

# Advanced Master's Degree Clinical Ultrasound





## Advanced Master's Degree Clinical Ultrasound

Course Modality: **Online**

Duration: **2 years**

Certificate: **TECH Technological University**

**120 ECTS Credits**

Teaching Hours: **3,000 hours.**

Website: [www.techtute.com/medicine/advanced-master-degree/advanced-master-degree-clinical-ultrasound](http://www.techtute.com/medicine/advanced-master-degree/advanced-master-degree-clinical-ultrasound)

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# 01

# Introduction

Ultrasound is one of the areas of medical care that has evolved the most in recent decades, becoming an essential tool in the management of all types of patients. This discipline has evolved so much that it has gone from being restricted to radiodiagnosis to being applied in practically all medical areas. The main objective of this program is to update the knowledge of healthcare professionals in the use of ultrasound, both in primary care and in cases of emergencies and critical care.



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*We offer you a quality specialization with which you can expand your competences in the health area. A high-level specialization for professionals seeking to achieve career success”*

Clinical Ultrasound or point-of-care ultrasound is the technique of ultrasound examination of the body that is used for the practical practice of medicine, related to the direct observation of the patient and his or her treatment. Using this system enhances the ability to diagnose and treat patients. As such, it has become a popular and valuable tool for guiding diagnostic and therapeutic interventions.

Additionally, technological advances have made it possible to reduce the size of the equipment, making it cheaper and more portable, help increased from the capabilities of clinical ultrasound, achieving a notable increase in its use in various situations.

Clinical Ultrasound an impact on each of the six fundamental domains of the current concept of quality of care: patient safety, effectiveness, efficiency, equity, timeliness and humanization. As a result, its use is effective and has become widespread both in primary care and in patients in emergency or critical care situations.

Throughout this specialization, the student will learn all of the current approaches to the different challenges posed by their profession. A high-level step that will become a process of improvement, not only on a professional level, but also on a personal level.

This challenge is one of TECH social commitments: to help highly qualified professionals to specialize and to develop their personal, social and labor competencies during the course of their training.

We will not only take you through the theoretical knowledge we offer, but we will introduce you to another way of studying and learning, one which is simpler, more organic, and efficient. We will work to keep you motivated and to develop your passion for learning, helping you to think and develop critical thinking skills. And we will push you to think and develop critical thinking.

This **Advanced Master's Degree in Clinical Ultrasound** contains the most comprehensive and up-to-date academic course on the university scene. The most important features of the program include:

- ♦ The latest technology in online teaching software
- ♦ A highly visual teaching system, supported by graphic and schematic contents that are easy to assimilate and understand
- ♦ Practical cases presented by practising experts
- ♦ State-of-the-art interactive video systems
- ♦ Teaching supported by remote training
- ♦ Continuous updating and retraining systems
- ♦ Autonomous learning: full compatibility with other occupations
- ♦ Practical exercises for self-evaluation and learning verification.
- ♦ Support groups and educational synergies: questions to the expert, debate and knowledge forums.
- ♦ Communication with the teacher and individual reflection work
- ♦ Content that is accessible from any, fixed or portable device with an Internet connection.
- ♦ Supplementary documentation databases are permanently available, even after the program



*A high-level scientific training program, supported by advanced technological development and the teaching experience of the best professionals"*

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*A training program created for professionals who aspire to excellence that will allow you to acquire new skills and strategies in a smooth and effective way"*

Our teaching staff is made up of working professionals. In this way, we ensure that we provide you with the training update we are aiming for. A multidisciplinary team of professionals with training and experience in different environments, who will develop the theoretical knowledge in an efficient way, but above all, they will bring their practical knowledge from their own experience to the course.

The efficiency of the methodological design of this Advanced Master's Degree, enhances the student's understanding of the subject. Developed by a multidisciplinary team of e-learning experts, it integrates the latest advances in educational technology. In this way, you will be able to study with a range of easy-to-use and versatile multimedia tools that will give you the necessary skills you need for your specialization.

The design of this program is based on Problem-Based Learning, an approach that conceives learning as a highly practical process. To achieve this remotely, we will use remote training learning. With the help of an innovative interactive video system, and learning from an expert, you will be able to acquire the knowledge as if you were actually dealing with the scenario you are learning about. A concept that will allow you to integrate and fix learning in a more realistic and permanent way.

*A deep and comprehensive dive into strategies and approaches in application of clinical ultrasound.*

*We have the best teaching methodology and a multitude of simulated cases that will help you train in real situations.*



# 02

# Objectives

Our objective is to train highly qualified professionals for work experience. An objective that is complemented, moreover, in a global manner, by promoting human development that lays the foundations for a better society. This objective is focused on helping professionals reach a much higher level of expertise and control. A goal that you will be able to achieve thanks to a highly intensive and detailed course.







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*If your goal is to improve in your profession, to acquire a qualification that will enable you to compete among the best, then look no further: Welcome to TECH”*



## General Objectives

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- Acquire the necessary knowledge in the use of ultrasound, in order to manage the routine situations of their practical use in healthcare
- Apply the skills acquired while performing the duties of an ultrasound specialist
- Use the latest clinical developments in the day-to-day work of a medical professional
- Turn physicians into masters in the use of ultrasound for the management of emergency situations and critical patients, regardless of the environment in which they find themselves





## Specific Objectives

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### Primary Care Clinical Ultrasound

- ♦ Optimize ultrasound imaging through in-depth knowledge of the physical principles of ultrasound and the controls and operation of ultrasound scanners
- ♦ Master the basic and advanced procedures of Ultrasound, both at diagnostic and therapeutic level
- ♦ Excel in spatial orientation or "econavigation"
- ♦ Practise all ultrasound modes in the safest way for the patient
- ♦ Know the indications and limitations of Clinical Ultrasound, and its application in the most common clinical situations
- ♦ Predict the results of invasive diagnostic procedures non-invasively by using ultrasound, with the possibility of replacing them
- ♦ Guiding invasive therapeutic procedures to minimize their risks
- ♦ Understand how to extend the concept of Clinical Ultrasound to healthcare, research, and academic environments

### Clinical Ultrasound in Emergencies and Critical Care

- ♦ 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
- ♦ 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
- ♦ 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

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

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*We are the largest Spanish-speaking online university and we want to help you improve your future”*

# 03 Skills

Once all the contents have been studied and the objectives of the Advanced Master's Degree in Clinical Ultrasound have been achieved, the health professional will have gained superior expertise and performance in this area. A very complete approach, in a high-level Advanced Master's Degree, which makes the difference.



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*Achieving excellence in any profession requires effort and perseverance. But, above all, the support of professionals, who will give you the boost you need, with the necessary means and assistance. At TECH, we offer you everything you need”*



## General Skills

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- ♦ Apply the contents learned in resolving the main health problems in the field of Clinical Ultrasound
- ♦ Develop learning to learn as one of the most important skills for any professional nowadays, who is obliged to constant professional training and improvement due to the speed at which scientific knowledge is being produced
- ♦ Increase diagnostic abilities through the use of ultrasound for their patients' healthcare
- ♦ Develop skills for self-improvement, in addition to being able to provide training and professional improvement activities due to the high level of scientific and professional preparation acquired with this program

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*Our objective is very simple: to offer you quality specialized training with the best teaching methods currently, so that you can reach new heights of excellence in your profession"*







## Specific Skills

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- ♦ Use ultrasound imaging with sufficient ability to integrate common diagnostic processes in primary care
- ♦ Optimize ultrasound imaging through in-depth knowledge of the physical principles of ultrasound and the controls and operation of ultrasound
- ♦ Understand basic and advanced ultrasound procedures, both diagnostic and therapeutic
- ♦ Excel in spatial orientation or "econavigation"
- ♦ 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

# 04

# Course Management

The program's teaching staff includes leading experts in Clinical Ultrasound, who contribute their vast work experience to this specialization program. Additionally, other recognized specialists participate in its design and preparation, which means that the program is developed in an interdisciplinary manner.



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*We have an excellent team of professionals who have come together to teach you the latest advances in Clinical Ultrasound”*

## Management



### Dr. Fumadó Qeral, Josep

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



### Dr. Pérez Morales, Luis Miguel

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



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

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

## **Coordinators**

### **Dr. Flores Herrero, Ángel**

- ♦ Degree in Medicine and Surgery
- ♦ Attending 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)

### **Dr. Igeño Cano, José Carlos**

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

**Dr. Osiniri Kippes, María Inés**

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

**Dr. Jiménez Díaz, Fernando**

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

**Dr. Vicho Pereira, Raúl**

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

**Dr. Vollmer Torrubiano, Iván**

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

**Scientific Committee**

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

- ♦ Specialist in Intensive Care Medicine
- ♦ Service of Intensive Care Medicine and Major Burns University Hospital of Getafe, Madrid
- ♦ Head of the TECH Master's Degree in Clinical Ultrasound in Emergency and Critical Care, CEU Cardenal Herrera University
- ♦ Head of the TECH Master's Degree in Clinical Imaging in Emergency and Critical Care, CEU Cardenal Herrera University
- ♦ Teacher in the Specialist Degree in Thoracic Ultrasound at the University of Barcelona

**Dr. Herrera Carcedo, Carmelo**

- ♦ Family Physician and Head of the Ultrasound Unit at the Briviesca Health Center (Burgos).
- ♦ Tutor at the Family and Community Medicine Teaching Unit in Burgos
- ♦ Teacher at the Spanish School of Ultrasound of the Spanish Society of General and Family Physicians (SEMG).

**Professor Dr. Jiménez Díaz, Fernando**

- ♦ Specialist in Sports Medicine
- ♦ Professor in the Faculty of Sports Sciences at the University of Castilla La Mancha Toledo
- ♦ Director of the International Chair of Musculoskeletal Ultrasound of the Catholic University of Murcia
- ♦ Teacher on the TECH Master's Degree in Clinical Imaging in Emergency and Critical Care, CEU Cardenal Herrera University

**Dr. Sánchez Sánchez, José Carlos**

- ♦ Radiodiagnosis Specialist
- ♦ Director of the Integrated Diagnostic Imaging Management Area and Intrahospital Coordinator of the Breast Cancer Early Detection Program at Poniente Hospital, El Ejido, Almeria
- ♦ Teacher on the Specialist Degree in Clinical Ultrasound for Family Physicians at the University of Barcelona

**Professors****Dr. Arancibia Zemelman, Germán**

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

**Dr. Argüeso García, Mónica**

- ♦ Service of Intensive Care Medicine Complejo Materno Insular at Gran Canaria Las Palmas de Gran Canaria (Canary Islands)

**Dr. Barceló Galíndez, Juan Pablo**

- ♦ Specialist in Occupational Medicine and medical sonographer at Mutualia Bilbao

**Dr. Cabrera González, Antonio José**

- ♦ Family Doctor at Tamaraceite Las Palmas de Gran Canaria Health Center (Canary Islands)

**Dr. Corcoll Reixach, Josep**

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

**Dr. De Varona Frolov, Serguei**

- ♦ Specialist at General University Hospital of Gran Canaria Dr Negrín. Las Palmas de Gran Canaria (Canary Islands)

**Dr. Donaire Hoyas, Daniel**

- ♦ Specialist in Orthopedic Surgery and Traumatology Hospital de Poniente El Ejido, Almeria

**Sr. Feroso, Antonio Fabián**

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

**Dr. Gálvez Gómez, Francisco Javier**

- ♦ Ultrasound Portfolio Solutions Manager España SIEMENS Healthcare Madrid

**Dr. García García, Nicasio**

- ♦ Family Physician (Schamann Health Center).

**Dr. Herrero Hernández, Raquel**

- ♦ Specialist in Service of Intensive Care Medicine and Major Burns at University Hospital of Getafe Madrid

**Dr. Igeño Cano, José Carlos**

- ♦ Head of the Emergency and Intensive Care Department at Hospital San Juan de Dios Córdoba

**Dr. León Ledesma, Raquel**

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

**Dr. López Cuenca, Sonia**

- ♦ Family Physician and Assistant in the Intensive Care and Major Burns Unit at Getafe Hospital (Madrid).

**Dr. López Rodríguez, Lucía**

- ♦ Specialist in Service of Intensive Care Medicine and Major Burns at University Hospital of Getafe Madrid

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

- ♦ Rehabilitation Specialist at Insular University Hospital Complex Maternity and Infant Las Palmas de Gran Canaria

**Sr. Moreno Valdés, Javier**

- ♦ Business Manager Ultrasound Cannon (Toshiba) Medical Systems Madrid

**Dr. Núñez Reiz, Antonio**

- ♦ Specialist in Intensive Medicine at San Carlos Clinical University Hospital Madrid

**Dr. Ortigosa Solorzano, Esperanza**

- ♦ Specialist in Anesthesiology, Resuscitation and Pain Treatment University Hospital in Getafe Madrid

**Dr. Segura Blázquez, José María**

- ♦ Family Doctor at Tamaraceite Las Palmas de Gran Canaria Health Center (Canary Islands)

**Professor Dr. Santos Sánchez, José Ángel**

- ♦ Specialist in the Radiology Department at Salamanca University Hospital

**Dr. Wagüemert Pérez, Aurelio**

- ♦ Specialist in Pneumology Hospital San Juan de Dios Santa Cruz de Tenerife (Canary Islands)

**Dr. Abril Palomares, Elena**

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

**Dr. Álvarez González, Manuel**

- ♦ Degree in Medicine and Surgery
- ♦ Specialist Doctor in Intensive Medicine
- ♦ Attending Physician in Intensive Care Medicine.
- ♦ San Carlos Clinical University Hospital Madrid.
- ♦ Founding Member of the Ecoclub of SOMIAMA

**Dr. Colinas Fernández, Laura**

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

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

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

**Dr. Hernández Tejedor, Alberto**

- ♦ Degree in Medicine and Surgery
- ♦ Specialist Doctor in Intensive Medicine
- ♦ Attending Physician in Intensive Care Medicine
- ♦ University Hospital Alcorcón Foundation, Madrid
- ♦ Member of the Ecoclub of SOMIAMA



**Dr. Herrero Hernández, Raquel**

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

**Dr. Lamarca Mendoza, María Pilar**

- ♦ Degree in Medicine and Surgery
- ♦ Attending Physician of Angiology and Vascular Surgery
- ♦ Toledo Hospital Complex.

**Dr. López Cuenca, Sonia**

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

**Dr. López Rodríguez, Lucía**

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

**Dr. Martínez Crespo, Javier**

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

**Dr. Martínez Díaz, Cristina**

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

**Dr. Mora Rangil. Patricia**

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

**Dr. Núñez Reiz, Antonio**

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

**Dr. Ortuño Andériz, Francisco**

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

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

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

**Dr. Pérez Morales, Luis Miguel**

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

**Dr. Phillipps Fuentes, Federico**

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

**Dr. Serna Gandía, María**

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



**Dr. Temprano Vázquez, Susana**

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

**Dr. Villa Vicente, Gerardo**

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

**Dr. Yus Teruel, Santiago**

- ◆ Degree in Medicine and Surgery
- ◆ Specialist Doctor in Intensive Medicine
- ◆ Attending Physician in Intensive Care Medicine
- ◆ La Paz- Carlos III University Hospital
- ◆ Member of the Ecoclub of SOMIAMA

# 05

## Structure and Content

The contents of this specialisation degree have been developed by the different Professors on this course, with a clear purpose: to ensure that our students acquire each and every one of the necessary skills to become true experts in this field. The content of this Advanced Master's Degree enables you to learn all aspects of the different disciplines involved in this field. A complete and well-structured program that will take you to the highest standards of quality and success.





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*Through a very well-organized program, you will be able to access the most advanced knowledge in Clinical Ultrasound”*

## Module 1. Ultrasound Imaging

- 1.1. Physical Principles
  - 1.1.1 Sounds and Ultrasound
  - 1.1.2 The Nature of Sound
  - 1.1.3 Interaction of Sound with Matter
  - 1.1.4 The Concept of Ultrasound
  - 1.1.5 Ultrasound Safety
- 1.2. Ultrasound Sequence
  - 1.2.1 Ultrasound Emission
  - 1.2.2 Tissue Interaction
  - 1.2.3 Echo Formation
  - 1.2.4 Ultrasound Reception
  - 1.2.5 Ultrasound Image Generation
- 1.3. Ultrasound Modes
  - 1.3.1 Modes A and M
  - 1.3.2 Mode B
  - 1.3.3 Doppler Modes (Color, Angio, and Spectral)
  - 1.3.4 Combined Modes
- 1.4. Ultrasound Scanners
  - 1.4.1 Common Components
  - 1.4.2 Classification
  - 1.4.3 Transducers.
- 1.5. Ultrasound Maps and Echonavigation
  - 1.5.1 Spatial Layout
  - 1.5.2 Ultrasound Maps
  - 1.5.3 Transducer movements
  - 1.5.4 Practical Advice
- 1.6. Trends in Ultrasound
  - 1.6.1 3D/4D Ultrasound
  - 1.6.2 Sonoelastography
  - 1.6.3 Echopotentialization
  - 1.6.4 Other Modes and Techniques

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

- 2.1. Anatomy Recap
  - 2.1.1 Cranium and Face
  - 2.1.2 Tubular Structures
  - 2.1.3 Glandular Structures
  - 2.1.4 Vascular Structures
- 2.2. Ocular Ultrasound
  - 2.2.1 Ultrasound Anatomy of the Eye
  - 2.2.2 Ocular Ultrasound Technique
  - 2.2.3 Indications and Contraindications of Ocular Ultrasonography
  - 2.2.4 Ultrasound Report
- 2.3. Ultrasound of Salivary Glands
  - 2.3.1 Regional Sonoanatomy
  - 2.3.2 Technical Aspects
  - 2.3.3 Most Common Tumor and Non-Tumor Pathologies
- 2.4. Thyroid Ultrasound
  - 2.4.1 Ultrasound Technique
  - 2.4.2 Indications
  - 2.4.3. Normal and Pathological Thyroid
  - 2.4.4 Diffuse Goiter
- 2.5. Ultrasound Examination of Adenopathies
  - 2.5.1 Reactive Lymph Nodes
  - 2.5.2 Non-Specific Inflammatory Diseases
  - 2.5.3 Specific Lymphadenitis (Tuberculosis)
  - 2.5.4 Primary Lymph Node Diseases (Sarcoidosis, Hodgkin's Lymphoma, Non-Hodgkin's Lymphoma)
  - 2.5.5 Lymph Node Metastases
- 2.6. Ultrasound of the Supra-Aortic Trunks
  - 2.6.1 Sonoanatomy
  - 2.6.2 Scanning Protocol
  - 2.6.3 Extracranial Carotid Pathology
  - 2.6.4 Vertebral Pathology and Subclavian Artery Steal Syndrome



### Module 3. Clinical Ultrasound of the Digestive Tract and Major Vessels

- 3.1. Hepatic Ultrasound
  - 3.1.1 Anatomy
  - 3.1.2 Liquid Focal Lesions
  - 3.1.3 Solid Focal Lesions
  - 3.1.4 Diffuse Liver Disease
  - 3.1.5 Chronic Liver Disease
- 3.2. Ultrasound of Gallbladder and Bile Ducts
  - 3.2.1 Anatomy
  - 3.2.2 Cholelithiasis and Biliary Sludge
  - 3.2.3 Vesicular Polyps
  - 3.2.4 Cholecystitis
  - 3.2.5 Bile Duct Dilatation
  - 3.2.6 Bile Duct Malformations
- 3.3. Pancreatic Ultrasound
  - 3.3.1 Anatomy
  - 3.3.2 Acute Pancreatitis
  - 3.3.3 Chronic Pancreatitis
- 3.4. Ultrasound of the Major Vessels
  - 3.4.1 Abdominal Aortic Disease
  - 3.4.2 Vena Cava Pathology
  - 3.4.3 Pathology of Celiac Trunk, Hepatic Artery, and Splenic Artery
  - 3.4.4 Aortomesenteric Clamp Pathology
- 3.5. Ultrasound of the Spleen and Retroperitoneum
  - 3.5.1 Spleen Anatomy
  - 3.5.2 Splenic Focal Lesions
  - 3.5.3 Study of Splenomegaly
  - 3.5.4 Adrenal Gland Anatomy
  - 3.5.5 Adrenal Pathology
  - 3.5.6 Retroperitoneal Lesions
- 3.6. The Digestive Tract
  - 3.6.1 Ultrasound Examination of the Stomach
  - 3.6.2 Ultrasound Examination of the Small Intestine
  - 3.6.3 Ultrasound Examination of the Colon

## Module 4. Clinical Genitourinary Ultrasound

- 4.1. Kidneys and Urinary Tract
  - 4.1.1 Anatomy Recap
  - 4.1.2 Structural Alterations
  - 4.1.3 Hydronephrosis Urinary Tract Dilation
  - 4.1.4 Kidney Stones, Cysts, and Tumors
  - 4.1.5 Renal Insufficiency
- 4.2. Urinary Bladder
  - 4.2.1 Anatomy Recap
  - 4.2.2 Ultrasound Characteristics
  - 4.2.3 Benign Bladder Pathology
  - 4.2.4 Malignant Bladder Pathology
- 4.3. Prostate and Seminal Vesicles
  - 4.3.1 Anatomy Recap
  - 4.3.2 Ultrasound Characteristics
  - 4.3.3 Benign Prostatic Pathology
  - 4.3.4 Malignant Prostatic Pathology
  - 4.3.5 Benign Seminal Pathology
  - 4.3.6 Malignant Seminal Pathology
- 4.4. The Scrotum
  - 4.4.1 Anatomy Recap
  - 4.4.2 Ultrasound Characteristics
  - 4.4.3 Benign Scrotal Pathology
  - 4.4.4 Malignant Scrotal Pathology
- 4.5. The Uterus
  - 4.5.1 Anatomy Recap
  - 4.5.2 Ultrasound Characteristics
  - 4.5.3 Benign Uterine Pathology
  - 4.5.4 Malignant Uterine Pathology

- 4.6. The Ovaries
  - 4.6.1 Anatomy Recap
  - 4.6.2 Ultrasound Characteristics of the Ovaries
  - 4.6.3 Benign Ovarian Pathology
  - 4.6.4 Malignant Ovarian Pathology

## Module 5. Musculoskeletal Clinical Ultrasound

- 5.1. Anatomy Recap
  - 5.1.1 Anatomy of the Shoulder
  - 5.1.2 Anatomy of the Elbow
  - 5.1.3 Anatomy of the Wrist and Hand
  - 5.1.4 Anatomy of the Hip and Thigh
  - 5.1.5 Anatomy of the Knee
  - 5.1.6 Anatomy of the Ankle, Foot, and Leg
- 5.2. Technical Requirements
  - 5.2.1 Introduction
  - 5.2.2 Musculoskeletal Ultrasound Equipment
  - 5.2.3 Ultrasound Imaging Methods
  - 5.2.4 Validation, Reliability, and Standardization
  - 5.2.5 Ultrasound-Guided Procedures
- 5.3. Examination Technique
  - 5.3.1 Basic Concepts in Ultrasound
  - 5.3.2 Rules for Correct Examination
  - 5.3.3 Examination Technique in Ultrasound Study of the Shoulder
  - 5.3.4 Examination Technique in Ultrasound Study of the Elbow
  - 5.3.5 Examination Technique in Ultrasound Study of the Wrist and Hand
  - 5.3.6 Examination Technique in Ultrasound Study of the Hip
  - 5.3.7 Examination Technique in Ultrasound Study of the Thigh
  - 5.3.8 Examination Technique in Ultrasound Study of the Knee
  - 5.3.9 Examination Technique in Ultrasound Study of the Leg and Ankle



- 5.4. Sonoanatomy of the Musculoskeletal System: I. Upper Extremities
  - 5.4.1 Introduction
  - 5.4.2 Shoulder Ultrasound Anatomy
  - 5.4.3 Elbow Ultrasound Anatomy
  - 5.4.4 Wrist and Hand Ultrasound Anatomy
- 5.5. Sonoanatomy of the Musculoskeletal System: II. Lower Extremities
  - 5.5.1 Introduction
  - 5.5.2 Hip Ultrasound Anatomy
  - 5.5.3 Thigh Ultrasound Anatomy
  - 5.5.4 Knee Ultrasound Anatomy
  - 5.5.5 Ultrasound Anatomy
  - 5.5.6 Of the Leg and Ankle
- 5.6. Ultrasound in the Most Frequent Acute Injuries of the Musculoskeletal System
  - 5.6.1 Introduction
  - 5.6.2 Muscle Injuries
  - 5.6.3 Tendon Injuries
  - 5.6.4 Ligament Injuries
  - 5.6.5 Subcutaneous Tissue Injuries
  - 5.6.6 Bone Injuries and Joint Injuries
  - 5.6.7 Peripheral Nerve Injuries

## Module 6. Clinical Vascular Ultrasound in Primary Care

- 6.1. Vascular Ultrasound
  - 6.1.1 Description and Applications
  - 6.1.2 Technical Requirements
  - 6.1.3 Procedure
  - 6.1.4. Interpretation of Results - Risks and Benefits
  - 6.1.5 Limitations
- 6.2. Doppler
  - 6.2.1 Fundamentals
  - 6.2.2 Applications
  - 6.2.3. Types of Echo-Doppler
  - 6.2.4 Color Doppler
  - 6.2.5 Power Doppler
  - 6.2.6 Dynamic Doppler
- 6.3. Normal Ultrasound of the Venous System
  - 6.3.1 Anatomy Recap: Venous System of the Upper Extremities
  - 6.3.2 Anatomy Recap: Venous System of the Lower Extremities
  - 6.3.3 Normal Physiology
  - 6.3.4 Regions of Interest
  - 6.3.5 Functional Tests
  - 6.3.6 Report Vocabulary
- 6.4. Upper Extremity Chronic Venous Disease
  - 6.4.1 Definition
  - 6.4.2 CEAP Classification
  - 6.4.3 Morphological Criteria
  - 6.4.4 Examination Technique
  - 6.4.5 Diagnostic Manoeuvres
  - 6.4.6 Type of Report
- 6.5. Acute/Subacute Vascular Thrombosis of the Upper Extremities
  - 6.5.1 Anatomy Recap
  - 6.5.2 Manifestations of Vascular Thrombosis of the Upper Extremities
  - 6.5.3 Ultrasound Characteristics
  - 6.5.4 Examination Technique
  - 6.5.5 Diagnostic Manoeuvres
  - 6.5.6 Technical Limitations

- 6.6. Acute/Subacute Vascular Thrombosis of the Lower Extremities
  - 6.6.1 Description
  - 6.6.2 Manifestations of Vascular Thrombosis of the Lower Extremities
  - 6.6.3 Ultrasound Characteristics
  - 6.6.4 Examination Technique
  - 6.6.5 Differential Diagnosis
  - 6.6.6 Vascular Report

## Module 7. Clinical Ultrasound in Emergencies

- 7.1. Ultrasound in Respiratory Failure
  - 7.1.1 Spontaneous Pneumothorax
  - 7.1.2 Bronchospasm
  - 7.1.3 Pneumonia
  - 7.1.4 Pleural Effusion
  - 7.1.5 Heart Failure
- 7.2. Ultrasound in Shock and Cardiac Arrest
  - 7.2.1 Hypovolemic Shock
  - 7.2.2 Obstructive Shock
  - 7.2.3 Cardiogenic Shock
  - 7.2.4 Distributive Shock
  - 7.2.5 Cardiac Arrest
- 7.3. Ultrasound in Polytrauma: Eco-FAST
  - 7.3.1 Pericardial Effusion
  - 7.3.2 Hemothorax and Pneumothorax
  - 7.3.3 Hepatorenal or Perihepatic Effusion
  - 7.3.4 Splenorenal or Perisplenic Effusion
  - 7.3.5 Perivesical Effusion
  - 7.3.6 Post-Traumatic Aortic Dissection
  - 7.3.7 Musculoskeletal Injuries

- 7.4. Genitourinary Emergencies
  - 7.4.1 Obstructive Uropathy
  - 7.4.2 Uterine Emergencies
  - 7.4.3 Ovarian Emergencies
  - 7.4.4 Bladder Emergencies
  - 7.4.5 Prostatic Emergencies Scrotal Emergencies
- 7.5. Acute Abdomen
  - 7.5.1 Cholecystitis
  - 7.5.2 Pancreatitis
  - 7.5.3 Mesenteric Ischemia
  - 7.5.4 Appendicitis
  - 7.5.5 Perforation of the Hollow Viscus
- 7.6. Ultrasound in Sepsis
  - 7.6.1 Hemodynamic Diagnosis
  - 7.6.2 Source Detection
  - 7.6.3 Handling of Liquids

## Module 8. Ultrasound-Guided Procedures in Primary Care

- 8.1. Ultrasound-Guided FNA
  - 8.1.1 Indications/Contraindications Material
  - 8.1.2 Informed Consent
  - 8.1.3. Procedure
  - 8.1.4. Results
  - 8.1.5. Complications
  - 8.1.6. Quality Control
- 8.2. Ultrasound-Guided Percutaneous Biopsy
  - 8.2.1 Informed Consent
  - 8.2.2. Biopsy Materials (Types of Biopsy Needles)
  - 8.2.3. Procedure
  - 8.2.4. Complications
  - 8.2.5. Care
  - 8.2.6. Quality Control

- 8.3. Drainage of Abscesses and Fluid Collections
  - 8.3.1 Indications and Contraindications
  - 8.3.2 Informed Consent
  - 8.3.3. Requirements and Materials
  - 8.3.4 Technique and Approach: Direct Puncture (Trocar Technique) vs. Step to Step (Seldinger Technique)
  - 8.3.5 Catheter Management and Patient Care
  - 8.3.6 Side Effects and Complications
  - 8.3.7 Quality Control
- 8.4. Ultrasound-Guided Thoracentesis, Pericardiocentesis, and Paracentesis
  - 8.4.1 Indications and Advantages over the Anatomical Reference Technique
  - 8.4.2 Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 8.4.3 Ultrasound Specifications and Pericardial Drainage Technique
  - 8.4.4 Ultrasound Specifications and Thoracic Drainage Technique
  - 8.4.5 Ultrasound Specifications and Abdominal Drainage Technique
  - 8.4.6 Common Problems, Complications, and Practical Advice
- 8.5. Ultrasound-Guided Vascular Cannulation
  - 8.5.1 Indications and Advantages over the Anatomical Reference Technique
  - 8.5.2 Current Evidence on Ultrasound-Guided Vascular Cannulation
  - 8.5.3 Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 8.5.4 Ultrasound-Guided Central Venous Cannulation Technique
  - 8.5.5 Single Peripheral Catheter and Peripherally Inserted Central Catheter (PICC) Cannulation Technique
  - 8.5.6 Arterial Cannulation Technique
- 8.6. Ultrasound-Guided Infiltration and Chronic Pain Treatment
  - 8.6.1 Infiltrations and Pain
  - 8.6.2 Large Joints: Intra-Articular and Myotendinous
  - 8.6.3 Small Joints: Intra-Articular and Myotendinous
  - 8.6.4 Spinal Column

## Module 9. Other Uses of Clinical Ultrasound

- 9.1. Radial Breast Ultrasound
  - 9.1.1 Anatomy Recap
  - 9.1.2 Technical Requirements
  - 9.1.3 Ultrasound Slices
  - 9.1.4 Ultrasound Characteristics Breast Pathology
  - 9.1.5 Breast Elastography
- 9.2. Dermatological Ultrasound
  - 9.2.1 Echoanatomy of the Skin and Appendages
  - 9.2.2 Ultrasound of Skin Tumors
  - 9.2.3 Ultrasound of Inflammatory Skin Diseases
  - 9.2.4 Ultrasound in Dermoesthetics and its Complications
- 9.3. Introduction to Cerebral Clinical Ultrasound
  - 9.3.1 Brain Anatomy and Physiology of Ultrasound Interest
  - 9.3.2 Ultrasound Techniques and Procedures
  - 9.3.3 Structural Alterations
  - 9.3.4 Functional Alterations
  - 9.3.5 Intracranial Hypertension
- 9.4. Ultrasound in Diabetes
  - 9.4.1 Aortic/Carotid Atheromatosis in Diabetics
  - 9.4.2 Parenchymal Echogenicity in Diabetic Patients
  - 9.4.3 Biliary Lithiasis in Diabetic Patients
  - 9.4.4 Neurogenic Bladder in Diabetic Patients
  - 9.4.5 Cardiomyopathy in Diabetic Patients
- 9.5. Ultrasound in the Study of Frailty in the Elderly
  - 9.5.1 Frail Elderly
  - 9.5.2 ABCDE Ultrasound with Frail Elderly
  - 9.5.3 Ultrasound Examination of Sarcopenia
  - 9.5.4 Ultrasound Examination of Cognitive Deterioration
- 9.6. Ultrasound Report
  - 9.6.1 Ultrasound Note
  - 9.6.2 Ultrasound Derivation
  - 9.6.3 Ultrasound Report in PC

## Module 10. Clinical Cardiac Ultrasound

- 10.1. Cardiac Anatomy.
  - 10.1.1 Basic Three-Dimensional Anatomy
  - 10.1.2 Basic Cardiac Physiology
- 10.2. Technical Requirements to Perform a Cardiac Ultrasound
  - 10.2.1 Probes
  - 10.2.2 Characteristics of the Equipment used in a Cardiac Ultrasound
- 10.3. Perineal Windows and Cardiac Ultrasound
  - 10.3.1 Windows and Maps Applied in Emergencies and Intensive Care Situations
  - 10.3.2 Basic Doppler (Color, Pulsating, Continuous and Tissue Doppler)
- 10.4. Structural Alterations
  - 10.4.1 Basic Measures in Cardiac Ultrasound
  - 10.4.2 Thrombi
  - 10.4.3 Suspected Endocarditis
  - 10.4.4 Valvular Heart Disease
  - 10.4.5 Pericardium
  - 10.4.6 How Is an Ultrasound Reported in Emergency and Intensive Care?
- 10.5. Hemodynamic Ultrasound
  - 10.5.1 Left Ventricular Hemodynamics
  - 10.5.2 Right Ventricular Hemodynamics
  - 10.5.3 Preload Dynamic Tests
- 10.6. Transesophageal Echocardiogram
  - 10.6.1 Techniques
  - 10.6.2 Indications in Emergencies and Intensive Care Cases
  - 10.6.3 Ultrasound-Guided Study of Cardioembolism

## Module 11. Clinical Thoracic Ultrasound

- 11.1. Fundamentals of Thoracic Ultrasound and Anatomical Review
- 11.2. Technical Requirements Examination Technique
- 11.3. Ultrasound of the Thoracic Wall and the Mediastinum
- 11.4. Ultrasound of the Pleura
- 11.5. Pulmonary Ultrasound
- 11.6. Diaphragmatic Ultrasound

## Module 12. Vascular Clinical Ultrasound in Emergencies and Critical Care

- 12.1. Anatomy Recap
  - 12.1.1 Venous Vascular Anatomy of the Upper Limbs
  - 12.1.2 Arterial Vascular Anatomy of the Upper Limbs
  - 12.1.3 Venous Vascular Anatomy of the Lower Limbs
  - 12.1.4 Arterial Vascular Anatomy of the Lower Limbs
- 12.2. Technical Requirements
  - 12.2.1 Ultrasound Scanners and Probes
  - 12.2.2 Curve Analysis
  - 12.2.3 Image-Color Media
  - 12.2.4 Echo Contrasts
- 12.3. Examination Technique
  - 12.3.1 Positioning
  - 12.3.2 Insonation Examining Technique
  - 12.3.3 Study of Normal Curves and Speeds
- 12.4. Large Thoracoabdominal Vessels
  - 12.4.1 Venous Vascular Anatomy of the Abdomen
  - 12.4.2 Arterial Vascular Anatomy of the Abdomen
  - 12.4.3 Abdomino-Pelvic Venous Pathology
  - 12.4.4 Abdomino-Pelvic Arterial Pathology
- 12.5. Supra-Aortic Trunks
  - 12.5.1 Venous Vascular Anatomy of the Supra-Aortic Trunks
  - 12.5.2 Arterial Vascular Anatomy of the Supra-Aortic Trunks
  - 12.5.3 Venous Pathology of the Supra-Aortic Trunks
  - 12.5.4 Arterial Pathology of the Supra-Aortic Trunks
- 12.6. Peripheral arterial and venous circulation
  - 12.6.1 Venous Pathology of Lower and Upper Limbs
  - 12.6.2 Arterial Pathology of Lower and Upper Limbs

**Module 13. Clinical Cerebral Ultrasound**

- 13.1. Cerebral Hemodynamics
  - 13.1.1 Carotid Circulation
  - 13.1.2 Vertebro-Basilar Circulation
  - 13.1.3 Cerebral Microcirculation
- 13.2. Ultrasound Modes
  - 13.2.1 Transcranial Doppler
  - 13.2.2 Cerebral Ultrasound
  - 13.2.3 Special Tests (vascular reaction, HITS, etc)
- 13.3. Acoustic Windows and Examination Technique
  - 13.3.1 Acoustic Windows
  - 13.3.2 Operator Position
  - 13.3.3 Study Sequence
- 13.4. Structural Alterations
  - 13.4.1 Collections and Masses
  - 13.4.2 Vascular Anomalies
  - 13.4.3 Hydrocephalus
  - 13.4.4 Venous Pathology
- 13.5. Hemodynamic Alterations
  - 13.5.1 Spectral Analysis
  - 13.5.2 Hyperdynamics
  - 13.5.3 Hypodynamics
  - 13.5.4 Asystole of the Brain
- 13.6. Ocular Ultrasound
  - 13.6.1 Pupil Size and Reactivity
  - 13.6.2 Diameter of the Optic Nerve Sheath

**Module 14. Clinical Abdominal Ultrasound**

- 14.1. Anatomy Recap
  - 14.1.1 Abdominal Cavity
  - 14.1.2 Liver
  - 14.1.3 Gallbladder and Bile Ducts
  - 14.1.4 Retroperitoneum and Great Vessels
  - 14.1.5 Pancreas
  - 14.1.6 Spleen
  - 14.1.7 Kidneys
  - 14.1.8 Bladder
  - 14.1.9 Prostate and Seminal Vesicles
  - 14.1.10. Uterus and Ovaries
- 14.2. Technical Requirements
  - 14.2.1 Ultrasound Equipment
  - 14.2.2 Types of Transducers for Abdominal Examination
  - 14.2.3 Basic Ultrasound Settings
  - 14.2.4 Patient Preparation
- 14.3. Examination Technique
  - 14.3.1 Study Maps
  - 14.3.2 Probe Movements
  - 14.3.3 Visualization of Organs According to Conventional Sectioning
  - 14.3.4 Systematic Study
- 14.4. ECO-FAST Methodology
  - 14.4.1 Equipment and Transducers
  - 14.4.2 ECO-FAST I
  - 14.4.3 ECO-FAST II
  - 14.4.4 ECO-FAST III Perivesical Effusion
  - 14.4.5 ECO-FAST IV Pericardial Effusion
  - 14.4.6 ECO-FAST V. Rule out ABD Aortic Aneurysm

- 14.5. Ultrasound of the Digestive System
  - 14.5.1 Liver
  - 14.5.2 Gallbladder and Bile Ducts
  - 14.5.3 Pancreas
  - 14.5.4 Spleen
- 14.6. Genitourinary Ultrasound
  - 14.6.1 Kidneys
  - 14.6.2 Urinary Bladder
  - 14.6.3 Male Genital System
  - 14.6.4 Female Genital System

### Module 15. Ultrasonographic Approach to the Major Syndromes

- 15.1. Cardiac Arrest
  - 15.1.1 Cerebral Hemodynamics
  - 15.1.2 Brain Damage in Cardiac Arrest
  - 15.1.3 Usefulness of Ultrasound in Resuscitation
  - 15.1.4 Usefulness of Ultrasound After Recovery of Spontaneous Circulation
- 15.2. Shock
  - 15.2.1 Ventricular Filling Pressure
  - 15.2.2 Heart Failure
  - 15.2.3 Prediction of the Hemodynamic response to Intravascular Volume Administration
  - 15.2.4 Ultrasound Evaluation of Pulmonary Edema
  - 15.2.5 Ultrasound Search for Sources of Sepsis
- 15.3. Respiratory Failure
  - 15.3.1 Acute Respiratory Failure: diagnosis
  - 15.3.2 Abrupt Hypoxemia in Patients on Mechanical Ventilation
  - 15.3.3 Monitoring of Recruitment Maneuvers
  - 15.3.4 Evaluation of Extravascular Lung Water
- 15.4. Acute Renal Failure
  - 15.4.1 Hydronephrosis
  - 15.4.2 Lithiasis
  - 15.4.3 Acute Tubular Necrosis
  - 15.4.4 Doppler Ultrasound in Acute Renal Failure
  - 15.4.5 Seminal Vesicle Ultrasound in Acute Renal Failure

- 15.5. Trauma
  - 15.5.1 FAST and e-FAST (Hemo and Pneumothorax)
  - 15.5.2 Ultrasound Evaluation in Special Situations
  - 15.5.3 Hemodynamic Evaluation Focused on Trauma
- 15.6. Stroke
  - 15.6.1 Justification
  - 15.6.2 Initial Assessment
  - 15.6.3 Ultrasound Assessment
  - 15.6.4 Ultrasound-Guided Management

### Module 16. Echoguided Procedures in Emergencies and Critical Care

- 16.1. Airway
  - 16.1.1 Advantages and Disadvantages
  - 16.1.2 Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 16.1.3 Orotracheal Intubation Technique
  - 16.1.4 Percutaneous Tracheotomy Technique
  - 16.1.5 Common Problems, Complications, and Practical Advice
- 16.2. Vascular Cannulation
  - 16.2.1 Indications and Advantages of the Anatomical Reference Technique
  - 16.2.2 Current Evidence on Ultrasound-Guided Vascular Cannulation
  - 16.2.3 Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 16.2.4 Ultrasound-Guided Central Venous Cannulation Technique
  - 16.2.5 Single Peripheral Catheter and Peripherally Inserted Central Catheter (PICC) Cannulation Technique
  - 16.2.6 Arterial Cannulation Technique
  - 16.2.7 Implementation of an Ultrasound-Guided Vascular Cannulation Protocol
  - 16.2.8 Common Problems, Complications, and Practical Advice
- 16.3. Pericardiocentesis and Thoracentesis
  - 16.3.1 Indications and Advantages of the Anatomical Reference Technique
  - 16.3.2 Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 16.3.3 Ultrasound Specifications and Pericardial Drainage Technique
  - 16.3.4 Ultrasound Specifications and Thoracic Drainage Technique
  - 16.3.5 Common Problems, Complications, and Practical Advice

- 16.4. Paracentesis
  - 16.4.1. Indications and Advantages of the Anatomical Reference Technique
  - 16.4.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 16.4.3. Ultrasound Specifications and Technique
  - 16.4.4. Common Problems, Complications, and Practical Advice
- 16.5. Lumbar Puncture
  - 16.5.1. Indications and Advantages of the Anatomical Reference Technique
  - 16.5.2. Basic Aspects: Ultrasound Specifications and Ultrasound Anatomy
  - 16.5.3. Techniques
  - 16.5.4. Common Problems, Complications, and Practical Advice
- 16.6. Other Drainage and Probing
  - 16.6.1. Suprapubic Probing
  - 16.6.2. Collection Drainage
  - 16.6.3. Extraction of Foreign Bodies

## Module 17. Clinical Pediatric Ultrasound

- 17.1. Technical Requirements
  - 17.1.1. Ultrasound at the Patient's Bedside
  - 17.1.2. Physical Space
  - 17.1.3. Basic Equipment
  - 17.1.4. Equipment for Interventionalist Ultrasounds
  - 17.1.5. Ultrasound Scanners and Probes
- 17.2. Examination Technique
  - 17.2.1. Pediatric Patient Preparation
  - 17.2.2. Tests and Probes
  - 17.2.3. Ultrasound Section Maps
  - 17.2.4. Examination System
  - 17.2.5. Ultrasound-Guided Procedures
  - 17.2.6. Images and Documentation
  - 17.2.7. Test Report

- 17.3. Pediatric sonoanatomy and sonophysiology
  - 17.3.1. Normal Anatomy
  - 17.3.2. Sonoanatomy
  - 17.3.3. Sonophysiology of a Child in the Different Stages of Development
  - 17.3.4. Variants of Normality
  - 17.3.5. Dynamic Ultrasound
- 17.4. Ultrasound of the Major Pediatric Syndromes
  - 17.4.1. Emergency Thorax Ultrasound
  - 17.4.2. Acute Abdomen
  - 17.4.3. Acute Scrotum
- 17.5. Ultrasound-Guided Procedures in Pediatrics
  - 17.5.1. Vascular Access
  - 17.5.2. Extraction of Superficial Foreign Bodies
  - 17.5.3. Pleural Effusion
- 17.6. Introduction to Neonatal Clinical Ultrasound
  - 17.6.1. Emergency Transfontanelar Ultrasound
  - 17.6.2. Most Common Examination Indications in Emergencies
  - 17.6.3. Most Common Pathologies in Emergencies



*A comprehensive specialized program that will take you through the necessary training to compete with the best in your profession”*

06

# Methodology

This training program provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

This teaching system is used 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 Re-learning, 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

In a given situation, what would you do? Throughout the program you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, resolve the situation. There is abundant scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you can 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 potential 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 professional medical 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 grasp concepts, but also develop their mental capacity by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the 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.



## Re-learning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Re-learning.

Our 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, which represent a real revolution with respect to simply studying and analyzing cases.

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



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

With this methodology we have trained more than 250,000 physicians with unprecedented success, in all clinical specialties regardless of the surgical load. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

*Re-learning 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 (we learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

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



In this program you will have access to the best educational material, prepared with you in mind:



#### Study Material

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

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.



#### Latest Techniques and Procedures on Video

We introduce you to the latest techniques, to the latest educational advances, to the forefront of current medical techniques. All this, in first person, with the maximum rigor, explained and detailed for your assimilation and understanding. And best of all, you can watch them as many times as you want.



#### Interactive Summaries

We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story"



#### Additional Reading

Recent articles, consensus documents, international guides. in our virtual library you will have access to everything you need to complete your training.





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

Effective learning ought to be contextual. Therefore, we will present you with real case developments in which the expert will guide you through focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



**Testing & Re-Testing**

We periodically evaluate and re-evaluate your knowledge throughout the program, through assessment and self-assessment activities and exercises: so that you can see how you are achieving your goals.



**Classes**

There is scientific evidence suggesting that observing third-party experts can be useful.  
Learning from an expert strengthens knowledge and memory, and generates confidence in our future difficult decisions.



**Quick Action Guides**

We offer you the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help you progress in your learning.



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# Certificate

Through a different and stimulating learning experience, you will be able to acquire the necessary skills to take a big step in your training. An opportunity to progress, with the support and monitoring of a modern and specialized university, which will propel you to another professional level.





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*This Advanced Master's Degree in Clinical Ultrasound is the largest body of knowledge in the industry: A degree that will be a highly qualified added value for any professional in this area"*

This **Advanced Master's Degree in Clinical Ultrasound** contains the most complete and up-to-date scientific program on the market.

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

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

Certificate: **Advanced Master's Degree in Clinical Ultrasound**

ECTS: **120**

Official Number of Hours: **3000**



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

future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

personalized service innovation

knowledge present

online training

development

languages

virtual classroom

**tech** technological  
university

Advanced Master's Degree  
Clinical Ultrasound

Course Modality: Online

Duration: 2 years

Certificate: TECH Technological University

120 ECTS Credits

Teaching Hours: 3,000 hours.

# Advanced Master's Degree Clinical Ultrasound