

# Professional Master's Degree

Cardiovascular Critical  
Care in the ICU





## Professional Master's Degree Cardiovascular Critical Care in the ICU

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Global University
- » Accreditation: 60 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/medicine/professional-master-degree/master-cardiovascular-critical-care-uci](http://www.techtute.com/us/medicine/professional-master-degree/master-cardiovascular-critical-care-uci)

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# 01

# Introduction

Intensive and continuous medical care for patients requiring specialized monitoring and treatment is the main reason of an Intensive Care Unit (ICU). These medical environments must also be precise in the development of procedures for the care of cardiovascular pathologies and, in this sense, it is essential to have the most highly specialized professionals. In other words, specialists must be highly qualified in these health facilities. Therefore, TECH has created this 100% online program where physicians will update their skills in the management of pathologies such as Cardiogenic Shock or Myocardial Infarction. At the same time, they will have access to a disruptive methodology and exclusive content at any time of their choice.







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*Improve your skills in Cardiovascular Critical Care in the ICU Service through this program, where you will find the best didactic material with real clinical cases”*

The tools to assist patients requiring Cardiovascular Critical Care have evolved significantly in recent years. Thanks to the expansion of surgical techniques and research into hypoallergenic materials that prevent rejection of transplants or replacement of valves and arteries, patients have achieved very high survival rates. To this care equation must also be added the professional excellence of the specialists who undertake these health strategies. In this way, it is not surprising that one of the priorities of health systems, and especially of Intensive Care Units (ICUs), is to have the best experts at their disposal.

TECH Global University students are just one step away from achieving professional excellence in this field by opting for this Professional Master's Degree. To achieve this success and the development of an updated praxis, they will only need to complete the 1,500 hours of this unparalleled academic itinerary. Through the study of this syllabus, they will strengthen their knowledge and skills in the technical resources to capture cardiac images in a non-invasive way or to delve in the management and application of Advanced Life Support.

The disruptive contents of this university program include a 100% online methodology, based on the Relearning system. The latter enhances in graduates the assimilation of the most complex concepts without the need to memorize them. On the other hand, access to the study materials, in innovative didactic and multimedia formats, will be available whenever students wish, from the mobile device of their choice.

Additionally, professionals will have 10 exclusive Masterclasses, led by an internationally recognized eminent teacher, a specialist with extensive experience in Critical Care in ICU. Thanks to the guidance of this medical expert graduates will be kept up to date on the most recent scientific advances in the management of patients with cardiac and respiratory failure.

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

- ♦ The development of case studies presented by experts in Critical Cardiovascular Care in the UC Department
- ♦ The graphic, schematic, and practical content with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where the self-assessment process can be carried out to improve learning
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ The availability of access to the contents from any fixed or portable device with an Internet connection



*Take the opportunity to learn about the latest advances in Cardiovascular Critical Care in the ICU Service and improve the care of your patients with TECH"*

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*Update your medical practice in Cardiovascular Critical Care in ICU by the hand of a renowned specialist of international renown. TECH will give you access to 10 top quality Masterclasses!"*

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

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

This program is designed around Problem-Based Learning, whereby students 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 created by renowned and experienced experts.

*Update your knowledge through this Professional Master's Degree in Cardiovascular Critical Care in the ICU.*

*Increase your decision-making confidence by updating your knowledge through this Professional Master's Degree.*





# 02 Objectives

This Professional Master's Degree from TECH comprehensively addresses from the management of the critically ill patient with heart failure to advanced life support situations. With a practical and up-to-date approach, our modules cover everything from acute cardiovascular pathology to surgery and anesthesia. Through meticulously designed specific objectives, we will prepare them to meet the most complex clinical challenges in the cardiovascular intensive care setting.





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*This program is designed to help you update your knowledge in Cardiovascular Critical Care in the ICU, with the use of the latest educational technology, to contribute with quality and safety to decision-making, diagnosis, treatment, and patient support”*



## General Objectives

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- ♦ Proficiently handle the diagnostic arsenal available in a tertiary center for the management of critically ill cardiovascular patients
- ♦ Identify the patient in severe or potentially severe short-term cardiovascular cause
- ♦ Implement treatment and therapeutic options in critically ill cardiovascular patients
- ♦ Guide urgent or emergent situations for an acute cardiovascular cause and coordinate efforts with other colleagues in the management of critically ill patients



*Make the most of the opportunity and take the step to get up to date on the latest developments in Cardiovascular Critical Care in the ICU”*







## Specific Objectives

### Module 1. Management of the Critically Ill Patient with Heart Failure and Cardiogenic Shock

- Understand the epidemiology and pathological substrate of heart failure, integrating anatomophysiological findings with diagnostic methods such as echocardiography
- Accurately assess acute pulmonary edema using diagnostic and therapeutic tools to improve the patient's prognosis
- Identify and effectively manage cardiogenic shock, applying specific diagnostic methods and appropriately selecting pharmacologic therapies and circulatory assists
- Master clinical ultrasound in the evaluation of hypotension and undifferentiated shock, using imaging techniques to guide treatment and improve hemodynamic stability of the patient

### Module 2. Critical Patient Management for Acute Coronary Syndrome (ACS)

- Analyze the pathologic substrate of ACS, differentiating between acute coronary syndrome with and without ST-segment elevation in order to apply specific management strategies
- Develop skills in the diagnosis and treatment of non-ST-segment elevation ACS, focusing on early identification and initial therapy
- Acquire skills in the management of ST-segment elevation ACS, including the diagnosis, acute treatment and secondary prevention strategies
- Integrate knowledge of antianginal drugs, antiplatelet agents, anticoagulants and indications for revascularization in the comprehensive management of the ACS patient



### **Module 3. ACS Secondary Prevention. Cardiac Rehabilitation Programs**

- ♦ Design strategies to optimize post-ACS medical treatment, focusing on the management of risk factors such as arterial hypertension and dyslipidemia
- ♦ Tailor evidence-based cardiac rehabilitation programs, including exercise prescription, diet, and smoking control to improve the quality of life post-ACS.
- ♦ Define telemedicine as a tool for follow-up and continuity of care after ACS and during the cardiac rehabilitation process
- ♦ Delve into the continuity of care in the cardiac rehabilitation process, including phase III, to ensure effective patient transition to a healthy lifestyle

### **Module 4. Arrhythmias and Cardiac Pacing Devices: Diagnosis and Acute Phase Management**

- ♦ Understand the fundamentals of cardiac electrophysiology and the normal and pathological ECG to diagnose and manage different types of arrhythmias
- ♦ Determine procedures for the management of arrhythmias associated with NSTEMI/ACS, including ventricular tachycardia, ventricular fibrillation, and non-sustained ventricular tachycardia, applying specific treatment protocols
- ♦ Evaluate the indications for implantation of cardiac pacing devices in the setting of STEMI/ACS, including transient pacemakers and implantable automatic defibrillators
- ♦ Differentiate the techniques of cardioversion and electrical defibrillation, as well as the indications for pacemaker implantation in cases of bradyarrhythmias and blockages in STEMI/ACS.

### **Module 5. Non-Invasive Cardiac Imaging and Functional Tests**

- ♦ Develop basic skills in echocardiography, including the identification of echocardiographic planes and performing hemodynamic calculations
- ♦ Apply echocardiography in special situations, such as the initial evaluation of the patient in shock and its use in the hemodynamics laboratory and operating room
- ♦ Appropriately interpret echocardiographic findings in emergency and critical care situations, including structural alterations and basic measures
- ♦ Use non-invasive imaging techniques such as cardiac CT, magnetic resonance and hemodynamic ultrasound to evaluate cardiac function and to detect acute complications in the critically ill patient

### **Module 6. Imaging in Acute Pathology of the Cardiovascular System**

- ♦ Determine acute myocardial pathologies, such as acute coronary syndrome, myocardial laceration and contusion, and myocarditis, by analyzing clinical findings and imaging tests
- ♦ Recognize and manage acute aortic syndrome, including aortic trauma, aortic dissection and aortic aneurysm, using diagnostic methods such as ultrasound and CAT scanning
- ♦ Diagnose and manage acute heart failure and thromboembolic disease, such as deep vein thrombosis and pulmonary embolism, using imaging tests such as ultrasound and angiography



**Module 7. Procedures and Techniques in the Cardiovascular Critical Care Patient**

- ♦ Master the techniques of intubation and invasive mechanical ventilation, including orotracheal intubation and selection of appropriate ventilation modes according to the clinical situation of the patient
- ♦ Perform procedures such as pericardiocentesis and arterial and central venous cannulation in a safe and effective manner, applying specific indications and techniques
- ♦ Implement circulatory support devices, such as balloon counterpulsation and transient pacemaker, following precise indications and appropriate implantation techniques

**Module 8. Special Situations in the Patient Under Critical Cardiovascular Care**

- ♦ Manage the perioperative cardiac surgery patient, including identification of expected complications and appropriate therapeutic decisions
- ♦ Address acute valvular pathology, such as endocarditis, and other cardiovascular emergencies, applying specific treatment protocols
- ♦ Evaluate and manage potential complications such as myocarditis, pericarditis and hemothorax in the setting of the cardiovascular critically ill patient, using appropriate therapeutic strategies
- ♦ Address ethical and legal situations related to advanced life support in the critically ill cardiovascular patient, considering aspects such as end-of-life decision making and informed consent

**Module 9. Action Guides in Acute Cardiac Pathology**

- ♦ Apply the guidelines for acute coronary syndrome with ST-segment elevation (STEMI) for the correct diagnosis and treatment of the patient
- ♦ Use guideline recommendations in the management of non-ST-segment elevation acute coronary syndrome (NSTEMI) to improve clinical outcomes and reduce morbidity and mortality

- ♦ Implement the indications for revascularization and dual antiplatelet therapy (DAPT) according to the clinical practice guidelines in patients with acute coronary artery disease
- ♦ Apply guideline recommendations in the management of acute heart failure to optimize medical treatment and reduce hospitalizations for decompensation

**Module 10. Surgery, Anesthesia and Intensive Care in Cardiopathies**

- ♦ Recognize and manage postoperative complications such as low cardiac output and renal and pulmonary complications, applying specific therapeutic strategies
- ♦ Identify and treat special situations such as acute valvular pathology and myocarditis in the perioperative setting, following appropriate management protocols
- ♦ Evaluate and apply therapeutic measures in cases of hemothorax, thrombopenia, allergies and sepsis related to cardiac surgery and intensive care in cardiopathies

**Module 11. Advanced Life Support**

- ♦ Master advanced life support techniques in adults, including rapid intubation sequence and airway management in critical situations
- ♦ Apply advanced life support protocols in adults to optimize care in emergency situations such as cardiorespiratory arrest
- ♦ Develop skills in advanced airway management and the performance of invasive procedures under critical conditions, such as intubation and vascular cannulation
- ♦ Address special situations in advanced life support, including ethical and legal aspects related to decision making in emergency situations and informed consent

# 03 Skills

After passing the assessments on the Professional Master's Degree in Cardiovascular Critical Care in the ICU, physicians will have acquired the necessary professional skills for quality, up-to-date practice based on the most recent scientific evidence. For this purpose, it has the most exclusive and innovative 100% online methodology, Relearning and comprehensive teaching materials in a wide range of formats. These include complementary readings, explanatory videos, interactive summaries and detailed infographics.



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*With this program you will be able to master new diagnostic and therapeutic procedures in Cardiovascular Critical Care in the ICU”*



## General Skills

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- ♦ Apply the acquired knowledge, both in diagnosis and in treatment, to acute cardiac pathology
- ♦ Apply clinical practice guidelines and the most relevant studies related to the treatment of acute cardiac pathology
- ♦ Develop resources and skills for enabling self-directed learning
- ♦ Relate clinical findings to the underlying pathophysiology that causes them
- ♦ Through the above, choose the best treatment strategy in situations where the clinical problem does not conform to clinical practice guidelines
- ♦ Integrate the anatomical and physiological basis on which the procedures and techniques, which may be necessary to perform on a cardiovascular critical patient in the practice of the same
- ♦ Acquire an orderly systematic approach to the performance of a specific technique
- ♦ Be aware of the possible complications that can arise from performing techniques in critical cardiovascular patients, and anticipate the possible occurrence of such complications







## Specific Skills

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- ♦ Create an appropriate treatment plan for a patient with acute pulmonary edema, accurately evaluate the response to said treatment and adapt decision-making accordingly
- ♦ Differentiate the different types of shock of the cardiogenic profile
- ♦ Manage the main vasoactive drugs and adjust the administration of each one according to the indication based on the patient's situation
- ♦ Establish the indication of the need for circulatory support and choose the appropriate one according to the patient's profile
- ♦ Accurately diagnose the patient's acute coronary event profile
- ♦ Establish a treatment strategy that is most appropriate for the type of coronary event suffered by the patient
- ♦ Anticipate and appropriately deal with possible complications that can present themselves in the context of acute coronary syndrome
- ♦ On the basis of electrocardiographic findings, diagnose the type of arrhythmia that a patient presents
- ♦ Correctly indicate the need for monitoring a patient with a rhythm disorder based on the possibility of it progressing to a more serious alteration
- ♦ Establish the need for transient or permanent cardiac pacing in a patient with bradycardia
- ♦ Identify the steps for implanting a transient pacemaker in a patient requiring urgent or temporary pacing
- ♦ Modify the programming of a pacemaker and defibrillator in preparation for an MRI or a surgical procedure
- ♦ Consult the programming of a pacemaker and defibrillator and identify if its operation is correct
- ♦ Acquire echocardiographic plans of sufficient quality for the identification of structures and possible alterations
- ♦ Operate an echocardiograph in its basic functions: two-dimensional, M mode, and color, pulsed and continuous Doppler
- ♦ Identify a pericardial effusion and establish the indication for percutaneous puncture to evacuate it
- ♦ Apply a systematic order to proceed with orotracheal intubation
- ♦ Apply a systematic order to proceed with pericardiocentesis
- ♦ Apply a systematic order for intra-aortic balloon counterpulsation implantation
- ♦ Apply a systematic order for intra-aortic balloon counterpulsation implantation
- ♦ Plan and indicate the appropriate treatment in patients with myocarditis and pericarditis to prevent recurrences and to support possible mechanical complications
- ♦ Identify possible postoperative complications in an echocardiogram
- ♦ Evaluate the severity of a pericardial effusion and its hemodynamic consequences
- ♦ Establish the indication for a pericardial effusion

# 04

# Course Management

The program's teaching staff includes leading specialists in Cardiovascular Critical Care in the ICU and other related areas, who bring their years of work experience to this training program. Moreover, other renowned specialists participate in its design and preparation, which means that the program is developed in an interdisciplinary manner.



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*Learn the latest advances in the procedures in Cardiovascular Critical Care in the ICU from leading professionals"*

## International Guest Director

Alain Combes, M.D., a renowned specialist in Intensive Care Medicine, and a prominent leader in the field of critical care, has an eminent career in the management of critically ill patients. As Head of the ICU Department at La Pitié-Salpêtrière Hospital, an integral part of the Paris Public Assistance Hospitals, he has led significant advances in the treatment of patients with acute cardiac conditions and cardiac transplantation.

His extensive research interests range from the care of the critically ill cardiac patient, including situations of *Cardiogenic Shock*, *Acute Myocardial Infarction* and *Complex Cardiac Surgery*.

Likewise, his pioneering work in *Mechanical Circulatory Assistance* and *Extracorporeal Membrane Oxygenation* has had a positive impact on the treatment of *Severe Respiratory Failure*, excelling in rescue therapies such as *ECMO* and *ECCO2R*.

In fact, his active participation in technological advances also stands out. A great example is his collaboration with *Hemovent GmbH* which has been crucial for the development of the world's most compact *Portable Extracorporeal Membrane Oxygenation System (ECMO)*.

This revolutionary device not only offers unparalleled mobility, but also improves performance parameters compared to standard therapies. In this way, he has demonstrated his commitment to *medical innovation* and *improved care* for patients with cardiac and respiratory failure.

To this must be added the *solid international reputation* that Dr. Combes has forged as an opinion leader, being an active member of renowned medical organizations such as The Société de Réanimation de Langue Française (SRLF), The European Society of Intensive Care Medicine (ESICM), The American Thoracic Society (ATS), The European Society of Cardiology (ESC) and The Extra Corporeal Life Support Organization (ELSO). Additionally, his expertise has been instrumental in publishing *cutting-edge research* in prestigious medical journals, consolidating his influence in the field.





## Dr. Combes, Alain

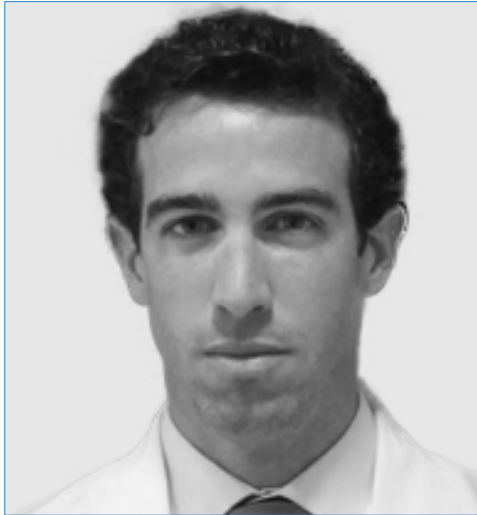
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- Head of the Department of Intensive Care at La Pitié-Salpêtrière Hospital, Paris, France
- Specialist in Intensive Care Medicine
- Doctorate in Medicine and Philosophy
- Member of: La Société de Réanimation de Langue Française (SRLF), The European Society of Intensive Care Medicine (ESICM), The American Thoracic Society (ATS), The European Society of Cardiology (ESC), The Extra Corporeal Life Support Organization (ELSO) and The International ECMO Network (ECMONet)

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*Thanks to TECH you will be able to learn with the best professionals in the world"*

## Management



### Dr. Rodríguez Muñoz, Daniel

- ♦ Cardiologist, Arrhythmologist and Interventional Electrophysiologist at La Zarzuela University Hospital
- ♦ Cardiologist, Arrhythmologist and Interventional Electrophysiologist at 12 de Octubre Hospital
- ♦ Doctorate in Health Sciences, University of Alcalá
- ♦ Master's Degree in Pacemakers, Defibrillators and Cardiac Resynchronization from the University of Alcalá
- ♦ Master's Degree in Diagnostic and Therapeutic Cardiac Electrophysiology from CEU San Pablo University
- ♦ Level 2 accreditation for the practice of Interventional Electrophysiology
- ♦ Director and teaching collaborator of numerous courses and postgraduate training programs in Arrhythmias
- ♦ Member of: European Heart Arrhythmia Association (EHRA), Spanish Society of Cardiology (SEC) and Section of Arrhythmia and Electrophysiology of the SEC.

## Professors

### Dr. Sanmartín Fernández, Marcelo

- ♦ Chief of the Acute Coronary Syndrome Section of Ramón y Cajal University Hospital
- ♦ Cardiology Specialist
- ♦ Doctor of Medicine
- ♦ Degree in Medicine from the University of Rio de Janeiro
- ♦ Member of: Spanish Society of Pediatric Cardiology

### Dr. Sionis Green, Alessandro

- ♦ Director of the Cardiac Intensive Care Unit in the Cardiology Department of the Hospital de la Santa Creu i Sant Pau
- ♦ Cardiology Physician
- ♦ Degree in Medicine and Surgery

**Dr. Zamorano Gómez, José Luis**

- ♦ Vice-President of the European Society of Cardiology
- ♦ Chief of the Cardiology Service of Ramón y Cajal Hospital
- ♦ Doctor of Medicine
- ♦ Executive Management and Health Resources at Esade, Madrid
- ♦ National Qualification as a Professor of Medicine
- ♦ Member of the First Accreditation Committee in Echocardiography of the European Association of Echocardiography
- ♦ Honorary Fellow American Society of Echocardiography.
- ♦ Chairman of the Clinical Guidelines Committee of the European Society of Cardiology.
- ♦ Chairman of the National Cardiovascular Panel FIS of the Carlos III Institute
- ♦ Associate Editor of the European Heart Journal Cardiovascular Imaging.
- ♦ Author of more than 20 books, more than 500 articles in scientific journals and more than 400 communications at national and international congresses
- ♦ Impact Factor > 1500. IH 84 and Citations > 40,000.
- ♦ Member of: Editorial Board of the Spanish Journal of Cardiology, Editorial Board of the European Journal of Echocardiography, Editorial Board of the American Society of Echocardiography and International Relations Task Force of the American Society of Echocardiography

**Dr. Castillo Orive, Miguel**

- ♦ Area Specialist in Cardiology at Ramón y Cajal Hospital
- ♦ Area Specialist in Cardiology at the San Francisco de Asis Sanatorium in Madrid
- ♦ Collaborating Professor of the University of Alcalá de Henares
- ♦ MIR Teacher
- ♦ Scientific Director of PROMIR
- ♦ Author of books: PROMIR: Cardiology and The 10 most asked topics in the MIR.

**Dr. Fernández-Golfín Lobán, Covadonga**

- ♦ Head of the Cardiovascular Imaging Section at the Ramón y Cajal University Hospital
- ♦ Coordinator of the Cardiac Imaging Unit at the Ramón y Cajal University Hospital
- ♦ Specialist Cardiology Physician at Sanitas La Zarzuela University Hospital
- ♦ Assistant Cardiology Physician in the Imaging Unit of San Carlos Clinical Hospital
- ♦ Assistant Cardiology Physician at the Virgen de la Salud Hospital
- ♦ PhD in Health Sciences from the University of Alcalá.
- ♦ Degree in Medicine from the Autonomous University Madrid
- ♦ Specialty Studies in Medicine at the Free University of Brussels
- ♦ Senior Management Program in Health Institutions at the University of Navarra

# 05

# Structure and Content

The syllabus of this study plan has the most comprehensive and complete content on different cardiac pathologies that must be addressed in hospital ICUs. An intensive syllabus that will provide specialists with the practical and theoretical tools to approach complex outpatient procedures, as well as the latest imaging technology for the most accurate diagnoses. To this is added an exclusive didactic methodology and very complete materials in different formats such as explanatory videos, detailed videos or infographics.







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*A syllabus where you will analyze the most advanced imaging tools and echocardiograms for the care of ICU patients with cardiovascular pathologies”*


## Module 1. Management of the Critically Ill Patient with Heart Failure and Cardiogenic Shock

- 1.1. Cardiovascular Disease: the Leading Cause of Mortality in the Developed World Epidemiological Transition
- 1.2. Underlying Pathology in Heart Failure
  - 1.2.1. Structural Alterations
    - 1.2.1.1. From Anatomy to Echocardiography
- 1.3. Acute Pulmonary Edema
  - 1.3.1. Diagnostic and Prognostic Tools
  - 1.3.2. Acute Treatment and Adjustment of Chronic Treatment
- 1.4. Cardiogenic Shock
  - 1.4.1. Diagnostic and Prognostic Tools
    - 1.4.1.1. Differential Diagnosis of Shock
  - 1.4.2. Indication and Management of Vasoactive Drugs
  - 1.4.3. Indication and Management of Circulatory Assistances
- 1.5. Clinical Ultrasound in Hypotension and Undifferentiated Shock
- 1.6. Echocardiographic Assessment of the Patient with Heart Failure or Cardiogenic Shock

## Module 2. Critical Patient Management for Acute Coronary Syndrome (ACS)

- 2.1. The Underlying Pathology in Acute Coronary Syndrome
  - 2.1.1. Structural Alterations
    - 2.1.1.1. Ischemic Heart Disease
  - 2.1.2. Acute Coronary Syndrome without Evidence of Coronary Lesions
    - 2.1.2.1. The Reason for Chronic Treatment and its Effect on Prognosis
- 2.2. Non-ST-Segment-Elevation in ACS
  - 2.2.1. Acute Management
    - 2.2.1.1. Diagnosis
    - 2.2.1.2. Treatment in the First 24 Hours
- 2.3. ST-Segment-Elevation ACS
  - 2.3.1. Acute Management
    - 2.3.1.1. Diagnosis
    - 2.3.1.2. Treatment in the First 24 Hours
  - 2.3.2. Expected Complications and Chronic Treatment



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- 2.4. Complementary Diagnostic Laboratory Tests and RXT in Non-ST Segment Elevation ACS
  - 2.5. Expected Complications and Chronic Treatment in NSTEMACS
  - 2.6. Anti-Anginal Drugs: Beta Blockers
  - 2.7. Anti-Anginal Drugs: Nitrates and Calcium Antagonists
  - 2.8. Planetary Antiaggregants Which Ones and For How Long?
  - 2.9. Anticoagulant Drugs Which Ones, How Much and Why?
  - 2.10. Indications for Coronary Angiography and Revascularization
  - 2.11. When Is Surgical Revascularization Indicated, and When Is Percutaneous Revascularization Indicated?
  - 2.12. Percutaneous Revascularization Techniques
  - 2.13. Surgical Revascularization Techniques

### **Module 3. ACS Secondary Prevention. Cardiac Rehabilitation Programs**

- 3.1. Optimization of Medical Treatment after ACS
- 3.2. Diet and Obesity Management
- 3.3. Prescription and Types of Exercise
- 3.4. Control of Arterial Hypertension before and after ACS
- 3.5. Dyslipidemia Control Before and After ACS
- 3.6. Smoking Control
- 3.7. Diagnosis and Management of Diabetes in Ischemic Heart Disease
- 3.8. Cardiac Rehabilitation Programs: Evidence, Phases, Components and Process of Care
- 3.9. Cardiac Rehabilitation Telemedicine
- 3.10. Continuity of Care after ACS and Cardiac Rehabilitation PHASE III of Cardiac Rehabilitation

### **Module 4. Arrhythmias and Cardiac Pacing Devices: Diagnosis and Acute Phase Management**

- 4.1. General Bases: Cellular and Cardiac Electrophysiology Anatomy and Embryology of the Conduction System Normal and Pathological ECG
- 4.2. Canalopathies
- 4.3. Preexcitation. Management
- 4.4. Ischemia as a Cause of Arrhythmias: Mechanisms
- 4.5. NSTEMACS Arrhythmias: EV, RIVA and TVNS (Meaning and Clinical Management)
- 4.6. Polymorphic and Monomorphic VT: Meaning and Treatment
- 4.7. VF and Out-of-Hospital Sudden Death in STEACS

- 4.8. Supraventricular Arrhythmias in NSTEMI/ACS
- 4.9. Antiarrhythmic Medication Used in STEMI/ACS
- 4.10. Cardioversion and Electrical Defibrillation: Protocols
- 4.11. Bradyarrhythmias and Blockages in STEMI/ACS Pacemaker Implantation Indications
- 4.12. Automatic Implantable Defibrillator: Indications, Results and Techniques
- 4.13. Cardiac Resynchronization, Indications and Outcomes

## Module 5. Non-Invasive Cardiac Imaging and Functional Tests

- 5.1. Basic Skills in Echocardiography
  - 5.1.1. Echocardiographic Planes
  - 5.1.2. Limitations in the Acute Context
  - 5.1.3. Hemodynamic Calculations
- 5.2. Special Situations
  - 5.2.1. Echocardiograms in the Initial Evaluation of the Patient
    - 5.2.1.1. The Patient in Shock and the Echocardiogram as a Diagnostic Tool
  - 5.2.2. Echocardiogram in the Hemodynamic Laboratory
  - 5.2.3. Echocardiogram in Cardiac Surgery Operating Room
  - 5.2.4. Acute Complications in Myocardial Infarction
- 5.3. General Basis of an Echocardiography. Equipment
- 5.4. Transthoracic and Transesophageal Echocardiography
- 5.5. Pericardial Windows and Cardiac Ultrasound
  - 5.5.1. Windows and Planes Applied in Emergencies and Intensive Care Situations
  - 5.5.2. Basic Doppler (Color, Pulsating, Continuous and Tissue Doppler)
- 5.6. Structural Alterations
  - 5.6.1. Basic Measures in Cardiac Ultrasound
  - 5.6.2. Thrombi
  - 5.6.3. Suspected Endocarditis
  - 5.6.4. Valvulopathies
  - 5.6.5. Pericardium
  - 5.6.6. How is an ultrasound reported in emergency and intensive care?
- 5.7. Structural Alterations II
  - 5.7.1. Left Ventricle
  - 5.7.2. Right Ventricle
- 5.8. Cardiac CAT

- 5.9. Magnetic Resonance
- 5.10. Functional Tests
- 5.11. Hemodynamic Ultrasound
  - 5.11.1. Left Ventricular Hemodynamics
  - 5.11.2. Right Ventricular Hemodynamics
  - 5.11.3. Preload Dynamic Tests

## Module 6. Imaging in Acute Pathology of the Cardiovascular System

- 6.1. Myocardial Pathology
  - 6.1.1. Acute Coronary Syndrome
  - 6.1.2. Myocardial Laceration and Contusion
  - 6.1.3. Myocarditis
- 6.2. Pericardial Pathology
  - 6.2.1. Acute Pericarditis
  - 6.2.2. Pericardial Effusion
  - 6.2.3. Cardiac Tamponade
- 6.3. Acute Aortic Syndrome
  - 6.3.1. Aortic Trauma
  - 6.3.2. Aortic Dissection
  - 6.3.3. Aortic Aneurysm
- 6.4. Heart Failure
  - 6.4.1. Congestive Heart Failure
  - 6.4.2. Pulmonary Edema
- 6.5. Venous Thromboembolic Disease
  - 6.5.1. Deep Vein Thrombosis
  - 6.5.2. Pulmonary Embolism
- 6.6. Ultrasound in Cardiac Arrest
  - 6.6.1. Cerebral Hemodynamics
  - 6.6.2. Brain Damage in Cardiac Arrest
  - 6.6.3. Usefulness of Ultrasound in Resuscitation
  - 6.6.4. Usefulness of Ultrasound After Recovery of Spontaneous Circulation



- 6.7. Ultrasound in Shock
  - 6.7.1. Ventricular Filling Pressure
  - 6.7.2. Cardiac Output
  - 6.7.3. Estimating Hemodynamic Responses to Intravascular Volume Therapy
  - 6.7.4. Ultrasound Assessment of Pulmonary Edema
  - 6.7.5. Ultrasound Search for Sources of Sepsis
- 6.8. Ultrasound in Strokes
  - 6.8.1. Justification
  - 6.8.2. Initial Assessment
  - 6.8.3. Ultrasound Assessment
  - 6.8.4. Ultrasound-guided Management

## Module 7. Procedures and Techniques in the Cardiovascular Critical Care Patient

- 7.1. Intubation and Invasive Mechanical Ventilation
  - 7.1.1. Orotracheal Intubation
    - 7.1.1.1. Available Tools and Techniques
  - 7.1.2. Mechanical Ventilation
    - 7.1.2.1. Forms of Ventilation
    - 7.1.2.2. Adjustment Depending on the Hemodynamic and Respiratory Situation of the Patient
- 7.2. Pericardiocentesis
  - 7.2.1. Indications
  - 7.2.2. Technique
  - 7.2.3. Alternatives to Pericardial Drainage
- 7.3. Arterial and Central Venous Cannulation
  - 7.3.1. Indications
  - 7.3.2. Technique
- 7.4. Counterpulsation Balloon
  - 7.4.1. Indications
  - 7.4.2. Implantation Technique
- 7.5. Transient Pacemaker
  - 7.5.1. Indications
  - 7.5.2. Implantation Technique

## Module 8. Special Situations in the Patient Under Critical Cardiovascular Care

- 8.1. The Patient Before, During and After Cardiac Surgery
  - 8.1.1. Aspects to Look Out For
  - 8.1.2. Evolution
  - 8.1.3. Expected Complications
  - 8.1.4. Vascular Surgery Indications
  - 8.1.5. Emergency Coronary Surgery Indications
- 8.2. Acute Valvular Disease
  - 8.2.1. Endocarditis
  - 8.2.2. Other Indications of Emergency Surgery
- 8.3. Myocarditis
  - 8.3.1. Certainties and Controversies in Acute Management
- 8.4. Pericarditis, Pericardial Effusion and Cardiac Tamponade
  - 8.4.1. Acute and Chronic Treatment Options in Pericarditis
- 8.5. Hemotherapy
- 8.6. Thrombopenia
- 8.7. Allergies and Anaphylactic Reactions
- 8.8. Sepsis and Septic Shock

## Module 9. Action Guides in Acute Heart Disease

- 9.1. SCAEST
- 9.2. Non-ST-Segment-Elevation ACS
- 9.3. Revascularization and DAPT
- 9.4. Heart Failure
- 9.5. Ventricular Arrhythmias and SCD - ICD Implantation Criteria
- 9.6. Syncope
- 9.7. Acute Chest Pain.
- 9.8. Pericarditis, Cardiac Tamponade
- 9.9. Deep Vein Thrombosis (DVT)
- 9.10. Pulmonary Thromboembolism (PTE)
- 9.11. Aortic Dissection
- 9.12. Hypertensive Emergencies.

## Module 10. Surgery, Anesthesia and Intensive Care in Heart Disease

- 10.1. Up-to-date Information on Congenital Cardiac Surgery
  - 10.1.1. Introduction and History of Congenital Heart Disease
  - 10.1.2. Principles of ECLS and ECMO
  - 10.1.3. Ventricular and Transplant Care
- 10.2. Palliative and Corrective Surgical Techniques
  - 10.2.1. Surgical Techniques on Septal Defects and Rings
  - 10.2.2. IVC and ICA Partial Pulmonary Venous Anomalies
  - 10.2.3. AV Channel AP Window Cor Triatriatum
  - 10.2.4. TAPVR Vascular Rings, DAP
  - 10.2.5. Right Heart Surgical Techniques
  - 10.2.6. TOF
  - 10.2.7. PA/IVS
  - 10.2.8. Tricuspid Valve
  - 10.2.9. RVOT and Pulmonary Valve
  - 10.2.10. Left Heart Surgical Techniques
  - 10.2.11. Aortic Valve
  - 10.2.12. Mitral Valve and Coronary Abnormalities
  - 10.2.13. Surgical Techniques of the Main Veins
  - 10.2.14. Aorta, Coarctation of the Aorta, IAA
  - 10.2.15. TGA and Truncus
  - 10.2.16. Single Ventricle
- 10.3. Low Postoperative Expense. Cardiac Dysfunction
- 10.4. Renal Complications. Renal Purification Techniques
- 10.5. Pulmonary Complications. Ventilatory Support Techniques. Pulmonary Hypertension Crisis
- 10.6. Other Complications
  - 10.6.1. Post-Operation Infections Neumonia, Sepsis and Infections of the Surgical Wound Mediastinitis
  - 10.6.2. Cardiac Tamponade Phrenic Plication and Others



## Module 11. Advanced Vital Support

- 11.1. Advanced Life Support in Adults
- 11.2. Advanced Airway Management.
- 11.3. Rapid Intubation Sequence.
- 11.4. Protocols for Advanced Life Support in Adults
- 11.5. Advanced Life Support in Pediatric Patients
- 11.6. Special Situations in Advanced Life Support in Adults
- 11.7. Special Situations in Advanced Life Support in Pediatric Patients
- 11.8. Ethical and Legal Aspects in Advanced Life Support

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*Enroll now in this 100%  
online TECH program and  
become a highly specialized  
physician in Cardiovascular  
Critical Care in the ICU"*



06

# Methodology

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

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







“

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

## At TECH 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.





07

# Certificate

The Professional Master's Degree in Cardiovascular Critical Care in the ICU guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree issued by TECH Global University.







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

This program will allow you to obtain a **Professional Master's Degree diploma in Cardiovascular Critical Care in the ICU** endorsed by **TECH Global University**, the world's largest online university.

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

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

Title: **TECH Master's Degree in Cardiovascular Critical Care in the ICU**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**

**tech** global university

Mr./Ms. \_\_\_\_\_ with identification document \_\_\_\_\_  
has successfully passed and obtained the title of:

**Professional Master's Degree in Cardiovascular Critical Care in the ICU**

This is a program of 1,500 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).


In Andorra la Vella, on the 28th of February of 2024


  
 Dr. Pedro Navarro Illana  
 Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFW0R0235 techtute.com/certificates

Professional Master's Degree in Cardiovascular Critical Care in the ICU

General Structure of the Syllabus		General Structure of the Syllabus			
Subject type	ECTS	Year	Subject	ECTS	Type
Compulsory (CO)	1,500	1º	Management of the Critically Ill Patient with Heart Failure and Cardiogenic Shock	5	CO
Optional (OP)	0	1º	Critical Patient Management for Acute Coronary Syndrome (ACS)	5	CO
External Work Placement (WP)	0	1º	ACS Secondary Prevention, Cardiac Rehabilitation Programs	5	CO
Master's Degree Thesis (MDT)	0	1º	Arrhythmias and Cardiac Pacing Devices: Diagnosis and Acute Phase Management	5	CO
<b>Total 1,500</b>		1º	Non-Invasive Cardiac Imaging and Functional Tests	5	CO
		1º	Imaging in Acute Pathology of the Cardiovascular System	5	CO
		1º	Procedures and Techniques in the Cardiovascular Critical Care Patient	5	CO
		1º	Special Situations in the Patient Under Critical Cardiovascular Care	5	CO
		1º	Action Guides in Acute Heart Disease	5	CO
		1º	Surgery, Anesthesia and Intensive Care in Heart Disease	7	CO
		1º	Advanced Vital Support	8	CO

  
 Dr. Pedro Navarro Illana  
 Rector



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


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## Professional Master's Degree

Cardiovascular Critical Care in the ICU

- » Modality: **online**
- » Duration: **12 months**
- » Certificate: **TECH Global University**
- » Accreditation: **60 ECTS**
- » Schedule: **at your own pace**
- » Exams: **online**



# Professional Master's Degree

## Cardiovascular Critical Care in the ICU