit. Getafe University Hospital. Getafe, Madrid
- ◆ Collaborating Professor of the Master's Degree in Intensive Care Medicine at the CEU Cardenal Herrera University of Valencia.
- ◆ Founding Member of the Ecoclub of SOMIAMA
- ◆ Collaborating Professor of SOCANECO
- ◆ Degree in Medicine and Surgery
- ◆ Specialist in Intensive Care Medicine.
- ◆ Doctor of Medicine (PhD)

## Professors

### Dr. Abril Palomares, Elena

- ◆ Specialist in Intensive Care Medicine
- ◆ Attending Physician of Intensive Care Medicine and Major Burns Unit
- ◆ Doctor at the University Hospital of Getafe. Madrid, Spain
- ◆ Member of the Ecoclub of SOMIAMA
- ◆ Degree in Medicine and Surgery

### Dr. Álvarez González, Manuel

- ◆ Specialist in Intensive Care Medicine
- ◆ Attending Physician in Intensive Medicine
- ◆ Physician at the University Hospital Clínico San Carlos. Madrid
- ◆ Founding Member of the Ecoclub of SOMIAMA
- ◆ Degree in Medicine and Surgery

**Dr. Colinas Fernández, Laura**

- ◆ Specialist in Intensive Care Medicine
- ◆ Assistant Physician of Intensive Care Medicine, University Hospital Complex of Toledo
- ◆ Member of the Spanish Society for Ultrasound in Critical Cases (ECOCRITIC)
- ◆ Degree in Medicine and Surgery

**Dr. De la Calle Reviriego, Braulio**

- ◆ Specialist in Intensive Care Medicine
- ◆ Head of Department in Intensive Medicine and Transplants Coordinator
- ◆ Doctor at the General University Hospital Gregorio Marañón. Madrid
- ◆ Collaborating Professor at the Complutense University of Madrid
- ◆ Trainer in Brain Ultrasound of the National Transplant Organization

**Dr. Flores Herrero, Ángel**

- ◆ Attending Physician of Vascular Surgery
- ◆ Physician at Toledo Hospital Complex
- ◆ Member of the American Society of Surgeons
- ◆ Collaborating Professor at the Catholic University San Antonio de Murcia (UCAM)
- ◆ Degree in Medicine and Surgery

**Dr. Fumadó Queral, Josep**

- ◆ Physician Specialist in Family Medicine
- ◆ Primary Care Team in Amposta. Tarragona
- ◆ Professor of Clinical Ultrasound of the Spanish Society of General Medicine (SEMG)
- ◆ Collaborating Professor and Honorary Member of the Canary Society of Ultrasound (SOCANECO)
- ◆ Degree in Medicine and Surgery

**Dr. Hernández Tejedor, Alberto**

- ◆ Degree in Medicine and Surgery
- ◆ Specialist in Intensive Care Medicine
- ◆ Attending Physician of Intensive Care Medicine, University Hospital Fundación de Alcorcón, Madrid
- ◆ Degree in Medicine and Surgery

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- ◆ Doctor at the University Hospital of Getafe. Getafe, Madrid
- ◆ Member of the Ecoclub of SOMIAMA
- ◆ Degree in Medicine and Surgery

**Dr. Igeño Cano, José Carlos**

- ◆ Specialist in Intensive Care Medicine
- ◆ Head of Intensive Care and Emergency Services
- ◆ Physician at San Juan de Dios Hospital. Córdoba
- ◆ Member of the HU-CI Project
- ◆ Creator and Director of Course of Echoguided Venous Canalization (CAVE)
- ◆ Degree in Medicine and Surgery

**Dr. Jiménez Díaz, Fernando**

- ◆ Specialist in Sport Medicine
- ◆ Professor in the Faculty of Sports Sciences at the University of Castilla La Mancha
- ◆ Director of the International Chair of Musculoskeletal Ultrasonography of the Catholic University of Murcia
- ◆ Degree in Medicine and Surgery

**Dr. Lamarca Mendoza, María Pilar**

- ◆ Attending Physician of Angiology and Vascular Surgery, Toledo Hospital Complex
- ◆ Degree in Medicine and Surgery

**Dr. López Cuenca, Sonia**

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- ◆ Doctor at the University Hospital of Getafe. Madrid
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- ◆ Degree in Medicine and Surgery





**Dr. Martínez Díaz, Cristina**

- ◆ Specialist in Intensive Care Medicine
- ◆ Attending Physician in Intensive Care Medicine
- ◆ Degree in Medicine and Surgery

**Dr. Mora Rangil, Patricia**

- ◆ Medical Specialist in Intensive Care Medicine, Montecanal Clinic. Zaragoza
- ◆ Degree in Medicine and Surgery

**Dr. Martínez Crespo, Javier**

- ◆ Specialist in Intensive Care Medicine
- ◆ Radio Diagnostic Attending Physician
- ◆ Doctor at the University Hospital of Getafe. Getafe, Madrid
- ◆ Associate Professor at the European University of Madrid
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- ◆ Specialist in Intensive Care Medicine
- ◆ Attending Physician in Intensive Medicine
- ◆ Doctor at Hospital Universitario Clínico San Carlos, Madrid
- ◆ Collaborating Professor of the Postgraduate Diploma in Thoracic Ultrasound of the Autonomous University of Barcelona
- ◆ Collaborating Professor of SOCANECO
- ◆ Degree in Medicine and Surgery

**Dr. Pérez Morales, Luis Miguel**

- ◆ Physician Specialist in Family Medicine
- ◆ Primary Care Doctor
- ◆ Doctor at Alzira Health Center Las Palmas de Gran Canaria
- ◆ President of the Canaries Society for Ultrasound (SOCANECO)
- ◆ Member of the European Federation of Societies of Ultrasound in Medicine and Biology (EFSUMB)
- ◆ Degree in Medicine and Surgery

**Dr. Osiniri Kippes, María Inés**

- ◆ Pediatrician
- ◆ Pediatrics, Pediatric Ultrasound and Pediatric Nephrology, Bofill Clinic Girona
- ◆ Collaborating Professor at the Spanish School of Clinical Ultrasound
- ◆ Member of the European Federation of Societies of Ultrasound in Medicine and Biology (EFSUMB)
- ◆ Degree in Medicine and Surgery

**Dr. Ortuño Andériz, Francisco**

- ◆ Specialist in Intensive Care Medicine
- ◆ Attending Physician in Intensive Medicine
- ◆ Doctor at the University Hospital Clínico San Carlos, Madrid
- ◆ Collaborating Professor of the Master's Degree in Intensive Care Medicine at the CEU Cardenal Herrera University of Valencia
- ◆ Degree in Medicine and Surgery

**Dr. Palacios Ortega, Francisco de Paula**

- ◆ Specialist in Intensive Care Medicine
- ◆ Attending Physician of Intensive Care Medicine and Major Burns Unit
- ◆ Doctor at the University Hospital of Getafe. Madrid. Collaborating Professor at the University of Madrid
- ◆ Founding Member of the Ecoclub of SOMIAMA
- ◆ Degree in Medicine and Surgery

**Dr. Phillipps Fuentes, Federico**

- ◆ Medical Specialist in Pediatrics, Perpetuo Socorro Hospital. Las Palmas de Gran Canaria
- ◆ Vice-President of the Canaries Society for Ultrasound (SOCANECO)
- ◆ Member of the European Federation of Societies of Ultrasound in Medicine and Biology (EFSUMB)
- ◆ Degree in Medicine and Surgery

**Dr. Serna Gandía, María**

- ◆ Medical Specialist in Anesthesiology and Resuscitation, Denia-Marina Salud Hospital Denia, Alicante
- ◆ Secretary of the Spanish Society for Ultrasound in Critical Cases (ECOCRITIC)
- ◆ Degree in Medicine and Surgery

**Dr. Temprano Vázquez, Susana**

- ◆ Specialist in Intensive Care Medicine
- ◆ Adjunct Physician of Intensive Care Medicine, 12 de Octubre University Hospital. Madrid
- ◆ Founding Member of the Ecoclub of SOMIAMA
- ◆ Degree in Medicine and Surgery





**Dr. Vicho Pereira, Raúl**

- ◆ Degree in Medicine and Surgery
- ◆ Specialist in Intensive Care Medicine, Quirónsalud Palmaplanas Hospital. Palma de Mallorca
- ◆ President of the Spanish Society for Ultrasound in Critical Cases (ECOCRITIC)

**Dr. Villa Vicente, Gerardo**

- ◆ Medical Specialist in Physical Education and Sports Medicine
- ◆ Professor of Physical Education and Sports at the University of León
- ◆ Expert in Ultrasound MSK (SEMED-FEMEDE)
- ◆ Degree in Medicine and Surgery

**Dr. Vollmer Torrubiano, Iván**

- ◆ Medical Specialist in Radiology
- ◆ Doctor of the Hospital Universitario Clinic i Provincial. Barcelona
- ◆ Director in the Specialist Degree in Thoracic Ultrasound at the Autonomous University of Barcelona
- ◆ Collaborator of EcoClub of SOMIAMA and collaborator of SOCANECO
- ◆ Degree in Medicine and Surgery

**Dr. Yus Teruel, Santiago**

- ◆ Specialist in Intensive Care Medicine
- ◆ Assistant Physician of Intensive Care Medicine, La Paz-Carlos III University Hospital Complex. Madrid
- ◆ Member of the Ecoclub of SOMIAMA
- ◆ Degree in Medicine and Surgery

# 05

# Structure and Content

TECH has assembled a specialized and relevant teaching team to deliver a degree that offers the latest and most innovative content in the field of Clinical Ultrasound in Emergencies and Intensive Care for Nursing. Through a theoretical-practical approach, students will be able to deepen throughout the 10 modules that make up this program in ultrasound imaging, the different examination techniques depending on the pathology, as well as the resolution of the most common problems and complications. An agenda available 24 hours a day that you can access comfortably from a computer or laptop.





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*You have a comprehensive and innovative syllabus that will keep you up to date with scientific advances in ultrasound-guided procedures”*

## Module 1. Ultrasound imaging

- 1.1. Physical Principles |
  - 1.1.1. Sounds and Ultrasound
  - 1.1.2. Nature of Ultrasound
  - 1.1.3. Interaction of Ultrasound with Matter
  - 1.1.4. 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. Echo Reception
  - 1.2.5. Ultrasound Image Generation
- 1.3. Ultrasound Modes
  - 1.3.1. Mode A
  - 1.3.2. M mode
  - 1.3.3. Mode B
  - 1.3.4. Color Doppler
  - 1.3.5. Angio-Doppler
  - 1.3.6. Spectral Doppler
  - 1.3.7. Combined Modes
  - 1.3.8. Other Modalities and Techniques
- 1.4. Echography
  - 1.4.1. Console Echograph Ultrasound Scanners
  - 1.4.2. Portable Echograph Ultrasound scanners
  - 1.4.3. Specialised Echograph Ultrasound Scanners
  - 1.4.4. Transducers
- 1.5. Ultrasound Maps and EchoNavigation
  - 1.5.1. Sagittal Plane
  - 1.5.2. Transverse Plane
  - 1.5.3. Coronal Plane
  - 1.5.4. Oblique Planes
  - 1.5.5. Ultrasound Marking
  - 1.5.6. Transducer Movements





## Module 2. Clinical Cardiac Ultrasound

- 2.1. Cardiac Anatomy
  - 2.1.1. Basic Three-Dimensional Anatomy
  - 2.1.2. Basic Cardiac Physiology
- 2.2. Technical Requirements to Perform a Cardiac Ultrasound
  - 2.2.1. Probes
  - 2.2.2. Characteristics of the Equipment used in a Cardiac Ultrasound
- 2.3. Pericardial Windows and Cardiac Ultrasound
  - 2.3.1. Windows and Planes Applied in Emergencies and Intensive Care Situations
  - 2.3.2. Basic Doppler (Color, Pulsating, Continuous and Tissue Doppler)
- 2.4. Structural Alterations
  - 2.4.1. Basic Measures in Cardiac Ultrasound
  - 2.4.2. Thrombi
  - 2.4.3. Suspected Endocarditis
  - 2.4.4. Valvulopathies
  - 2.4.5. Pericardium
  - 2.4.6. How is an ultrasound reported in emergency and intensive care?
- 2.5. Hemodynamic Ultrasound
  - 2.5.1. Left Ventricular Hemodynamics
  - 2.5.2. Right Ventricular Hemodynamics
  - 2.5.3. Preload Dynamic Tests
- 2.6. Transesophageal Echocardiogram
  - 2.6.1. Technique
  - 2.6.2. Indications in Emergencies and Intensive Care Cases
  - 2.6.3. Ultrasound-Guided Study of Cardioembolism

### Module 3. Clinical Thoracic Ultrasound

- 3.1. Anatomy Recap.
  - 3.1.1. Study of the Normal Thorax
  - 3.1.2. Pulmonary Ultrasound Semiology
  - 3.1.3. Pleural Ultrasound Semiology
- 3.2. Technical Requirements
  - 3.2.1. Types of Probes Used
  - 3.2.2. Ultrasound with Contrast in the Thorax
- 3.3. Examination Technique
  - 3.3.1. Examination of Pulmonary Pathology
  - 3.3.2. Examination of Pleural Pathology
  - 3.3.3. Examination of Mediastinal and Thoracic Wall Pathology
- 3.4. Ultrasound of the Thoracic Wall, Pleura and the Mediastinum
  - 3.4.1. Pleural Effusion and Solid Pleural Pathology
  - 3.4.2. Pneumothorax
  - 3.4.3. Pleural Interventionism
  - 3.4.4. Adenopathies and Mediastinal Masses
  - 3.4.5. Adenopathies of the Thoracic Wall
  - 3.4.6. Osteomuscular Pathology of the Thoracic Wall
- 3.5. Pulmonary Ultrasound Scan
  - 3.5.1. Pneumonia and Atelectasis
  - 3.5.2. Pulmonary Neoplasms
  - 3.5.3. Diffuse Pulmonary Pathology
  - 3.5.4. Pulmonary Infarction
- 3.6. Diaphragmatic Ultrasound
  - 3.6.1. Ultrasound Approach to the Diaphragmatic Pathology
  - 3.6.2. Usefulness of Ultrasound in the Study of the Diaphragm

### Module 4. Clinical Vascular Ultrasound

- 4.1. Anatomy Recap.
  - 4.1.1. Venous Vascular Anatomy of the Upper Limbs
  - 4.1.2. Arterial Vascular Anatomy of the Upper Limbs
  - 4.1.3. Venous Vascular Anatomy of the Lower Limbs
  - 4.1.4. Arterial Vascular Anatomy of the Lower Limbs
- 4.2. Technical Requirements
  - 4.2.1. Ultrasound Scanners and Probes
  - 4.2.2. Curve Analysis
  - 4.2.3. Image-Color Media
  - 4.2.4. Echo Contrasts
- 4.3. Examination Technique
  - 4.3.1. Positioning
  - 4.3.2. Insonation. Examining Technique
  - 4.3.3. Study of Normal Curves and Speeds
- 4.4. Large Thoracoabdominal Vessels
  - 4.4.1. Venous Vascular Anatomy of the Abdomen
  - 4.4.2. Arterial Vascular Anatomy of the Abdomen
  - 4.4.3. Abdomino-Pelvic Venous Pathology
  - 4.4.4. Abdomino-Pelvic Arterial Pathology
- 4.5. Supra-Aortic Trunks
  - 4.5.1. Venous Vascular Anatomy of the Supra-Aortic Trunks
  - 4.5.2. Arterial Vascular Anatomy of the Supra-Aortic Trunks
  - 4.5.3. Venous Pathology of the Supra-Aortic Trunks
  - 4.5.4. Arterial Pathology of the Supra-Aortic Trunks
- 4.6. Peripheral Arterial and Venous Circulation
  - 4.6.1. Venous Pathology of Lower and Upper Limbs
  - 4.6.2. Arterial Pathology of Lower and Upper Limbs

**Module 5. Clinical Cerebral Ultrasound**

- 5.1. Cerebral Hemodynamics
  - 5.1.1. Carotid Circulation
  - 5.1.2. Vertebro-Basilar Circulation
  - 5.1.3. Cerebral Microcirculation
- 5.2. Ultrasound Modes
  - 5.2.1. Transcranial Doppler
  - 5.2.2. Cerebral Ultrasound
  - 5.2.3. Special Tests (Vascular Reaction, HITS, etc.)
- 5.3. Acoustic Windows and Examination Technique
  - 5.3.1. Acoustic Windows
  - 5.3.2. Operator Position
  - 5.3.3. Examination Sequence
- 5.4. Structural Alterations
  - 5.4.1. Collections and Masses
  - 5.4.2. Vascular Anomalies.
  - 5.4.3. Hydrocephalus
  - 5.4.4. Venous Pathology
- 5.5. Hemodynamic Alterations
  - 5.5.1. Spectral Analysis
  - 5.5.2. Hyperdynamics
  - 5.5.3. Hypodynamics
  - 5.5.4. Asystole of the Brain
- 5.6. Ocular Ultrasonography
  - 5.6.1. Pupil Size and Reactivity
  - 5.6.2. Diameter of the Optic Nerve Sheath

**Module 6. Clinical Abdominal Ultrasound**

- 6.1. Anatomy Recap.
  - 6.1.1. Abdominal Cavity
  - 6.1.2. Liver
  - 6.1.3. Gallbladder and Bile Ducts
  - 6.1.4. Retroperitoneum and Great Vessels
  - 6.1.5. Pancreas.
  - 6.1.6. Bladder
  - 6.1.7. Kidneys
  - 6.1.8. Bladder
  - 6.1.9. Prostate and Seminal Vesicles
  - 6.1.10. Uterus and Ovaries
- 6.2. Technical Requirements
  - 6.2.1. Ultrasound Equipment
  - 6.2.2. Types of Transducers for Abdominal Examination
  - 6.2.3. Basic Ultrasound Settings
  - 6.2.4. Patient Preparation
- 6.3. Examination Technique
  - 6.3.1. Examination Planes
  - 6.3.2. Probe Movements
  - 6.3.3. Visualization of Organs According to Conventional Sectioning
  - 6.3.4. Systematic Examination
- 6.4. ECO-FAST Methodology
  - 6.4.1. Equipment and Transducers
  - 6.4.2. FAST I
  - 6.4.3. FAST II
  - 6.4.4. FAST III. Perivesical Effusion
  - 6.4.5. FAST IV. Pericardial Effusion
  - 6.4.6. ECO-FAST V. Exclude ABD Aortic Aneurysm

- 6.5. Ultrasound Scan of the Digestive System
  - 6.5.1. Liver
  - 6.5.2. Gallbladder and Bile Ducts
  - 6.5.3. Pancreas.
  - 6.5.4. Bladder
- 6.6. Genitourinary Ultrasound
  - 6.6.1. Kidney
  - 6.6.2. Urinary Bladder
  - 6.6.3. Male Genital System
  - 6.6.4. Female Genital System

### Module 7. Clinical Musculoskeletal Ultrasound

- 7.1. Anatomy Recap.
- 7.2. Technical Requirements
- 7.3. Examination Technique
- 7.4. Sonoanatomy of the Locomotor System: I. Upper Extremities
- 7.5. Sonoanatomy of the Locomotor System: II. Lower Extremities
- 7.6. Ultrasound in the Most Frequent Acute Locomotor System Injuries

### Module 8. Ultrasonographic Approach to the Major Syndromes.

- 8.1. Cardiac Arrest
  - 8.1.1. Cerebral Hemodynamics
  - 8.1.2. Brain Damage in Cardiac Arrest
  - 8.1.3. Usefulness of Ultrasound in Resuscitation
  - 8.1.4. Usefulness of Ultrasound After Recovery of Spontaneous Circulation

- 8.2. Shock
  - 8.2.1. Ventricular Filling Pressure
  - 8.2.2. Cardiac Output
  - 8.2.3. Prediction of the Hemodynamic Response to Intravascular Volume Administration
  - 8.2.4. Ultrasound Assessment of Pulmonary Edema
  - 8.2.5. Ultrasound Search for Sources of Sepsis
- 8.3. Respiratory Failure
  - 8.3.1. Acute Respiratory Failure: Diagnosis
  - 8.3.2. Abrupt Hypoxemia in Patients on Mechanical Ventilation
  - 8.3.3. Monitoring of Recruitment Maneuvers
  - 8.3.4. Assessment of Extravascular Lung Water
- 8.4. Acute Renal Failure.
  - 8.4.1. Hydronephrosis
  - 8.4.2. Lithiasis
  - 8.4.3. Acute Tubular Necrosis
  - 8.4.4. Doppler Ultrasound in Acute Renal Failure
  - 8.4.5. Bladder Ultrasound in Acute Renal Failure
- 8.5. Trauma
  - 8.5.1. FAST and E-FAST (Hemo and Pneumothorax)
  - 8.5.2. Ultrasound Assessment in Special Situations
  - 8.5.3. Hemodynamic Assessment Focused on Trauma
- 8.6. Stroke
  - 8.6.1. Justification
  - 8.6.2. Initial Assessment
  - 8.6.3. Ultrasound Appraisal
  - 8.6.4. Ultrasound-Guided Management



## Module 9. Ultrasound-Guided Procedures

- 9.1. Airway
  - 9.1.1. Advantages and Disadvantages
  - 9.1.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 9.1.3. Orotracheal Intubation Technique
  - 9.1.4. Percutaneous Tracheotomy Technique
  - 9.1.5. Common Problems, Complications, and Practical Advice
- 9.2. Vascular Cannulation
  - 9.2.1. Indications and Advantages of the Anatomical Reference Technique
  - 9.2.2. Current Evidence on Ultrasound-Guided Vascular Cannulation
  - 9.2.3. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 9.2.4. Ultrasound-Guided Central Venous Cannulation Technique
  - 9.2.5. Single Peripheral Catheter and Peripherally Inserted Central Catheter (PICC) Cannulation Technique.
  - 9.2.6. Arterial Cannulation Technique
  - 9.2.7. Implementation of an Ultrasound-Guided Vascular Cannulation Protocol
  - 9.2.8. Common Problems, Complications, and Practical Advice
- 9.3. Pericardiocentesis and Thoracentesis
  - 9.3.1. Indications and Advantages of the Anatomical Reference Technique
  - 9.3.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 9.3.3. Ultrasound Specifications and Pericardial Drainage Technique
  - 9.3.4. Ultrasound Specifications and Thoracic Drainage Technique
  - 9.3.5. Common Problems, Complications, and Practical Advice
- 9.4. Paracentesis
  - 9.4.1. Indications and Advantages of the Anatomical Reference Technique
  - 9.4.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 9.4.3. Ultrasound Specifications and Technique
  - 9.4.4. Common Problems, Complications, and Practical Advice

- 9.5. Lumbar Puncture
  - 9.5.1. Indications and Advantages of the Anatomical Reference Technique
  - 9.5.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 9.5.3. Technique
  - 9.5.4. Common Problems, Complications, and Practical Advice
- 9.6. Other Drainage and Probing
  - 9.6.1. Suprapubic Probing
  - 9.6.2. Collection Drainage
  - 9.6.3. Extraction of Foreign Bodies

## Module 10. Clinical Pediatric Ultrasound

- 10.1. Technical Requirements
  - 10.1.1. Ultrasound at the Patient's Bedside
  - 10.1.2. Physical Space
  - 10.1.3. Basic Equipment
  - 10.1.4. Equipment for Interventionalist Ultrasounds
  - 10.1.5. Ultrasound Scanners and Probes
- 10.2. Examination Technique
  - 10.2.1. Pediatric Patient Preparation
  - 10.2.2. Tests and Probes
  - 10.2.3. Ultrasound Section Planes
  - 10.2.4. Examination System
  - 10.2.5. Ultrasound-Guided Procedures
  - 10.2.6. Images and Documentation
  - 10.2.7. Test Report

- 10.3. Pediatric Sonoanatomy and Sonophysiology
  - 10.3.1. Normal Anatomy
  - 10.3.2. Sonoanatomy
  - 10.3.3. Sonophysiology of a Child in the Different Stages of Development
  - 10.3.4. Variants of Normality
  - 10.3.5. Dynamic Ultrasound
- 10.4. Ultrasound of the Major Pediatric Syndromes
  - 10.4.1. Emergency Thorax Ultrasound
  - 10.4.2. Acute Abdomen
  - 10.4.3. Acute Scrotum
- 10.5. Ultrasound-Guided Procedures in Pediatrics
  - 10.5.1. Vascular Access
  - 10.5.2. Extraction of Superficial Foreign Bodies
  - 10.5.3. Pleural Effusion
- 10.6. Introduction to Neonatal Clinical Ultrasound
  - 10.6.1. Emergency Transfontanellar Ultrasound
  - 10.6.2. Most Common Examination Indications in Emergencies
  - 10.6.3. Most Common Pathologies in Emergencies





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*A 100% online program that offers the professional the opportunity to study ultrasound in depth in patients with major pediatric syndromes"*

06

# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





“

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

## At TECH 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.

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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. 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 Emergencies and Intensive Care for Nursing 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”*

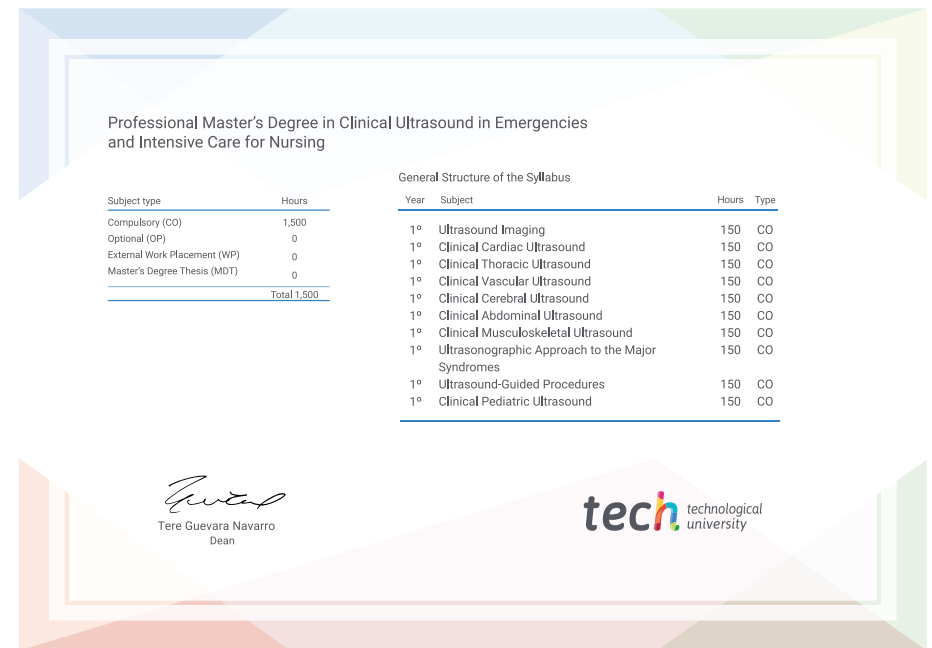
This **Professional Master's Degree in Clinical Ultrasound in Emergencies and Intensive Care for Nursing** contains the most complete and updated scientific program on the market.

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 Emergencies and Intensive Care for Nursing**

Official N° of hours: **1,500 h.**



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

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



## Professional Master's Degree Clinical Ultrasound in Emergencies and Intensive Care for Nursing

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

# Professional Master's Degree Clinical Ultrasound in Emergencies and Intensive Care for Nursing

