

# Hybrid Professional Master's Degree

## Clinical Ultrasound for Emergencies and Critical Care



## Hybrid Professional Master's Degree

### Clinical Ultrasound for Emergencies and Critical Care

Course Modality: Hybrid (Online + Clinical Internship)

Duration: 12 months

Certificate: TECH Technological University

Teaching Hours: 1,620 hours.

Website: [www.techtute.com/in/medicine/hybrid-professional-master-degree/hybrid-professional-master-degree-clinical-ultrasound-emergencies-critical-care](http://www.techtute.com/in/medicine/hybrid-professional-master-degree/hybrid-professional-master-degree-clinical-ultrasound-emergencies-critical-care)

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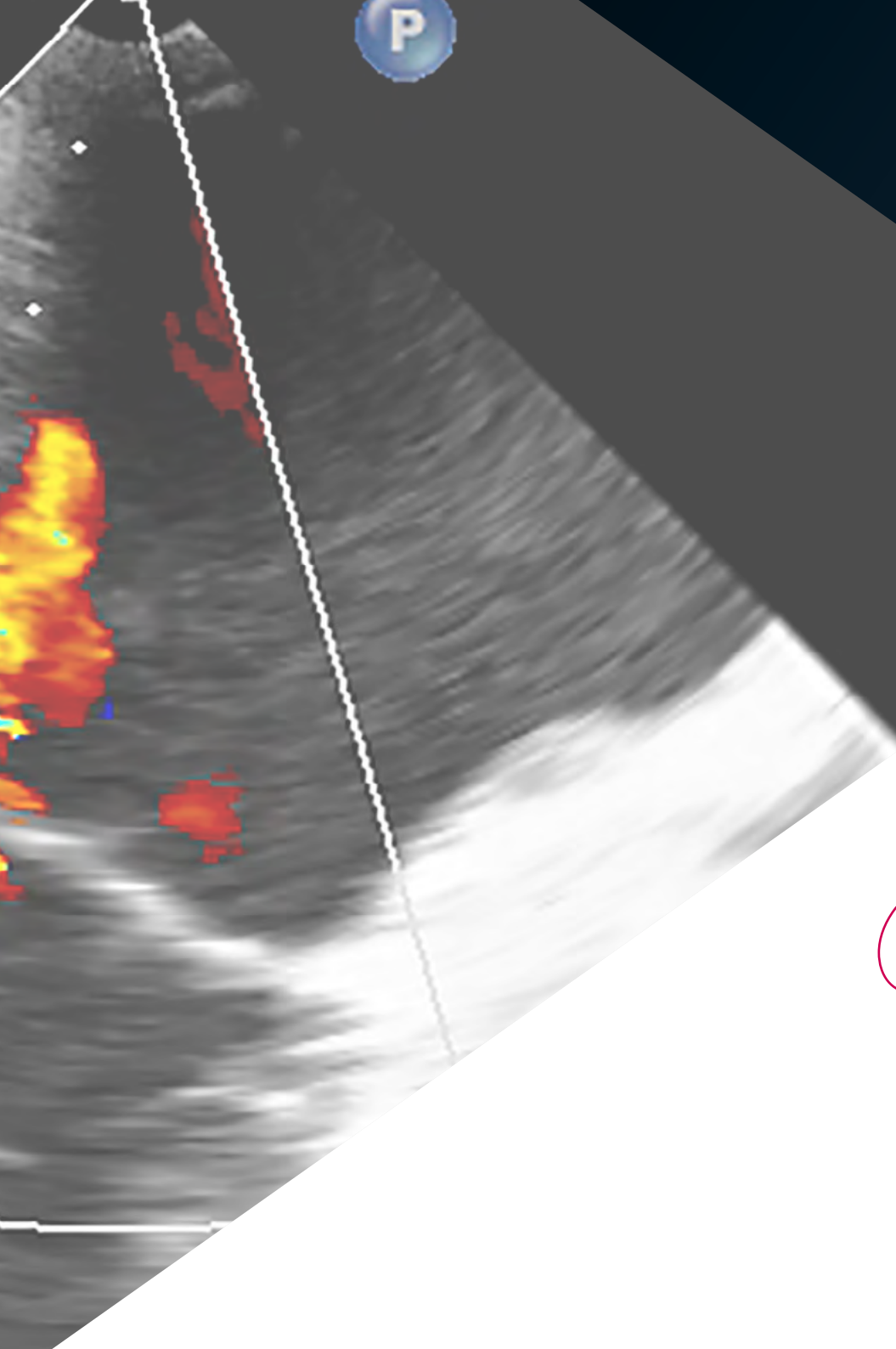
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# 01

# Introduction

Clinical Ultrasound facilitates the diagnosis and treatment of patients in emergency or critical care situations, and has become an increasingly valuable and useful tool to guide diagnostic and therapeutic interventions. Therefore, it is essential for the medical professional to keep up to date with state-of-the-art techniques. This program condenses the most innovative aspects in a 100% online curriculum determined by the vision of a team of expert teachers who have configured the program that includes ultrasound-guided procedures and different ultrasound techniques in different parts of the body and various pathologies. In addition, a 3-week Internship Program in a state-of-the-art clinical center.





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*With this Hybrid Professional Master's Degree you will play a specialized role, applying the most advanced techniques of Clinical Ultrasound for Emergencies and Critical Care"*

At present, clinical ultrasound is the most widely used diagnostic technique to explore the patient's state of health. Thanks to its minimally invasive ultrasound technology that does not generate consequences at the cellular level like other diagnostic treatments. It is used in the practical practice of medicine, for the direct observation of the patient and to propose the subsequent treatment. Today it is essential for specialists in emergency and critical care units in different specialties to attend their patients using Clinical Ultrasound, in order to take advantage of its multiple benefits and provide much more efficient and accurate care.

This program will allow the professional to know all the technological advances in the use of Clinical Ultrasound. You will understand the sequences, the modes, the image planes looking for the best possible visibility. In addition, you will be updated on the technical requirements to perform cardiac, thoracic, cerebral, abdominal and musculoskeletal ultrasound.

Likewise, during the 1,500 hours of 100% online theoretical study, you will be able to delve into the ultrasound approach to major syndromes such as shock, cardiac arrest, respiratory failure, acute renal failure, among others that require critical care. This will enable you to make a more accurate ultrasound diagnosis, safely perform ultrasound-guided interventions, accurately perform non-invasive hemodynamic evaluations or quickly assess traumatic injuries.

This Hybrid Professional Master's Degree is a unique opportunity to expand your medical knowledge, since you will also be able to share with other experts for 3 weeks, in a reference clinical center. This will be chosen within or outside the national territory according to your needs and goals. In this way, you will be at the forefront of the most effective diagnostic methods through the use of Clinical Ultrasound.

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

- ♦ More than 100 clinical cases presented by experts in Clinical Ultrasound
- ♦ The graphic, schematic, and practical contents with which they are created provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ New diagnostic and therapeutic developments in clinical ultrasound evaluation, diagnosis and intervention
- ♦ It contains practical exercises where the self-assessment process can be carried out to improve learning
- ♦ Iconography of clinical and diagnostic imaging tests
- ♦ An algorithm-based interactive learning system for decision-making in the clinical situations presented throughout the course
- ♦ With special emphasis on evidence-based medicine and research methodologies in Clinical Ultrasound for Emergencies and Critical Care
- ♦ All this will be complemented with theoretical lessons, questions to the expert, discussion forums on controversial issues and individual reflection work
- ♦ Content that is accessible from any fixed or portable device with an Internet connection
- ♦ In addition, you will be able to carry out a clinical internship in one of the best hospitals in the world



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*Take an intensive 3-week program in a state-of-the-art clinical center and acquire all the knowledge to continue to evolve personally and professionally”*

In this Professional Master's Degree proposal, of a professionalizing nature and blended learning modality, the program is aimed at updating medical professionals who perform their duties in the Clinical Ultrasound for Emergencies and Critical Care unit, and who require a high level of qualification. The contents are based on the latest scientific evidence, and oriented in a didactic way to integrate theoretical knowledge into medical practice, and the theoretical-practical elements will facilitate the updating of knowledge and will allow decision making in patient management.

Thanks to their multimedia content developed with the latest educational technology, they will allow the medical professional to obtain situated and contextual learning, that is to say, a simulated environment that will provide immersive learning programmed 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, students will be assisted by an innovative interactive video system developed by renowned experts.

*This Hybrid Professional Master's Degree allows you to practice in simulated environments, which provide immersive learning programmed to train for real situations.*

*This training is a unique opportunity for updating that stands out for the quality of its contents and for its excellent teaching staff, composed of elite professionals.*



# 02

## Why Study this Hybrid Professional Master's Degree?

TECH in its interest to offer high academic level training has designed this program of a blended learning character that focuses on advances in Clinical Ultrasound for Emergency and Critical Care in a 100% online mode. In addition, after completing the theoretical study, the specialist will advance to the Internship Program in a prestigious clinical center with professionals of renowned experience for 3 weeks. Thus, over 12 months you will obtain this program that will update you on the various types of Clinical Ultrasound, the ultrasound approach to major syndromes, ultrasound-guided procedures, among other aspects that will refine your vision in the area.





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*You won't find a program like it. TECH, always at the forefront of higher education, combines two effective teaching methods in this Hybrid Professional Master's Degree”*

### 1. Updating from the latest technology available

Among the diagnostic methods most commonly used in medicine today, Clinical Ultrasound stands out for its multiple advantages. It provides a high degree of precision when applied correctly, for which the specialist must be prepared and updated on the most current techniques. With this program, the professional will have access to an environment equipped with state-of-the-art equipment, in order to be able to apply his knowledge in a specific way.

### 2. Gaining In-Depth Knowledge from the Experience of Top Specialists

The professional will have a designated tutor who will show them the whole process and will provide the necessary accompaniment alongside the multidisciplinary team that makes up the hospital center where they will carry out the internship. In addition, the great endorsement of the teaching team that configures the theoretical part for its updating and improvement of the daily clinical practice.

### 3. Entering into clinical environments of

TECH has exhaustively selected the centers available for Internship Programs. Thus, access to a prestigious clinical environment is guaranteed in order to provide the specialist with the most specialized resources for the study and implementation of knowledge in Clinical Ultrasound.





#### 4. Combining the Best Theory with State-of-the-Art Practice

Thanks to its interest in offering high-level and differentiating training, TECH has designed this program according to the latest scientific evidence on advances in Clinical Ultrasound for Emergency and Critical Care. This academic space, which combines theory and practice, will allow you to be in charge of procedures with state-of-the-art equipment over a period of 3 weeks.

#### 5. Expanding the Boundaries of Knowledge

TECH, in its avant-garde vision and interest in training professionals beyond its borders, continues to innovate with this cutting-edge blended program. To this end, it has established agreements with Clinical Analysis in different parts of the world where the specialist will be able to expand his or her frontiers and catch up with the best experts practicing in prestigious of healthcare. environments.

“

*You will have full practical immersion at the center of your choice”*



# 03

## Objectives

The objective of this Hybrid Professional Master's Degree is to guide the medical specialist in their update related to Clinical Ultrasound for Emergencies and Critical Care. For this purpose, TECH and its team of experts have selected 1,500 hours of the best theoretical and additional material, designed in a multi-format manner and based on the latest scientific evidence from the clinical sector. In this way, you will have access to an academic experience that will not only allow you to update your knowledge, but also to perfect your skills in the use of ultrasound imaging and its multiple applications.



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*You will work on the interpretation of clinical ultrasound of the thoracic, vascular, cerebral, abdominal and applicable to many more body areas”*





## General Objective

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- This Hybrid Professional Master's Degree in Clinical Ultrasound for Emergencies and Critical Care has been designed in order to complete the physician's updating itinerary in the use of ultrasound in diverse and specific situations, whatever the environment in which he/she is. Thanks to this, you will be able to implement in your practice the most innovative and effective theoretical and practical knowledge in the interpretation and analysis of ultrasound scans and visual diagnostic tests.



*Whatever your academic goals are, TECH will provide you with all the material you need to achieve and surpass them in less time than you expect"*





## 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 echo-navigation

### 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**

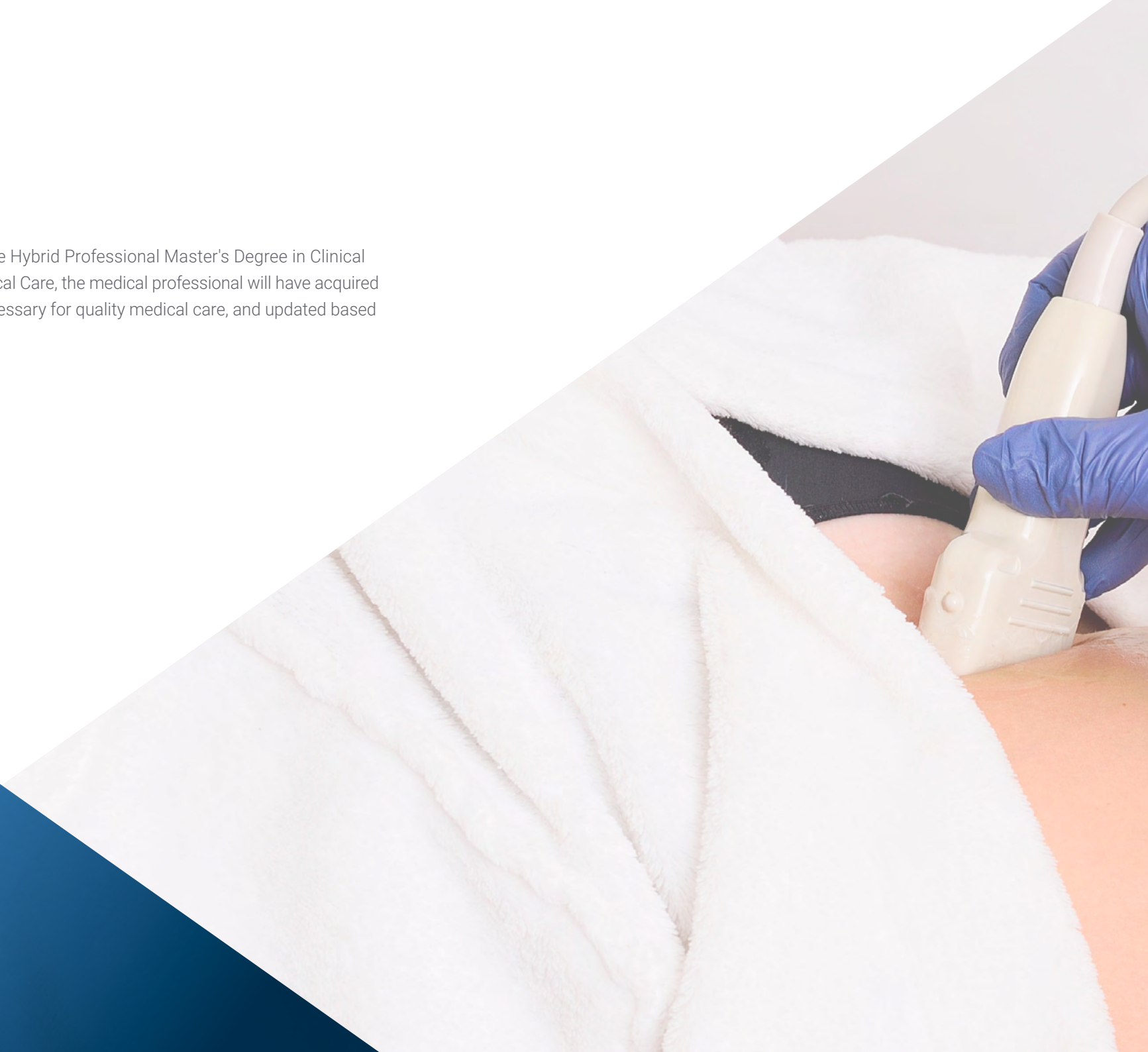
- ♦ Describe the technical requirements of pediatric ultrasounds
- ♦ Explain the examination technique for pediatric ultrasounds
- ♦ Describe pediatric sonoanatomy and sonophysiology
- ♦ Explain the use of ultrasound in the major pediatric syndromes

“ *It delves into the most relevant theory in this field, subsequently applying it in a real work environment* ”



# 04 Skills

After passing the evaluations of the Hybrid Professional Master's Degree in Clinical Ultrasound for Emergency and Critical Care, the medical professional will have acquired the professional competencies necessary for quality medical care, and updated based on the latest scientific evidence.







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*Through this program you will be able to update your knowledge in Clinical Ultrasound for Emergencies and Critical Care, and you will be able to perform quality patient care based on the latest scientific evidence”*



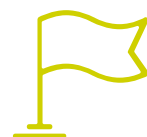
## General Skills

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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 field 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 further studying in a largely self-directed or autonomous manner







## 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 "echo-navigation"
- 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

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*You will diversify your current medical practice in terms of the use of ultrasound as a diagnostic technique”*

# 05

# Course Management

For the development of this curriculum TECH has relied on the vision and expertise of a medical staff with extensive experience. Their determination to implement the most advanced ultrasound techniques will be demonstrated throughout the syllabus with which the professional will be updated on the most current methods. A specialized faculty that meets the needs of the specialist who will receive a high level of teaching, according to their interests and in order to offer the best medical care to their patients.



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*This well-versed team of specialists  
has tailored the curriculum to fit  
today's professional"*



## Management



### Dr. Jesús Andrés Álvarez Fernández

- ♦ Chief Doctor at Juaneda Miramar Hospital
- ♦ Specialist in Intensive Care Medicine and management of buen patients at the University Hospital of Getafe
- ♦ Associate Researcher of the Neurochemistry and Neuroimaging Area at the University of La Laguna

## Professors

### Dr. Ángel Flores Herrero

- ♦ Coordinator of the Angiology, Vascular and Endovascular Surgery Service at Hospital Quirón Salud Toledo
- ♦ Vascular Surgery FEA at the Enova Medical Center
- ♦ Associate Physician of Vascular Surgery, Toledo Hospital Complex
- ♦ Member of the American Society of Surgeons
- ♦ Collaborating Professor at the Catholic University San Antonio de Murcia (UCAM)
- ♦ Examiner of the European Board of Vascular Surgery and Fellow of the American College of Surgeons
- ♦ Doctor of Medicine and Surgery
- ♦ Master's Degree in Hospital Management

### Dr. Josep Fumadó Queral

- ♦ Family doctor at Els Muntells Primary Care Center
- ♦ Head of the Emergency Ultrasound Group of the Spanish Society of General and Family Physicians (SEMG)
- ♦ Qualified in Clinical Ultrasound and Training of Trainers from the University of Montpellier
- ♦ Lecturer at the Associació Mediterrània of General Medicine
- ♦ Teacher at the Spanish School of Ultrasound of the Spanish Society of General and Family Physicians (SEMG)
- ♦ Honorary Member of the Canary Society of Ultrasound (SOCANECO) and Professor of its Annual Symposium
- ♦ Lecturer on the Master's Degree in Clinical Ultrasound for Emergencies and Critical Care at the CEU Cardenal Herrera University

**Dr. José Carlos Igeño Cano**

- ♦ Chief of Intensive Care and Emergency Medicine Service, San Juan de Dios Hospital, Córdoba
- ♦ Responsible for the Patient Welfare Area in the HUCI Project, Humanizing Intensive Care
- ♦ Coordinator of the Planning and Organization and Management Working Group of the Spanish Society of Intensive Care Medicine, Critical Care and Coronary Units (SEMICYUC)
- ♦ Medical Director of the Resuscitation and Post-Surgical Care Unit of the IDC Salud Hospital Virgen de Guadalupe
- ♦ Assistant ICU Physician in the Castilla-La Mancha Health Service
- ♦ Assistant Physician, Medicine and Neurotrauma Unit, Nuestra Señora de la Candelaria Hospital
- ♦ Head of Critical Patient Transport Service in Ambulancias Juan Manuel SL
- ♦ Master's Degree in Clinical Management, Medical and Healthcare Management from CEU Cardenal Herrera University
- ♦ Member of: Pan-American and Iberian Federation of Critical Medicine and Intensive Care, Spanish Society of Intensive Care Medicine, Critical Care and Coronary Units

**Dr. Javier Martínez Crespo**

- ♦ Specialist in Intensive Care Medicine
- ♦ Attending Physician of Radiodiagnostics University, Hospital of Getafe
- ♦ Collaborator of the Ecoclub of SOMIAMA
- ♦ Degree in Medicine and Surgery
- ♦ Associate Professor at the European University of Madrid

**Dr. Núñez Reiz, Antonio**

- ♦ Doctor at Intensive Care Medicine the San Carlos University Hospital Clinic
- ♦ Doctor of the and Intensive Care Unit, Fundación Alcorcón University Hospital
- ♦ Physician of the Critical Care Unit of the Alarcón Foundation University Hospital
- ♦ Member of the European Society of Intensive Care Medicine

**Dr. Luis Miguel Pérez Morales**

- ♦ Primary Care Physician in the Canary Health Service
- ♦ Family physician at the Primary Care Center of Arucas (Gran Canaria, Canary Islands)
- ♦ President and Professor of the Canary Society of Ultrasound (SOCANECO) and Director of its Annual Symposium
- ♦ Professor on the Master's Degree in Clinical Ultrasound for Emergency and Critical Care at the CEU Cardenal Herrera University
- ♦ Expert in Thoracic Ultrasound at the University of Barcelona
- ♦ Expert in Abdominal and Musculoskeletal Clinical Ultrasound for Emergency and Critical Care CEU Cardenal Herrera University
- ♦ Diploma of the Course P Ultrasound in Primary Care of the University Rovira y Virgili Institut Catalá de la Salut

**Dr. Sonia López Cuenca**

- ♦ Specialist in the area of Nuclear Medicine at the Rey Juan Carlos University Hospital
- ♦ Intensivist at the University Hospital of Getafe
- ♦ Researcher of Madrid Health Service
- ♦ Intensivist at Los Madroños Hospital
- ♦ Out SUMMA of-hospital emergency physician

**Dr. María Inés Osiniri Kippes**

- ♦ Pediatrics, Pediatric Ultrasound and Pediatric Nephrology Bofill Clinic
- ♦ Doctor of Medicine. Research in medical and clinical laboratory with Cum Laude excellence by the University of Girona
- ♦ Master's Degree in Health Promotion, University of Girona
- ♦ Degree in Pediatric Ultrasound by the Spanish Society of Ultrasound
- ♦ Pediatric Ultrasonographer, Ecopediatrics. Figueres
- ♦ Assistant Pediatrician. Head of Pediatric Ultrasound, Fundació Salut Empordà, Figueres Hospital, Barcelona

**Dr. Iván Vollmer Torrubiano**

- ♦ Medical Specialist in the Radiology Service at Barcelona Clinical Analysis Hospital
- ♦ Adjunct Coordinator of the Lung Cancer Functional Unit of the Hospital del Mar
- ♦ European Diploma in Radiology
- ♦ Specialized training in Radiodiagnosis at the Hospital del Mar in Barcelona
- ♦ Degree in Medicine and Surgery from the University of Barcelona
- ♦ Scientific Director of the Spanish Society of Cardiothoracic Imaging (SEICAT)
- ♦ President of the Oncology Commission of the Spanish Society of Medical Radiology (SERAM)
- ♦ Member of the Scientific Committee of the SERAM National Congress
- ♦ Member of the Scientific Committee of the National Congress of Catalan Radiologists

**Dr. Raúl Vicho Pereira**

- ♦ Clinical Chief of ICU at Hospital Quirónsalud Palmaplanas, Balearic Islands
- ♦ President of the Spanish Society for Ultrasound in Critical Cases (ECOCRITIC)
- ♦ National CPR Plan Instructor
- ♦ Medical Specialist in Intensive Care Medicine at Hospital Quirónsalud Palmaplanas, Balearic Islands
- ♦ Specialist in Intensive Care Medicine at the Virgen de Valme University Hospital, Seville
- ♦ Intensive Care Unit Specialist at Hospital Quirónsalud Palmaplanas, Balearic Islands
- ♦ Intensive Care Unit Specialist at Clínica Rotger Quirónsalud, Balearic Islands
- ♦ Responsible for teaching the Resident Medical Internship for Critical Care Ultrasound
- ♦ Expert Reviewer of the Intensive Care Journal
- ♦ More than 150 Ultrasound programs in the last 5 years in all the autonomous communities of the country for ICU, Anesthesia, Emergency Room, etc
- ♦ Organizer of the First ECOCRITIC Congress, Denia, Alicante, Spain
- ♦ Ultrasound trainer for the entire ICU service at the University Hospital of Donostia, Basque Country
- ♦ Trainer in Ultrasound of the ICU Service at the Hospital de Manises, Valencia
- ♦ Graduate in Medicine and Surgery from the University of Seville
- ♦ Member of: Editorial Board of the journal e-Anestesiari, Spanish Society of Critical Care Ultrasonography

**Dr. Elena Abril Palomares**

- ♦ Doctor Specialist in the Intensive Care and Major Burns Department, Getafe University Hospital
- ♦ Degree in Medicine and Surgery
- ♦ Attending Physician of Intensive Care Medicine and Major Burns Unit

**Dr. Manuel Álvarez González**

- ♦ Faculty Specialist at San Carlos Clinical Hospital
- ♦ Specialist in Intensive Care Medicine
- ♦ Founding Member of the Ecoclub of SOMIAMA
- ♦ Degree in Medicine and Surgery

**Dr. Laura Colinas Fernández**

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

**Dr. Braulio De la Calle Reviriego**

- ♦ Head of Intensive Care Medicine and Transplant Coordinator at the Gregorio Marañón Hospital
- ♦ Chief of Service at Quirón San José Hospital
- ♦ Collaborating Professor at the Complutense University of Madrid
- ♦ Trainer in Brain Ultrasound of the National Transplant Organization
- ♦ Member of the Gregorio Marañón Health Research Institute

**Dr. Alberto Hernández Tejedor**

- ♦ Specialist in Intensive Care Medicine
- ♦ Attending Physician of Intensive Care Medicine at the Alorcón Foundation University Hospital
- ♦ Intensivist at the 12 de Octubre University Hospital, Madrid
- ♦ Author of dozens of scientific publications

**Dr. Raquel Herrero Hernández**

- ♦ Specialist in Intensive Care Medicine
- ♦ Associate Doctor, Intensive Care Medicine Department, Fuenlabrada University Hospital, Madrid
- ♦ Author of numerous scientific publications
- ♦ Doctorate in Medicine from the Autonomous University Madrid

**Dr. María Pilar Lamarca Mendoza**

- ♦ Assistant Physician of the Angiology, Vascular and Endovascular Surgery Department of the Toledo Hospital Complex
- ♦ Medical specialist in SESCAM (Castilla-La Mancha Health Service)
- ♦ Author of numerous national and international scientific publications and essays
- ♦ Degree in Medicine and Surgery from the Autonomous University of Madrid

**Dr. Lucía López Rodríguez**

- ♦ Doctor Specialist in the Intensive Care and Major Burns Department, Getafe University Hospital
- ♦ Doctor of Medicine, UCM
- ♦ Degree in Medicine and Surgery from the UCM
- ♦ Member of the Ecoclub of SOMIAMA

**Dr. Cristina Martínez Díaz**

- ♦ Specialist in Intensive Care Medicine
- ♦ Degree in Medicine and Surgery
- ♦ Doctor at the University Hospital Príncipe of Asturias. Alcalá Henares University
- ♦ Member of the Ecoclub of SOMIAMA

**Dr. Patricia Mora Rangil**

- ♦ Urology Specialist Hospital Miguel Servet Hospital Miguel from Servet , Zaragoza
- ♦ Doctor at Miguel Servet Hospital, Zaragoza
- ♦ Graduate of the Faculty of Medicine, Rovira I Virgili University of Tarragona
- ♦ Degree in Medicine. MIR Intensive Care Miguel Servet University Hospital
- ♦ Member of the Spanish Society for Ultrasound in Critical Cases (ECOCRITIC)
- ♦ Author of the book "The Critical Patient" Drugs, frequently used fluid therapy and water-electrolyte disorders

**Dr. Francisco Ortuño Andériz**

- ♦ Physician of the Neurocritical and Polytraumatized Section at Hospital Clínico San Carlos
- ♦ Specialist in Intensive Care Medicine
- ♦ Doctor of Medicine and Surgery, Complutense University of Madrid (UCM)
- ♦ Master's Degree in Healthcare Organization, Management and Administration

**Dr. Francisco de Paula Palacios Ortega**

- ♦ Specialist in Intensive Care Medicine
- ♦ Associate Doctor in the Intensive Care Unit at the University Hospital of Getafe
- ♦ Medical Collaborator of the Artificial Intelligence and Knowledge Engineering (AIKE) group, University of Murcia
- ♦ Research Collaborator of the WASPSS group, whose objective is the Rational Use of Antibiotics
- ♦ Speaker at the Lecture Series of the Center for Surgical Studies, Complutense University of Madrid

**Dr. Federico Phillipps Fuentes**

- ♦ Pediatrician
- ♦ Pediatric Emergency Room Physician at Hospital Interzonal de Agudos, Specialized in Pediatrics Sor María Ludovica, La Plata, Argentina
- ♦ Area Specialist in the Pediatrics Emergency Department at the Materno Insular University Hospital of the Canaries
- ♦ Chief Resident Physician of Pediatrics at the Pedro de Elizalde General Children's Hospital, Buenos Aires
- ♦ Specialist in Pediatrics, Hospital Perpetuo Socorro Las Palmas de Gran Canaria

**Dr. María Serna Gandía**

- ♦ Medical Specialist in Anesthesiology and Resuscitation, Denia-Marina Salud Hospital Alicante
- ♦ Secretary of the Spanish Society for Ultrasound in Care Critical Cases (ECOCRITIC)
- ♦ Speaker at programs and workshops for the use of Ultrasound in Intensive Care
- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Anesthesiology and Resuscitation
- ♦ Program for the management of Ultrasonography in the ICU



**Dr. Susana Temprano Vázquez**

- ♦ Attending Physician, Intensive Care Medicine Department, 12 de Octubre University Hospital
- ♦ Faculty of the classroom part of the program ECMO Hybrid Course
- ♦ Founding Member of the Ecoclub of SOMIAMA
- ♦ Degree in Medicine and Surgery
- ♦ Specialist in Intensive Care Medicine

**Dr. Gerardo Villa Vicente**

- ♦ Doctor of the Spanish Paralympic Committee
- ♦ Medical Specialist in Physical Education and Sports Medicine
- ♦ Professor of Physical Education and Sports at the University of León
- ♦ Director of fourteen doctoral theses, three dissertations and thirteen Ph doctoral theses (DEA)
- ♦ PhD in Medicine and Surgery from the University of Salamanca
- ♦ Specialist in Physical Education and Sports Medicine from the University of Oviedo
- ♦ Expert in Ultrasound MSK (SEMED-FEMEDE)
- ♦ National Prize in Sports Medicine
- ♦ Member of the Institute of Biomedicine of León (IBIOMED), Spanish Paralympic Committee, Parliamentary Commission on the State of Sport (Healthy Lifestyle) of the Parliament of Castilla y León, Group of Experts in Physical Activity and Health for the Development of the A+D Plan of the Superior Sports Council (CSD)

**Dr. Santiago Yus Teruel**

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

**Dr. Fernando Jiménez Díaz**

- ♦ Expert in Sports Medicine and University Professor
- ♦ Founder and Director of Sportoledo
- ♦ Researcher at the Sports Performance and Injury Rehabilitation Laboratory of the University of Castilla La Mancha
- ♦ Member of the Medical Service at Club Basketball Fuenlabrada
- ♦ Doctor of Medicine and Surgery from the University of Cordoba
- ♦ President of the Spanish Society of Ultrasound
- ♦ Member of: Spanish Society of Sports Medicine, European Federation of Societies for Ultrasound in Medicine and Biology

# 06

## Educational Plan

Thanks to the Relearning methodology implemented by TECH in each of its theoretical programs, it achieves the levels of learning efficiency that today's professionals need. Therefore, you will have an academic itinerary designed under this method that will allow you to advance in 1,500 hours of study on the novelties and fundamentals of Clinical Ultrasound for Emergencies and Critical Care, 100% online and from any device of your choice. Thus, after passing this stage, you will continue towards 100% practical training in a reference health center and with a designated tutor who will guide you.





“

*This complete curriculum has been configured by experienced professionals and you can consult it 100% online and at your own pace, which gives it flexibility and quality”*

## 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 Echo-graph 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
  - 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. Structural alterations I
  - 2.5.1. Left ventricle
  - 2.5.2. Right ventricle
- 2.6. Hemodynamic Ultrasound
  - 2.6.1. Left Ventricular Hemodynamics
  - 2.6.2. Right Ventricular Hemodynamics
  - 2.6.3. Preload Dynamic Tests
- 2.7. Echocardiography transeophageal echocardiography
  - 2.7.1. Technique
  - 2.7.2. Indications in Emergencies and Intensive Care Cases
  - 2.7.3. Ultrasound-Guided Study of Cardioembolism



**Module 3. Clinical Thoracic Ultrasound**

- 3.1. Fundamentals of Thoracic Ultrasound and Anatomical Review
  - 3.1.1. Study of the Normal Thorax
  - 3.1.2. Pulmonary Ultrasound Semiology
  - 3.1.3. Pleural Ultrasound Semiology
- 3.2. Technical Requirements. Examination Technique
  - 3.2.1. Types of Probes Used
  - 3.2.2. Ultrasound with Contrast in the Thorax
- 3.3. Ultrasound of the Thoracic Wall and the Mediastinum
  - 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 Pleura
  - 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
- 5.7. Echodoppler in the diagnosis of encephalic death
  - 5.7.1. Clinical diagnosis of encephalic death
  - 5.7.2. Necessary conditions before transcranial Doppler (TCD) examination for the diagnosis of cerebral circulatory arrest
  - 5.7.3. TCD application technique
  - 5.7.4. Advantages of a TCD
  - 5.7.5. Limitations of TCD and interpretation
  - 5.7.6. TCD ultrasound for the diagnosis encephalic death
  - 5.7.7. TCD ultrasound in the diagnosis of encephalic death

## 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
- 6.7. Utilidad de la ecografía en el paciente con trasplante renal, hepático y pancreático
  - 6.7.1. Normal ultrasound in the renal transplant patient
  - 6.7.2. Acute tubular necrosis (ATN)
  - 6.7.3. Acute rejection (AR)
  - 6.7.4. Chronic transplant dysfunction
  - 6.7.5. Normal ultrasound in the patient with liver transplantation
  - 6.7.6. Normal ultrasound in the patient with pancreas transplantation

## Module 7. Clinical Musculoskeletal Ultrasound

- 7.1. Anatomy Recap
  - 7.1.1. Shoulder anatomy
  - 7.1.2. Anatomy of the Elbow
  - 7.1.3. Anatomy of the Wrist and Hand
  - 7.1.4. Anatomy of the Hip and Thigh
  - 7.1.5. Anatomy of the Knee
  - 7.1.6. Anatomy of the Ankle, Foot, and Leg
- 7.2. Technical Requirements
  - 7.2.1. Musculoskeletal Ultrasound Equipment
  - 7.2.2. Methodology
  - 7.2.3. Ultrasound imaging
  - 7.2.4. Validation, Reliability, and Standardization
  - 7.2.5. Ultrasound-Guided Procedures
- 7.3. Examination Technique
  - 7.3.1. Basic Concepts in Ultrasound
  - 7.3.2. Rules for Correct Examinations
  - 7.3.3. Examination Technique in Ultrasound Study of the Shoulder
  - 7.3.4. Examination Technique in Ultrasound Study of the Elbow
  - 7.3.5. Examination Technique in Ultrasound Study of the Wrist and Hand
  - 7.3.6. Examination Technique in Ultrasound Study of the Hip
  - 7.3.7. Examination Technique in Ultrasound Study of the Thigh
  - 7.3.8. Examination Technique in Ultrasound Study of the Knee
  - 7.3.9. Examination Technique in Ultrasound Study of the Leg and Ankle
- 7.4. Sonoanatomy of the Locomotor System: I. Upper Extremities
  - 7.4.1. Shoulder Ultrasound Anatomy
  - 7.4.2. Elbow Ultrasound Anatomy
  - 7.4.3. Wrist and Hand Ultrasound Anatomy
- 7.5. Sonoanatomy of the Locomotor System: II. Lower Extremities
  - 7.5.1. Hip Ultrasound Anatomy
  - 7.5.2. Thigh Ultrasound Anatomy
  - 7.5.3. Knee Ultrasound Anatomy
  - 7.5.4. Ultrasound Anatomy
- 7.6. Ultrasound in the Most Frequent Acute Locomotor System Injuries
  - 7.6.1. Muscle Injuries
  - 7.6.2. Tendon Injuries
  - 7.6.3. Ligament Injuries
  - 7.6.4. Subcutaneous Tissue Injuries
  - 7.6.5. Bone Injuries
  - 7.6.6. Joint Injuries
  - 7.6.7. Peripheral Nerve Injuries

## Module 8. Ultrasonographic Approach to the Major Syndromes

- 8.1. Ultrasound in acute renal failure
  - 8.1.1. Introduction
    - 8.1.1.1. Prerenal ARF
    - 8.1.1.2. Renal or intrinsic ARF
    - 8.1.1.3. Post-renal or obstructive ARF
  - 8.1.2. Hydronephrosis
  - 8.1.3. Lithiasis
  - 8.1.4. Acute Tubular Necrosis
  - 8.1.5. Doppler Ultrasound in Acute Renal Failure
  - 8.1.6. Bladder Ultrasound in Acute Renal Failure
- 8.2. Ultrasound in trauma
  - 8.2.1. FAST and E-FAST (Hemo and Pneumothorax)
  - 8.2.2. Ultrasound Assessment in Special Situations
  - 8.2.3. Hemodynamic Assessment Focused on Trauma
- 8.3. Ultrasound in stroke
  - 8.3.1. Introduction
  - 8.3.2. Justification
  - 8.3.3. Initial Assessment
  - 8.3.4. Ultrasound Appraisal
  - 8.3.5. Ultrasound-Guided Management
- 8.4. Ultrasound in cardiac arrest
  - 8.4.1. Cerebral Hemodynamics
  - 8.4.2. Hemodynamics in cardiac arrest
  - 8.4.3. Usefulness of Ultrasound in Resuscitation
  - 8.4.4. Usefulness of Ultrasound After Recovery of Spontaneous Circulation
- 8.5. Ultrasound in shock
  - 8.5.1. Definition, types of shock and echocardiographic findings
    - 8.5.1.1. Definition
    - 8.5.1.2. Types of Shock
    - 8.5.1.3. Advantages of ultrasound in the recognition and management of the different etiologies of shock
    - 8.5.1.4. ICU Considerations
    - 8.5.1.5. Hemodynamic monitoring by ultrasound

- 8.6. Ultrasound in Respiratory Failure
  - 8.6.1. Clinical ethology of Dyspnea
  - 8.6.2. Approach to Patients with Dyspnea
  - 8.6.3. The Use of Clinical Ultrasound in Patients with Dyspnea
  - 8.6.4. Pulmonary Ultrasound Scan
  - 8.6.5. Echocardiography

## 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. Thoracocentesis and Pericardiocentesis
  - 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. Drainage and drilling
  - 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 Patients 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 Transfontanelar Ultrasound
  - 10.6.2. Most Common Examination Indications in Emergencies
  - 10.6.3. Most Common Pathologies in Emergencies



*This training will allow you to perform a 100% practical activity in a state-of-the-art clinical center"*

07

# Clinical Internship

After completing the online training period, the program includes a practical training period in a reference clinical center. The student will have at their disposal the support of a tutor who will accompany them during the whole process, both in the preparation and in the development of the clinical practice.





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*Through this program you will be able to do your internship in a hospital of the future, with the best medical technology and with renowned professors. Incorporate the latest advances in Clinical Ultrasound for Emergency and Critical Care into your routine clinical practice"*



The Internship Program's Internship Program consists of a practical stay in a prestigious clinical center, from Monday to Friday, with 8 consecutive hours of practical training with an associate specialist. This stay will allow you to deal with real patients alongside a team of reference professionals in the area of ultrasound in Emergencies and critical care, applying the most innovative diagnostic procedures with ultrasound and planning the latest generation therapy in each pathology.

In this completely practical Internship Program, the activities are aimed at developing and perfecting the skills necessary to provide healthcare care in areas and conditions that require highly qualified professionals, and are oriented towards specific expertise for practicing the activity, in a safe environment for the patient and with highly professional performance.

This is a new way of understanding and integrating health processes, and makes the CIMA SANITAS Hospital in Barcelona the ideal teaching scenario for this innovative experience in the improvement of medical professional competencies in the 21st century. This is a new way of understanding and integrating health processes, making it the ideal teaching scenario for this innovative experience in the improvement of professional medical competencies for the 21st century.

The practical teaching will be carried out with the active participation of the student performing the activities and procedures of each area of competence (learning to learn and learning to do), with the accompaniment and guidance of the professors and other fellow trainees that facilitate teamwork and multidisciplinary integration as transversal competencies for medicine Analysis Clinical Analysis Care Medicine (learning to be and learning to relate).

The procedures described below will form the basis of the practical part of the training, and their completion is subject to both the suitability of the patients and the availability of the center and its workload, with the proposed activities being as follows:



*Receive specialized education in an institution that can offer you all these possibilities, with an innovative academic program and a human team that will help you develop your full potential"*

Module	Practical Activity
<b>Thoracic and abdominal clinical ultrasound</b>	Use the latest techniques in ultrasound of the chest wall, pleura and mediastinum
	Participate in training in pulmonary and diaphragmatic ultrasound techniques
	Apply the techniques of abdominal ultrasound and Eco-FAST technique
	Participate in ultrasound training of the digestive and genitourinary system
	Use ultrasound techniques for the diagnosis of pathologies of the digestive and genitourinary system
<b>Clinical cardiac ultrasound</b>	Visualizing Cardiac Windows with New Echocardiography Technologies
	Participate in the care and management of patients with structural cardiac alterations
	Identify cardiac structural alterations with conventional cardiac ultrasound equipment
	Diagnose cardiovascular conditions through Transesophageal Echocardiography
	Use color Doppler echocardiography with all its variants (transthoracic, transesophageal, contrast-enhanced, stress and strain) in hemodynamic conditions
<b>Ultrasonographic Approach to the Major Syndromes.</b>	Use the latest ultrasound techniques in cardiac arrest, shock and respiratory failure
	Participate in training sessions on the application of ultrasound in sepsis, trauma and stroke
	Using Ultrasound in the diagnosis of abdominal pain
	Apply ultrasound-guided intubation techniques
	Perform vascular cannulation by ultrasound
	Perform thoracentesis and pericardiocentesis by ultrasound
	Use of ultrasound in the performance of drainage and probing

Module	Practical Activity
<b>Clinical Vascular Ultrasound</b>	Participate in training in vascular ultrasound examination techniques
	Apply examination techniques in vascular ultrasound
	Practice in ultrasound of the great thoracic and abdominal vessels
	Participate in training and use of ultrasound of the supra-aortic trunks
	Apply the principles of peripheral arterial circulation ultrasound
<b>Clinical Cerebral Ultrasound</b>	Participate in training sessions on localization and visualization of ultrasound windows in brain ultrasound
	Use the different ultrasound modalities in brain ultrasound
	Apply the examination technique in brain ultrasound
	Participate in the identification of different structural and hemodynamic alterations to be identified in brain ultrasound
	Apply ocular ultrasound techniques

## Civil Liability Insurance

This institution's main concern is to guarantee the safety of the trainees and other collaborating agents involved in the internship process at the company. Among the measures dedicated to achieve this is the response to any incident that may occur during the entire teaching-learning process.

To this end, this entity commits to purchasing a civil liability insurance policy to cover any eventuality that may arise during the course of the internship at the center.

This liability policy for interns will have broad coverage and will be taken out prior to the start of the practical training period. That way professionals will not have to worry in case of having to face an unexpected situation and will be covered until the end of the internship program at the center.



## General Conditions of the Internship Program

The general terms and conditions of the internship agreement for the program are as follows:

**1. TUTOR:** During the Hybrid Professional Master's Degree, students will be assigned with two tutors who will accompany them throughout the process, answering any doubts and questions that may arise. On the one hand, there will be a professional tutor belonging to the internship center who will have the purpose of guiding and supporting the student at all times. On the other hand, they will also be assigned with an academic tutor whose mission will be to coordinate and help the students during the whole process, solving doubts and facilitating everything they may need. In this way, the student will be accompanied and will be able to discuss any doubts that may arise, both clinical and academic.

**2. DURATION:** The internship program will have a duration of three continuous weeks, in 8-hour days, 5 days a week. The days of attendance and the schedule will be the responsibility of the center and the professional will be informed well in advance so that they can make the appropriate arrangements.

**3. ABSENCE:** If the students does not show up on the start date of the Hybrid Professional Master's Degree, they will lose the right to it, without the possibility of reimbursement or change of dates. Absence for more than two days from the internship, without justification or a medical reason, will result in the professional's withdrawal from the internship, therefore, automatic termination of the internship. Any problems that may arise during the course of the internship must be urgently reported to the academic tutor.

**4. CERTIFICATION:** Professionals who pass the Hybrid Professional Master's Degree will receive a certificate accrediting their stay at the center.

**5. EMPLOYMENT RELATIONSHIP:** the Hybrid Professional Master's Degree shall not constitute an employment relationship of any kind.

**6. PRIOR EDUCATION:** Some centers may require a certificate of prior education for the Hybrid Professional Master's Degree. In these cases, it will be necessary to submit it to the TECH internship department so that the assignment of the chosen center can be confirmed.

**7. DOES NOT INCLUDE:** The Hybrid Professional Master's Degree will not include any element not described in the present conditions. Therefore, it does not include accommodation, transportation to the city where the internship takes place, visas or any other items not listed

However, students may consult with their academic tutor for any questions or recommendations in this regard. The academic tutor will provide the student with all the necessary information to facilitate the procedures in any case.



08

# Where Can I Do the Clinical Internship?

With this program TECH has decided to broaden its academic horizons and has chosen various healthcare centers for the Internship Program to be taught in various healthcare centers all over the world. A unique opportunity that allows the professional to evolve personally and professionally.





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*TECH puts at your disposal the most specialized clinical centers for you to implement the advanced techniques of Clinical Ultrasound for adult and pediatric patients”*



The student will be able to take the practical part of this Hybrid Professional Master's Degree in the following



Medicine.

### Hospital HM Modelo

Country	City
Spain	La Coruña

Management: Rúa Virrey Osorio, 30, 15011, A Coruña

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Anaesthesiology and Resuscitation
- Palliative Care



Medicine.

### Hospital Maternidad HM Belén

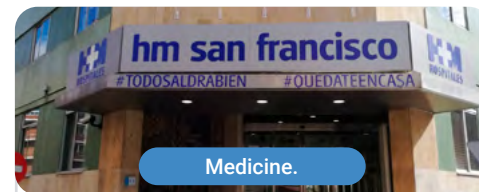
Country	City
Spain	La Coruña

Management: R. Filantropía, 3, 15011, A Coruña

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Update in Assisted Reproduction
- Hospitals and Health Services Management



Medicine.

### Hospital HM San Francisco

Country	City
Spain	León

Management: C. Marqueses de San Isidro, 11, 24004, León

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Update in Anaesthesiology and Resuscitation
- Trauma Nursing



Medicine.

### Hospital HM Regla

Country	City
Spain	León

Management: Calle Cardenal Landázuri, 2, 24003, León

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Update on Psychiatric Treatment in Minor Patients



Medicine.

### Hospital HM Nou Delfos

Country	City
Spain	Barcelona

Management: Avinguda de Vallcarca, 151, 08023 Barcelona

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Aesthetic Medicine
- Clinical Nutrition in Medicine



Medicine.

### Hospital HM Madrid

Country	City
Spain	Madrid

Management: Pl. del Conde del Valle de Súchil, 16, 28015, Madrid

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Palliative Care
- Anaesthesiology and Resuscitation



Medicine.

### Hospital HM Montepíncipe

Country	City
Spain	Madrid

Management: Av. de Montepíncipe, 25, 28660, Boadilla del Monte, Madrid

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Palliative Care
- Aesthetic Medicine



Medicine.

### Hospital HM Torrelodones

Country	City
Spain	Madrid

Management: Av. Castillo Olivares, s/n, 28250, Torrelodones, Madrid

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

**Related internship programs:**

- Anaesthesiology and Resuscitation
- Palliative Care





### Hospital HM Sanchinarro

Country	City
Spain	Madrid

Management: Calle de Oña, 10, 28050, Madrid

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

- Related internship programs:**
- Anaesthesiology and Resuscitation
  - Palliative Care



### Hospital HM Vallés

Country	City
Spain	Madrid

Management: Calle Santiago, 14, 28801, Alcalá de Henares, Madrid

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

- Related internship programs:**
- Gynecologic Oncology
  - Clinical Ophthalmology



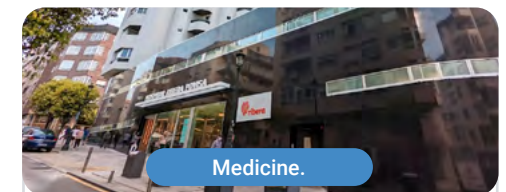
### Hospital HM Puerta del Sur

Country	City
Spain	Madrid

Management: Av. Carlos V, 70, 28938, Móstoles, Madrid

Network of private clinics, hospitals and specialized centers distributed throughout Spain.

- Related internship programs:**
- Palliative Care
  - Clinical Ophthalmology



### Hospital Ribera Povisa

Country	City
Spain	Pontevedra

Management: Rúa de Salamanca, 5, 36211 Vigo, Pontevedra

Hospital Ribera Povisa is part of the Ribera Group's network of healthcare centers, with more than 20 years of experience.

- Related internship programs:**
- Emergency Clinical Sonography and Intensive Care



# 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.





“

*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. 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, trying to recreate the real conditions in the physician's professional practice.



“

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

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

1. 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.



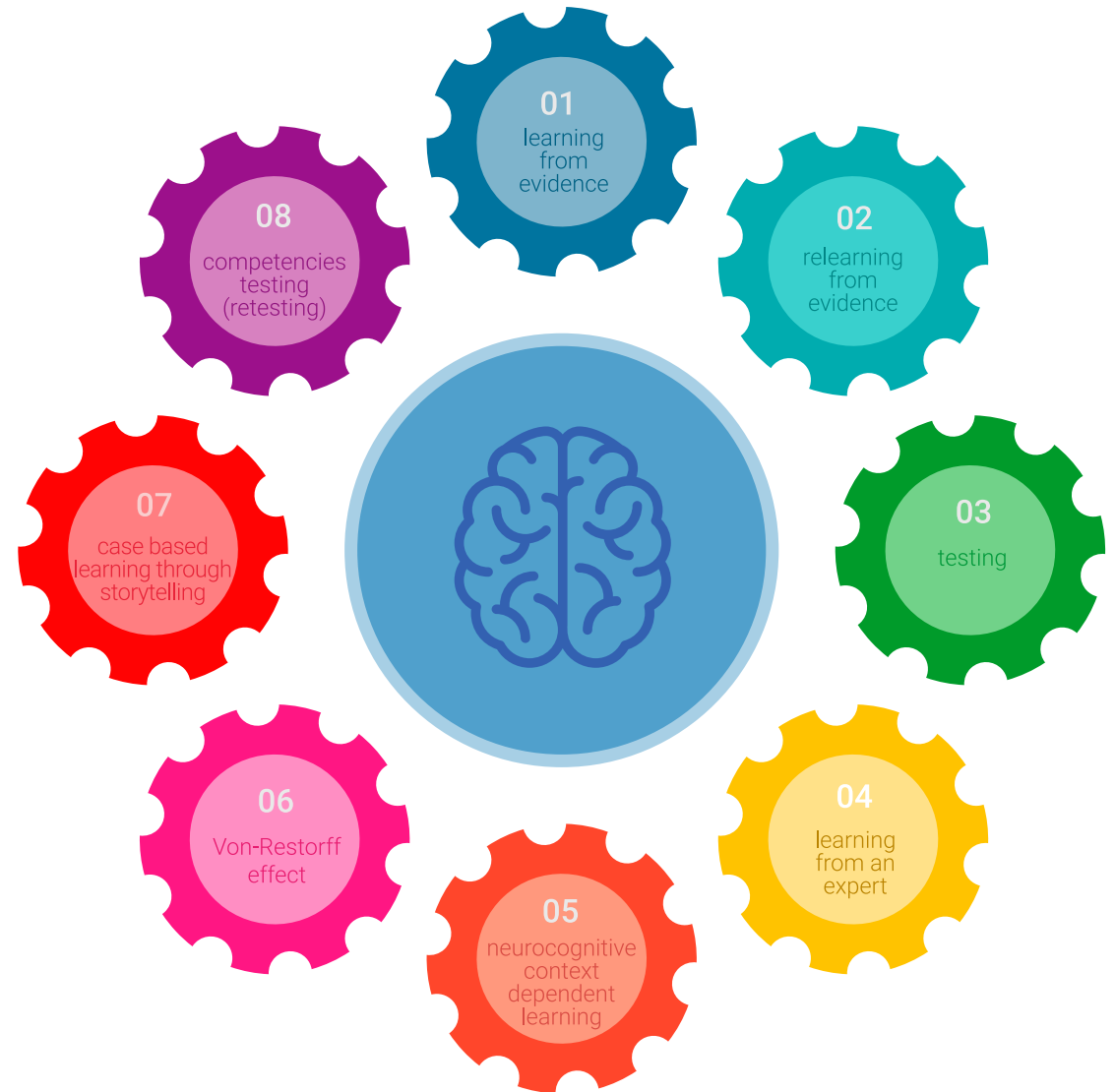


## Relearning Methodology

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

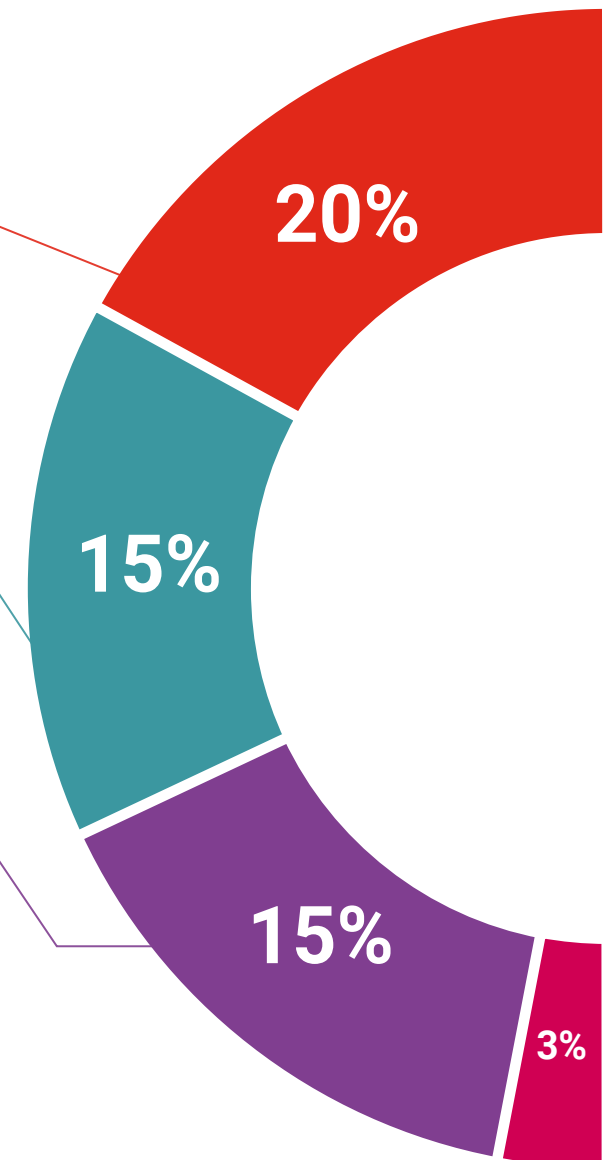
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

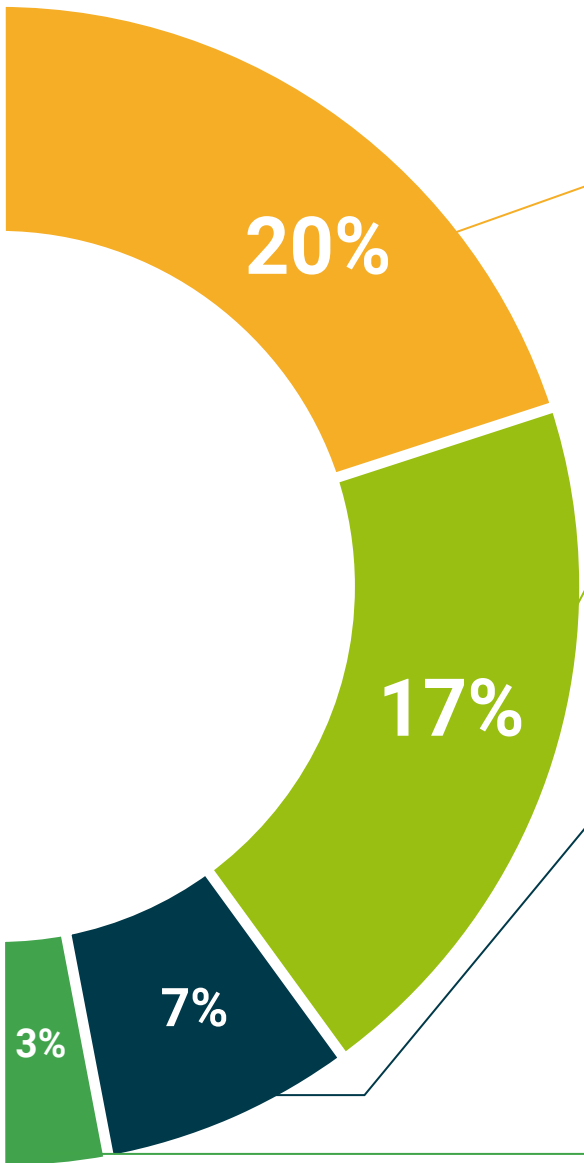
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### 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.





# 10 Certificate

The Hybrid Professional Master's Degree in Clinical Ultrasound for Emergencies and Critical Care guarantees students, in addition to the most rigorous and up-to-date education, access to a Hybrid Professional Master's Degree diploma issued by TECH Technological University.



“

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

This **Hybrid Professional Master's Degree in Clinical Ultrasound for Emergencies and Critical Care** contains the most complete and up-to-date program on the professional and educational field.

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

In addition to the Certificate, students will be able to obtain an academic transcript, as well as a certificate outlining the contents of the program. In order to do so, students should contact their academic advisor, who will provide them with all the necessary information.

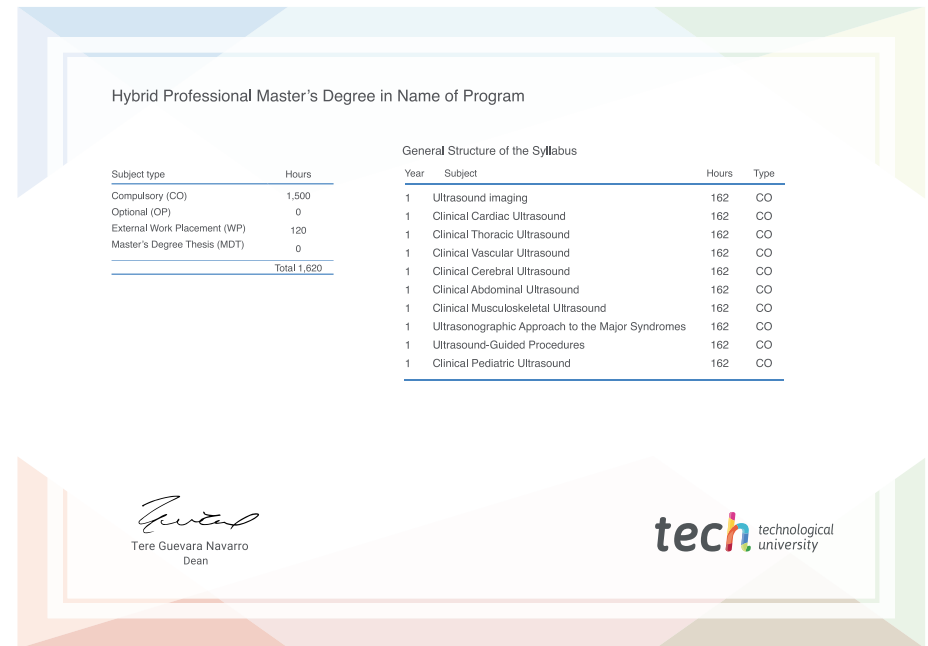
Certificate: **Hybrid Professional Master's Degree in Clinical Ultrasound for Emergencies and Critical Care**

Course Modality: **Hybrid (Online + Clinical Internship)**

Duration: **12 months.**

Certificate: **TECH Technological University**

Teaching Hours: **1,620 h.**



\*Apostille Convention. In the event that the student wishes to have their paper certificate 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 present quality  
development online courses  
virtual classrooms



**Hybrid Professional Master's Degree**  
Clinical Ultrasound for Emergencies  
and Critical Care

Course Modality: Hybrid (Online + Clinical Internship)

Duration: 12 months

Certificate: TECH Technological University

Teaching Hours: 1,620 hours.



# Hybrid Professional Master's Degree

## Clinical Ultrasound for Emergencies and Critical Care