

# Postgraduate Diploma

## Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care for Nursing





## Postgraduate Diploma Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care for Nursing

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/nursing/postgraduate-diploma/postgraduate-diploma-clinical-cardiothoracic-ultrasound-emergencies-intensive-care-nursing](http://www.techtute.com/us/nursing/postgraduate-diploma/postgraduate-diploma-clinical-cardiothoracic-ultrasound-emergencies-intensive-care-nursing)

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# 01

# Introduction

Cardiac diseases are very prevalent in developed countries and clinical ultrasound techniques provide the opportunity to optimize the diagnostic processes in a way that was not possible before now. The importance of this tool is what makes it necessary for nursing professionals to be up to date on the latest innovations in the field, with the aim of carrying out their professional work to a high quality standard.



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*We offer you the best specialization of the moment so that you can improve your qualifications as a nurse”*

The use of clinical cardiothoracic ultrasound in emergencies and intensive care has become a fundamental part of the nursing field. Therefore, professionals must be up to date in the use of this type of tools, which will allow them to develop their work in a more effective way. Specifically, by studying this specialization they will be trained in the use of ultrasound devices in the management of emergency and critical care situations, with total guarantees of effectiveness and confidence.

It must be taken into account that clinical ultrasound is a tool that helps to diagnose and treat patients in emergency situations or with intensive care needs. Today, it is one of the most popular and valuable tools for guiding diagnostic and therapeutic interventions. In addition, it has the advantages of portability, accuracy, real-time display, reproducibility and efficiency.

Technological advances have made it possible to reduce the size of the equipment, making it cheaper and more portable, and have increased the capacity of clinical ultrasound, leading to a notable increase in its applications. Nowadays, more accurate ultrasound diagnosis, safe ultrasound-guided interventions, precise non-invasive hemodynamic evaluations and rapid assessment of traumatic injuries are all possible.

In this Postgraduate Diploma, TECH offers students the most complete specialization program on clinical ultrasound, specifying its use in the care of patients who find themselves in emergency situations or those who need intensive care. Additionally, as it is a 100% online training, the student will have the opportunity to balance their studies with the rest of their daily commitments, so that they will be able to improve their training in a comfortable way.

This **Postgraduate Diploma in Clinical Cardiothoracic 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 of the specialization are:

- ♦ Clinical cases presented by experts in clinical ultrasound in emergencies and intensive care
- ♦ 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
- ♦ Latest developments in Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ An algorithm-based interactive learning system for decision-making in the clinical situations presented throughout the course
- ♦ 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"*



*This Postgraduate Diploma is the best investment you can make when choosing a specialization course for two reasons: you will acquire the best and most up-to-date specialization in Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care for Nursing, and you will obtain a Postgraduate Diploma issued by TECH Technological University”*

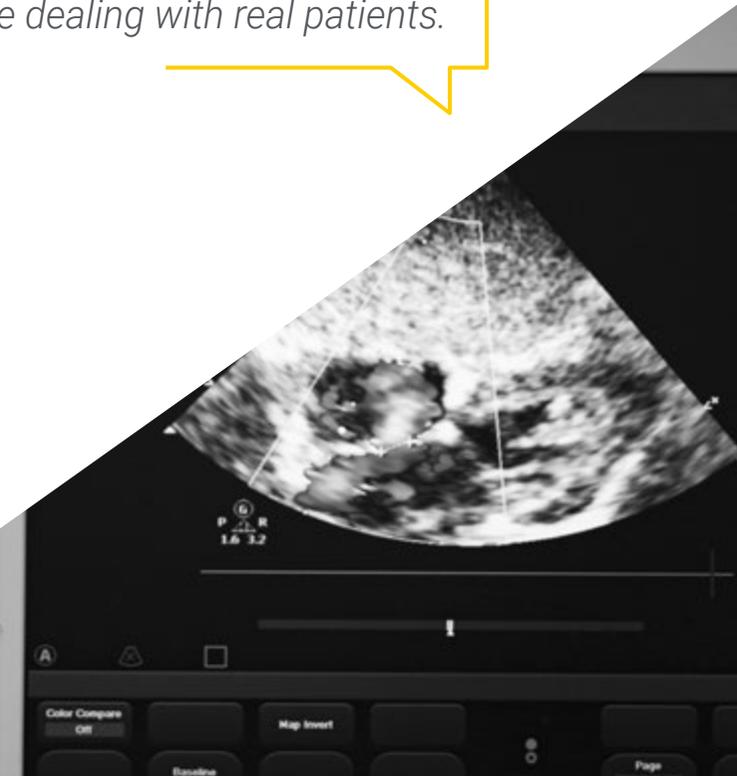
The teaching staff includes professionals from the field of clinical ultrasound, who bring their experience to this training program, as well as renowned specialists from leading scientific societies

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 an immersive training program designed to train 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 physician will be assisted by an innovative interactive video system created by renowned and experienced experts in the field of clinical cardiothoracic ultrasound in emergencies and intensive care, who have extensive teaching experience

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

*We offer you the opportunity to study with a multitude of practical cases in such a way that you can learn new skills as if you were dealing with real patients.*



# 02 Objectives

This Postgraduate Diploma in Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care for Nursing is aimed at enhancing the physician's ability to diagnose and treat patients in emergency or intensive care situations.



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*Our goal is to offer our students the most complete training on the market so that they are able to excel and broaden their knowledge and, therefore, become more efficient in their profession"*



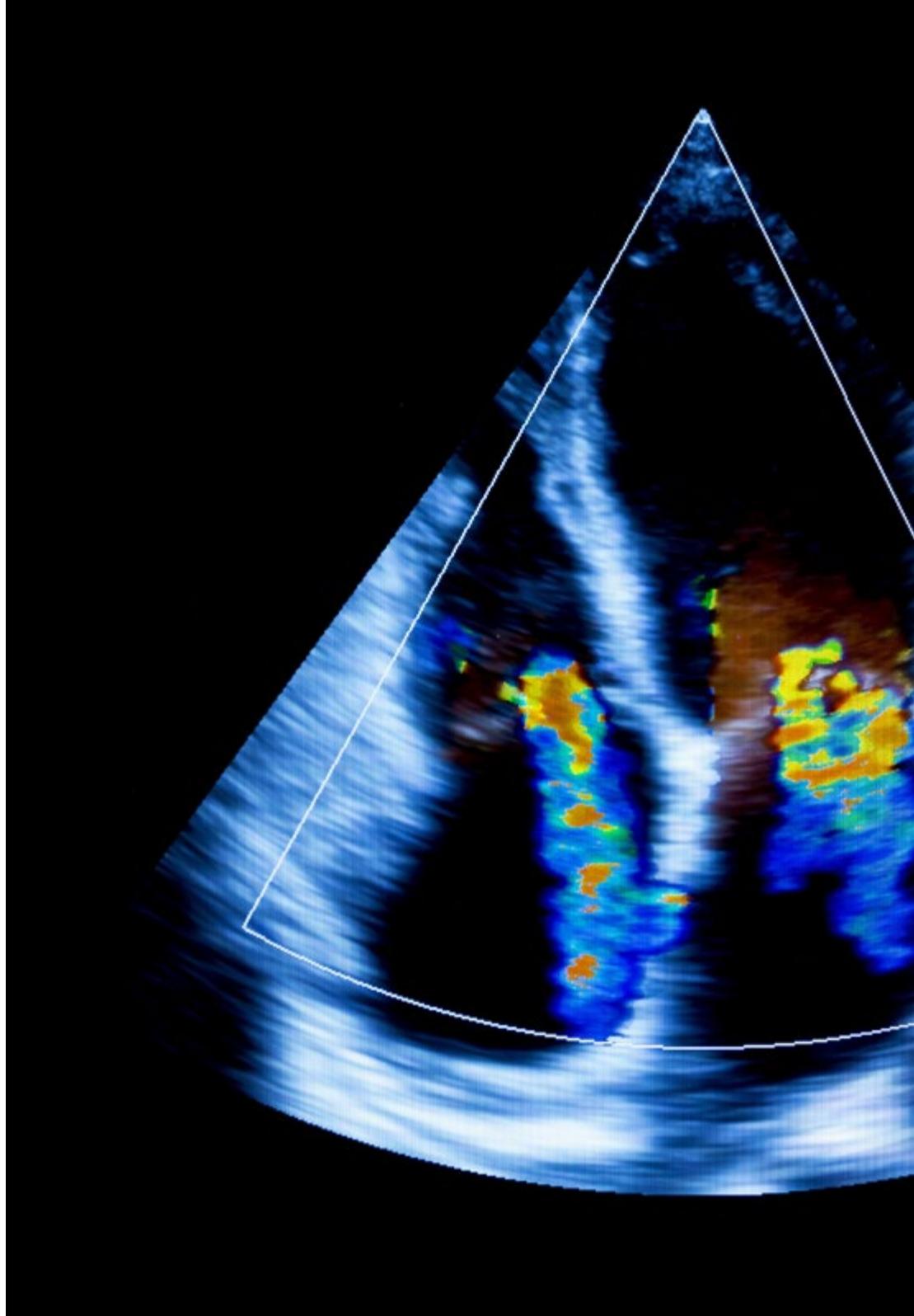
### General Objective

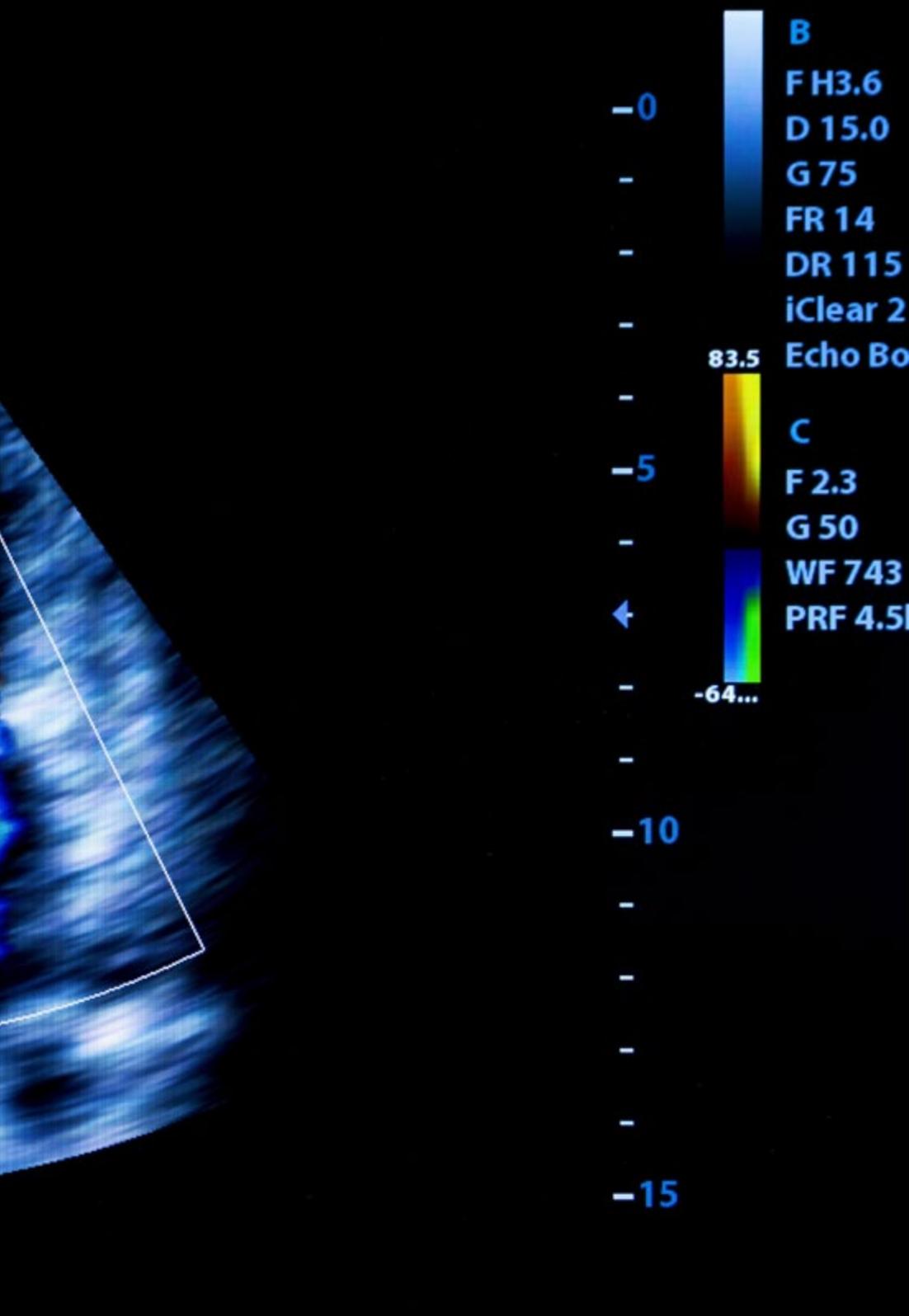
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- Update the nurses' knowledge in the processes of using ultrasound devices for the management of cardiothoracic pathological conditions in the patient, specifically in emergency situations and in critically ill patients, regardless of the environment in which they find themselves



*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 that 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 ultrasound and their applications
- ♦ Describe the different ultrasound maps
- ♦ Explain the principles of econavigation

### 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 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

03

# Course Management

The program includes in its teaching staff renowned experts in Clinical Ultrasound, who contribute their 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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*Leading experts in the field are  
at the best university to help you  
achieve professional success”*

## Management



### Dr. Álvarez Fernández, Jesús Andrés

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

## Coordination

### Dr. Igeño Cano, José Carlos

- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Intensive Care Medicine.
- ♦ Head of Intensive Care and Emergency Services.
- ♦ San Juan de Dios Hospital, Cordoba
- ♦ Member of the HU-CI Project
- ♦ Creator and Director of Course of Ultrasound-guided Venous Canalization (CAVE)

### 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. Vollmer Torrubiano, Iván**

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

**Dr. Colinas Fernández, Laura**

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

**Dr. Jiménez Díaz, Fernando**

- ♦ Degree in Medicine and Surgery
- ♦ 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 Ultrasound of the Catholic University of Murcia

**Dr. López Rodríguez, Lucía**

- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Intensive Care Medicine.
- ♦ Attending Physician of Intensive Care Medicine and Major Burns Unit.
- ♦ University Hospital of Getafe, (Madrid)
- ♦ Member of the Ecoclub of SOMIAMA.

**Dr. Martínez Díaz, Cristina**

- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Intensive Care Medicine.
- ♦ Attending Physician in Intensive Care Medicine.
- ♦ University Hospital Prince of Asturias, Alcalá de Henares, Madrid
- ♦ Member of the Ecoclub of SOMIAMA.

**Dr. Mora Rangil, Patricia**

- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Intensive Care Medicine.
- ♦ Montecanal Clinic, Zaragoza
- ♦ Member of the Spanish Society for Ultrasound in Critical Cases (ECOCRITIC)

**Dr. Núñez Reiz, Antonio**

- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Intensive Care Medicine.
- ♦ Attending Physician in Intensive Medicine.
- ♦ San Carlos Clinical University Hospital, Madrid.
- ♦ Collaborating Professor in the Specialist Degree in Thoracic Ultrasound at the Autonomous University of Barcelona.
- ♦ Founding Member and Attending Coordinator of the Ecoclub of SOMIAMA.
- ♦ Collaborating Professor of SOCANEKO

**Dr. Ortuño Andériz, Francisco**

- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Intensive Care Medicine.
- ♦ Attending Physician in Intensive Medicine.
- ♦ San Carlos Clinical University Hospital, Madrid.
- ♦ Collaborating Professor of the Master's Degree in Update on Intensive Care Medicine at the CEU Cardenal Herrera University of Valencia.
- ♦ Founding Member of the Ecoclub of SOMIAMA

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

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

**Dr. Serna Gandía, María**

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



04

# Structure and Content

The structure of the contents has been designed by a team of professionals from the best educational hospital and universities in the country, who are aware of the relevance of up-to-date, training, and are committed to quality teaching using new educational technologies.



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*We have the most complete and up-to-date scientific program on the market. We strive for educational excellence and we want you to achieve it too"*

## 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. Ecography
  - 1.4.1. Console Ecograph Ultrasound Scanners
  - 1.4.2. Portable Ecograph Ultrasound scanners
  - 1.4.3. Specialized Ecograph Ultrasound Scanners
  - 1.4.4. Transducers
- 1.5. Ultrasound Maps and Eco Navigation
  - 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. Cardiac Windows and Examination Techniques
  - 2.3.1. Windows and Maps 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 Situations?
- 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



*A unique training opportunity to advance your career"*

## Module 3. Clinical Vascular Ultrasound

- 3.1. Anatomy Recap
  - 3.1.1. Venous Vascular Anatomy of the Upper Limbs
  - 3.1.2. Arterial Vascular Anatomy of the Upper Limbs
  - 3.1.3. Venous Vascular Anatomy of the Lower Limbs
  - 3.1.4. Arterial Vascular Anatomy of the Lower Limbs
- 3.2. Technical Requirements
  - 3.2.1. Ultrasound Scanners and Probes
  - 3.2.2. Curve Analysis
  - 3.2.3. Image-Color Media
  - 3.2.4. Echo Contrasts
- 3.3. Examination Technique
  - 3.3.1. Positioning
  - 3.3.2. Insonation. Examining Technique
  - 3.3.3. Study of Normal Curves and Speeds
- 3.4. Large Thoracoabdominal Vessels
  - 3.4.1. Venous Vascular Anatomy of the Abdomen
  - 3.4.2. Arterial Vascular Anatomy of the Abdomen
  - 3.4.3. Abdomino-Pelvic Venous Pathology
  - 3.4.4. Abdomino-Pelvic Arterial Pathology
- 3.5. Supra-Aortic Trunks
  - 3.5.1. Venous Vascular Anatomy of the Supra-Aortic Trunks
  - 3.5.2. Arterial Vascular Anatomy of the Supra-Aortic Trunks
  - 3.5.3. Venous Pathology of the Supra-Aortic Trunks
  - 3.5.4. Arterial Pathology of the Supra-Aortic Trunks
- 3.6. Peripheral Arterial and Venous Circulation
  - 3.6.1. Venous Pathology of Lower and Upper Limbs
  - 3.6.2. Arterial Pathology of Lower and Upper Limbs



05

# 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.

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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.



06

# Certificate

The Postgraduate Diploma in Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care for Nursing guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.



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

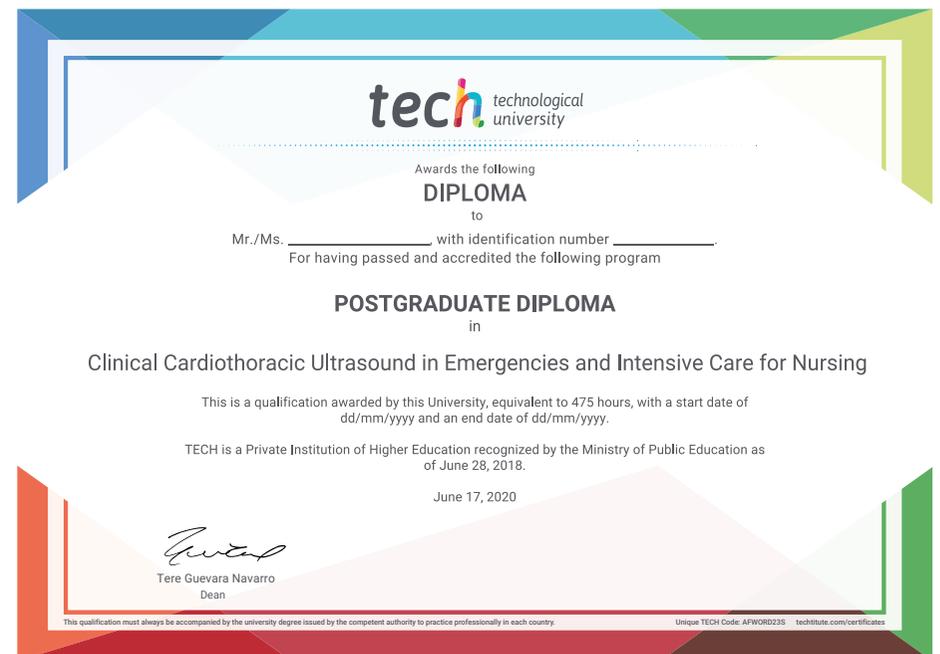
This **Postgraduate Diploma in Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care for Nursing** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery\*.

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

Title: **Postgraduate Diploma in Clinical Cardiothoracic Ultrasound in Emergencies and Intensive Care for Nursing**

Official N° of Hours: **475 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.

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education information tutors  
guarantee accreditation teaching  
institutions technology learning



**Postgraduate Diploma**  
Clinical Cardiothoracic  
Ultrasound in Emergencies  
and Intensive Care  
for Nursing

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Diploma

Clinical Cardiothoracic Ultrasound  
in Emergencies and Intensive  
Care for Nursing