

# Postgraduate Diploma

Ultrasound Approach to Major  
Syndromes and Ultrasound-  
Guided Procedures





## Postgraduate Diploma

### Ultrasound Approach to Major Syndromes and Ultrasound-Guided Procedures

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Credits: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-ultrasound-approach-major-syndromes-ultrasound-guided-procedures](http://www.techtute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-ultrasound-approach-major-syndromes-ultrasound-guided-procedures)

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# 01

# Introduction

The advances that have been made in diagnostic imaging, specifically in relation to ultrasound, have allowed medical specialists to work in a more accurate and specialized way based on the pathology suffered by the patient. Thanks to sound waves, it is possible to take reliable images of internal organs, tissues and structures without causing any adverse effects on the patient. However, in order to interpret the results, practitioners are required to master both the latest analysis strategies as well as the latest ultrasound-guided procedures. And to get up to date in the ultrasound approach to major syndromes you can count on this comprehensive 100% online program that will immerse you in the advances made in this area through a comprehensive and multidisciplinary academic experience.





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*If you are looking for a program that will allow you to perfect your medical skills in the Approach and Interpretation of Ultrasound-Guided Procedures, this Postgraduate Diploma is perfect for you”*

Diagnostic ultrasound has become one of the most widely used procedures in the medical field to address major syndromes such as cardiac problems, respiratory failure, trauma, abdominal pain and many more. Given its reliability, the quality of its results, and that it poses no risk to patients (unlike X-rays, for example), many resources have been used to perfect its use, thus guaranteeing clear intracorporeal images that provide valuable information to diagnose and treat numerous diseases.

However, the procedure requires technical, specialized and updated knowledge, which medical professionals will be able to obtain with this Postgraduate Diploma. TECH presents the program as a 100% online academic opportunity where graduates will be able to update on the latest developments in ultrasound imaging, as well as on the approach to major syndromes such as stroke, sepsis or shock, among others, through the use of this clinical technology. Students will also learn about the latest advances in ultrasound-guided procedures and the most innovative and effective techniques to carry them out: intubation, vascular cannulation, thoracentesis, pericardiocentesis, etc.

To that end, students will benefit from 450 hours of theoretical, practical and additional material, the latter presented in various formats: detailed videos, research articles, complementary readings, images, case studies, self-knowledge exercises and dynamic summaries for each unit. All of this content will be available on the Virtual Campus from the very beginning and can be downloaded to any device with an Internet connection. In this way, the graduate will be able to work on updating their knowledge in a personalized way and based on their time availability, even when they do not have coverage.

This **Postgraduate Diploma in Ultrasound Approach to Major Syndromes and Ultrasound-Guided Procedures** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ Practical cases presented by experts in Medicine and Ultrasound-Guided Procedures
- ♦ 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
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection work
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*You will be able to update your knowledge of the physical principles involved in ultrasound imaging, as well as in setting the appropriate wave sequence for each examination"*

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*A program that incorporates the forefront of the medical field and that includes dozens of hours of additional high-quality material to expand your knowledge on the subject in a personalized way”*

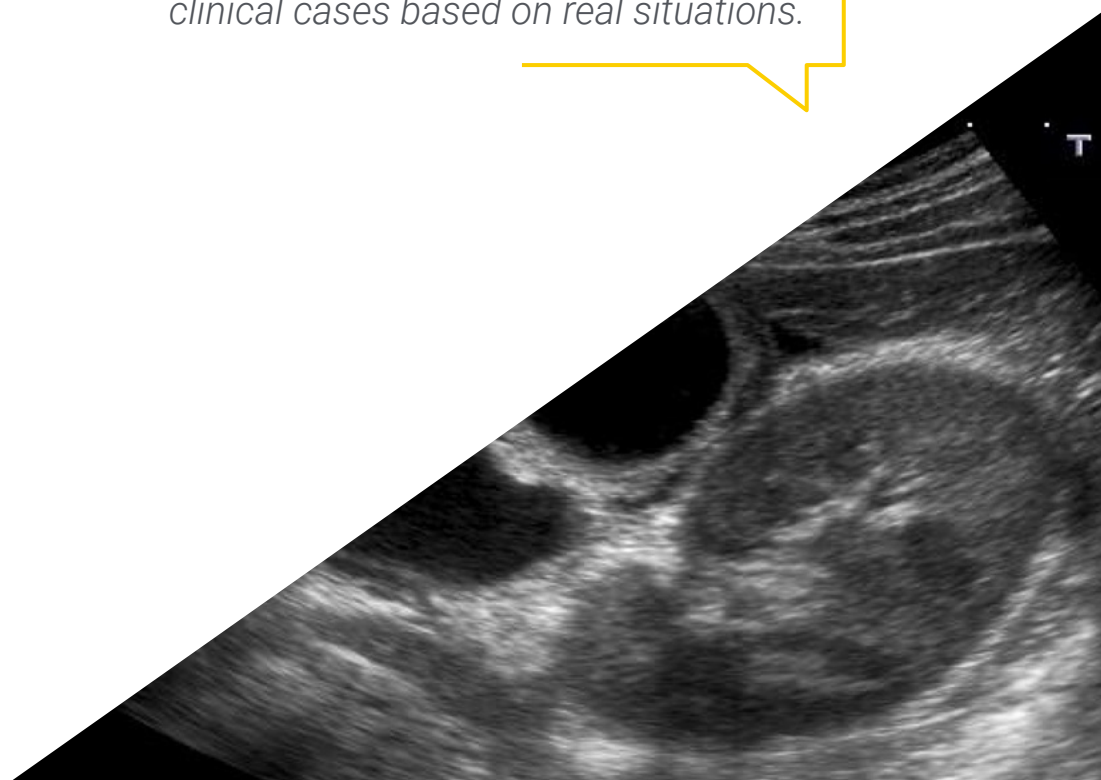
The program's teaching staff includes professionals from the industry who contribute their work experience to this program, as well as renowned specialists from leading societies and prestigious universities.

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 education 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 during the academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Given the comprehensive nature of the program, you will gain in-depth knowledge of the latest ultrasound methods, their distinct features, and the advantages and disadvantages of their use.*

*You will work intensively to perfect your econavigation skills through clinical cases based on real situations.*



# 02 Objectives

The very high frequency in the use of ultrasound in the different specialties of Medicine, as well as the advances that have been made in this field are the reasons why TECH wanted to launch a program through which the professional can catch up on them. That is why the objective of this Postgraduate Diploma is to provide students with both the most cutting-edge content and the best academic tools so they can update their knowledge and perfect their skills in only six months.







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*A program that will provide you with all the resources you need to master Ultrasound-Guided Procedures using the most cutting-edge and innovative techniques in the hospital sector”*



## General Objectives

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- Provide the most exhaustive and innovative information on Ultrasound Approaches to Major Clinical Syndromes
- Establish clinical action guidelines based on the latest diagnostic and therapeutic strategies in medicine

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*You benefit from a detailed and updated explanation on the different uses of ultrasound in the approach to major syndromes such as trauma, abdominal pain or sepsis”*





## 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. 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 3. Echoguided Procedures in Emergencies and Critical Care

- ◆ 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

# 03

## Course Management

The professors on this Postgraduate Diploma, as it could not be otherwise, form a group of specialists in the medical field who have extensive professional experience in the use of ultrasound as a quintessential diagnostic imaging test. Thanks to their experience and actively working at clinical centers, they possess detailed knowledge of the latest developments in the technique, so they will impart the most avant-garde and accurate information available in the area.





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*The exhaustive and specialized work the teaching team put into the program has made it possible to create a syllabus based on the latest developments in the Diagnostic Approach using Co-Guided Procedures in the hospital sector”*

## Management



### **Dr. Álvarez Fernández, Jesús Andrés**

- Chief Physician at the Juaneda Miramar Hospital
- Specialist in Intensive Care Medicine and Burn Patient Management at the University Hospital of Getafe
- Associate Researcher of the Neurochemistry and Neuroimaging Area at the University of La Laguna



# 04

## Structure and Content

The teaching team has invested a substantial amount of time in developing the content on this Postgraduate Diploma. As professionals versed in the field, they possess detailed knowledge of what information physicians need to update and perfect their skills in the use of ultrasound-guided techniques in diagnostics and medical monitoring. The program also includes a variety of high-quality additional material, as well as clinical cases taken from the professors' professional practice, so students can train and perfect their skills in a dynamic and multidisciplinary manner.







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*Thanks to its 100% online format, diverse additional material has been included for you to contextualize the information and never be left in the dark”*

## 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. Specialised 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. Ultrasonographic Approach to the Major Syndromes

- 2.1. Ultrasound in Acute Renal Failure
  - 2.1.1. Introduction
    - 2.1.1.1. Pre-renal ARF
    - 2.1.1.2. Renal or Intrinsic ARF
    - 2.1.1.3. Post-renal or Obstructive ARF
  - 2.1.2. Hydronephrosis
  - 2.1.3. Lithiasis
  - 2.1.4. Acute Tubular Necrosis
  - 2.1.5. Doppler Ultrasound in Acute Renal Failure
  - 2.1.6. Bladder Ultrasound in Acute Renal Failure
- 2.2. Ultrasound in Trauma
  - 2.2.1. FAST and E-FAST (Hemo and Pneumothorax)
  - 2.2.2. Ultrasound Assessment in Special Situations
  - 2.2.3. Hemodynamic Assessment Focused on Trauma
- 2.3. Ultrasound in Stroke
  - 2.3.1. Introduction
  - 2.3.2. Justification
  - 2.3.3. Initial Assessment
  - 2.3.4. Ultrasound Appraisal
  - 2.3.5. Ultrasound-Guided Management
- 2.4. Ultrasound in Cardiac Arrest
  - 2.4.1. Cerebral Hemodynamics
  - 2.4.2. Hemodynamics in Cardiac Arrest
  - 2.4.3. Usefulness of Ultrasound in Resuscitation
  - 2.4.4. Usefulness of Ultrasound After Recovery of Spontaneous Circulation
- 2.5. Ultrasound in Shock
  - 2.5.1. Definition, types of shock and echocardiographic findings
    - 2.5.1.1. Definition
    - 2.5.1.2. Types of Shock
    - 2.5.1.3. Advantages of ultrasound in the recognition and management of the different etiologies of shock
    - 2.5.1.4. ICU Considerations
    - 2.5.1.5. Hemodynamic monitoring by ultrasound

- 2.6. Ultrasound in Respiratory Failure
  - 2.6.1. Clinical Ethology of Dyspnea
  - 2.6.2. Approach to Patients with Dyspnoea
  - 2.6.3. The Use of Clinical Ultrasound in Patients with Dyspnoea
  - 2.6.4. Pulmonary Ultrasound Scan
  - 2.6.5. Echocardiography

### Module 3. Echoguided Procedures in Emergencies and Critical Care

- 3.1. Airway
  - 3.1.1. Advantages and Disadvantages
  - 3.1.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 3.1.3. Orotracheal Intubation Technique
  - 3.1.4. Percutaneous Tracheotomy Technique
  - 3.1.5. Common Problems, Complications, and Practical Advice
- 3.2. Vascular Cannulation
  - 3.2.1. Indications and Advantages of the Anatomical Reference Technique
  - 3.2.2. Current Evidence on Ultrasound-Guided Vascular Cannulation
  - 3.2.3. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 3.2.4. Ultrasound-Guided Central Venous Cannulation Technique
  - 3.2.5. Single Peripheral Catheter and Peripherally Inserted Central Catheter (PICC) Cannulation Technique
  - 3.2.6. Arterial Cannulation Technique
  - 3.2.7. Implementation of an Ultrasound-Guided Vascular Cannulation Protocol
  - 3.2.8. Common Problems, Complications, and Practical Advice
- 3.3. Thoracentesis and Pericardiocentesis
  - 3.3.1. Indications and Advantages of the Anatomical Reference Technique
  - 3.3.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 3.3.3. Ultrasound Specifications and Pericardial Drainage Technique
  - 3.3.4. Ultrasound Specifications and Thoracic Drainage Technique
  - 3.3.5. Common Problems, Complications, and Practical Advice

- 3.4. Paracentesis
  - 3.4.1. Indications and Advantages of the Anatomical Reference Technique
  - 3.4.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 3.4.3. Ultrasound Specifications and Technique
  - 3.4.4. Common Problems, Complications, and Practical Advice
- 3.5. Lumbar Puncture
  - 3.5.1. Indications and Advantages of the Anatomical Reference Technique
  - 3.5.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 3.5.3. Technique
  - 3.5.4. Common Problems, Complications, and Practical Advice
- 3.6. Drainages and Drillings
  - 3.6.1. Suprapubic Probing
  - 3.6.2. Collection Drainage
  - 3.6.3. Extraction of Foreign Bodies



*A program that will allow you to offer the most updated and valuable clinical service, based on the most groundbreaking and innovative diagnostic strategies used in ultrasound imaging”*

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 we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

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



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

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

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

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

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

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

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





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

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

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

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

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



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



#### Study Material

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

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



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

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

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



#### Additional Reading

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





**Expert-Led Case Studies and Case Analysis**

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



**Testing & Retesting**

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



**Classes**

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



**Quick Action Guides**

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



06

# Certificate

The Postgraduate Diploma in Ultrasound Approach to Major Syndromes and Ultrasound-Guided Procedures guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Global University.





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

This private qualification will allow you to obtain a **Postgraduate Diploma in Ultrasound Approach to Major Syndromes and Ultrasound-Guided Procedures** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** private qualification is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Ultrasound Approach to Major Syndromes and Ultrasound-Guided Procedures**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**



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



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