

Professional Master's Degree Cardiovascular Surgery





Professional Master's Degree Cardiovascular Surgery

- » 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-surgery

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01

Introduction

Heart disease is the leading cause of death in developed countries; therefore, cardiovascular surgery is of great importance to care for patients suffering from heart disease and to increasingly minimize these figures. From its beginnings to the present time, there have been innumerable advances and every day new procedures emerge that perfect the techniques and improve the development before, during and after the surgical processes. This is where the relevance of a correct and constant updating of cardiac surgeons who want to deepen or update themselves with the latest state-of-the-art techniques lies. In this program, the specialist will find everything necessary for this, with the most innovative study methodology based on *relearning*, the most rigorous content prepared by a teaching team of the highest academic level and a convenient teaching system 100% online.





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TECH has compiled in this complete university program the most current scientific developments and postulates, elaborated by a teaching team of the highest academic level. Enroll now”

This evolution in surgical and anesthetic techniques has been possible thanks to technological and pharmacological developments, but basically to the deepening of knowledge of the pathophysiological changes that occur in the different contexts of surgery, mainly during extracorporeal circulation.

This Professional Master's Degree in Cardiovascular Surgery focuses on providing the most advanced knowledge to be implemented both in the field of clinical practice management, as well as in the framework of daily activity, giving the possibility to streamline and maximize the ability to make decisions among the different possible alternatives and choose those that best meet the requirements of the cases presented. Therefore, the establishment of priorities and allocation of available resources must be carried out taking into account the most advanced scientific basis.

The specialist will study an up-to-date and detailed review of the main areas of action in cardiac surgery taking into consideration the importance of joint decisions and the heart team to address the different strategies of medical, percutaneous and surgical treatment in valvular pathologies, ischemic and congenital heart disease; aortic pathologies.

This, among other aspects developed in depth in the syllabus of this up-to-date program, which is taught in a 100% online format, for the flexibility and freedom of organization of the student, setting their own time and mode of study. Undoubtedly, an advantage for the most demanding schedules of the specialist at the present time, which allows an advance in their preparation and to obtain a new qualification in 12 months. In addition, the university degree includes 10 comprehensive Masterclasses taught by a leading international expert in this medical-surgical field.

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

- ◆ Practical cases presented by experts in Cardiovascular Surgery
- ◆ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ◆ Practical exercises where the process of self-assessment can be used to improve learning
- ◆ Its special emphasis on innovative methodologies
- ◆ Theoretical lessons, questions for experts and individual reflection work
- ◆ Content that is accessible from any fixed or portable device with an Internet connection



This program will provide you with 10 exclusive Masterclasses, developed by a renowned international expert in Cardiovascular Surgery”

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A high-level teaching team has designed this program, which brings a unique background to your professional profile"

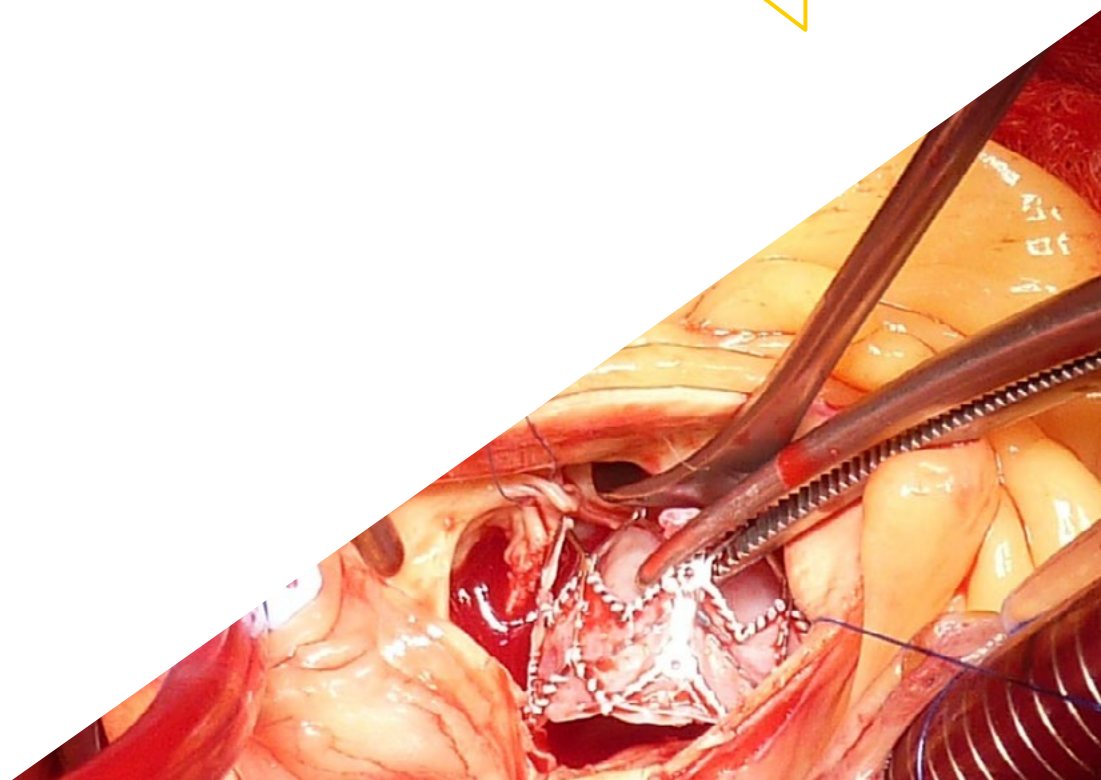
The program's teaching staff includes professionals from the industry who contribute their work experience to this program, as well as renowned specialists from leading societies and prestigious universities.

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

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned and experienced experts.

Add new procedures, techniques and proven scientific methods to your skills.

Access the most up-to-date content on the different heart diseases and their comprehensive approach.



02 Objectives

Given the medical relevance of the topic of study, TECH has made every effort to ensure that this program provides an in-depth and accurate update on the most important issues for all cardiac surgery specialists. Therefore, both the contents and the exercises and supplementary material are focused on achieving a comprehensive, effective and deep update, with which the physician will modernize all their knowledge even before finishing the program.





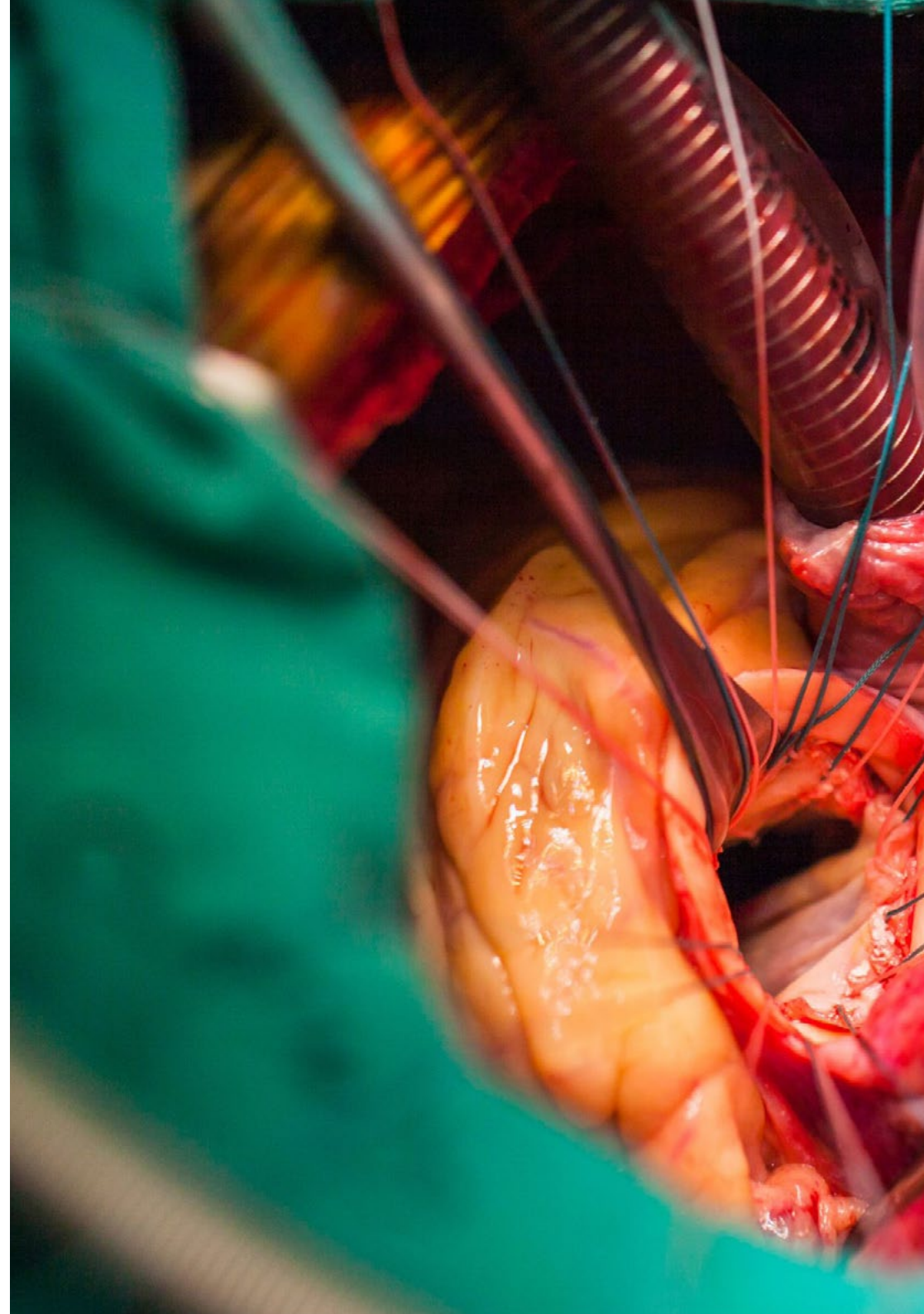
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You will achieve your updating objectives with the help of experts and the best study methodology”



General Objectives

- ◆ Gain an in-depth knowledge about all cardiovascular diseases and their forms of treatment
- ◆ Broaden the knowledge and understanding of extracorporeal circulation as a whole
- ◆ Analyze the importance of new technologies involved in the management and control of cardiovascular diseases and imaging techniques
- ◆ Obtain the necessary knowledge to improve patient recovery, avoid complications and reduce mortality
- ◆ Obtain the most up-to-date knowledge to approach comprehensively and from the surgical point of view, as appropriate, all valvular heart diseases, ischemic heart, aortic pathology and congenital heart diseases
- ◆ Learn about other cardiovascular diseases, transcatheter valve implantation and concomitant diseases





Specific Objectives

Module 1. Anatomy and Pathophysiology of the Cardiovascular System

- ◆ Study embryology to understand the origin of cardiac anatomy
- ◆ Outline the basic aspects of the pathophysiology of the heart
- ◆ In-depth study of the conduction system, coronary anatomy, great vessels and peripheral vascular system
- ◆ Gain an in-depth knowledge of all cardiovascular diseases
- ◆ Analyze hemostasis and the different pathways from of blood coagulation
- ◆ Know the new trends in cardiovascular pharmacology

Module 2. Extracorporeal Circulation ECC

- ◆ Broaden the knowledge and understanding of extracorporeal circulation as a whole
- ◆ In-depth study of the new technologies implemented for their management and control
- ◆ Master protection and monitoring methods
- ◆ Master the techniques of cerebral cannulation and perfusion

Module 3. Perioperative Care

- ◆ Gain an in-depth knowledge about all perioperative measures and strategies
- ◆ Update monitoring techniques in the operating room.
- ◆ Understand ways to improve for optimal recovery of the surgical patient
- ◆ In-depth study of the techniques to be applied prior to surgery to avoid complications and reduce mortality
- ◆ Achieve more efficient postoperative control
- ◆ Reduce transfusions of blood products as much as possible

Module 4. Ischemic Heart Disease

- ◆ Obtain a multi-angle view of ischemic heart disease
- ◆ A comprehensive approach to ischemic heart disease
- ◆ In-depth study of angina and myocardial infarction
- ◆ Evaluate the diagnostic methods and natural history of coronary artery disease
- ◆ Understand the importance of the *Heart Team* in addressing different medical, percutaneous and surgical treatment strategies
- ◆ Delve into the surgical complications of myocardial infarction and the techniques to treat them

Module 5. Valvular Heart Disease

- ◆ Understand the surgical approach to heart valve diseases
- ◆ In-depth study of the causes of heart valve diseases and their treatment
- ◆ Understand the importance of the *heart team* in decision making in the approach to valvular pathologies
- ◆ Delve into all surgical techniques for its treatment, including mini-incision surgery
- ◆ Evaluate different results of the different types of prostheses and surgical techniques used

Module 6. Aortic Pathology

- ◆ Delve into the notions of anatomy and physiology of the aortic root, given its involvement in the functioning and preservation of the aortic valve
- ◆ Learn more about surgical treatment techniques for acute aortic syndrome
- ◆ Review the main pathologies of the aorta artery by segments
- ◆ Observe the implications of acute aortic syndrome with its main surgical options
- ◆ Check different percutaneous treatment options

Module 7. Congenital Heart Disease

- ◆ Provide an overview of congenital heart disease through a detailed review of the most common pathologies
- ◆ Study the physiology of congenital heart diseases in order to group them according to their physiological behavior
- ◆ Make an anatomical description of each group of anomalies
- ◆ Verify the different surgical options to correct congenital cardiopathies
- ◆ Evaluate the best time to correct congenital heart disease

Module 8. Arrhythmias

- ◆ Gain an in-depth knowledge of the electrophysiological basis of cardiac contraction and rhythm disturbances
- ◆ Learn about the surgical treatment alternatives for certain arrhythmias such as atrial fibrillation
- ◆ Review the electrophysiological mechanisms involved in the genesis and propagation of the cardiac impulse
- ◆ Master the implantation and explantation techniques of cardiac electrostimulation devices
- ◆ Understand the implications of the use of cardiac electrostimulation devices
- ◆ Know the surgical technique for the treatment of atrial fibrillation and left atrial appendage closure

Module 9. Treatment of Other Cardiovascular Diseases, Transcatheter Valve Implantation and Concomitant Conditions

- ◆ Study in depth the different cardiovascular diseases and their surgical treatment
- ◆ Deepen knowledge about cardiac trauma and its surgical management
- ◆ Understand hereditary conditions such as Cardiomyopathies
- ◆ Delve into the diseases of the pericardium and the different cardiac tumors, both primary and secondary
- ◆ Analyze pulmonary thromboembolism with its different surgical strategies.
- ◆ Evaluate end-stage heart failure, updating the new therapies by means of ventricular devices and cardiac transplantation
- ◆ Understand the importance of transcatheter therapies TAVI and mitral
- ◆ Gain an in-depth knowledge about certain extracardiovascular diseases that interfere with extracorporeal surgery

Module 10. New Technologies and Imaging Techniques. Statistics

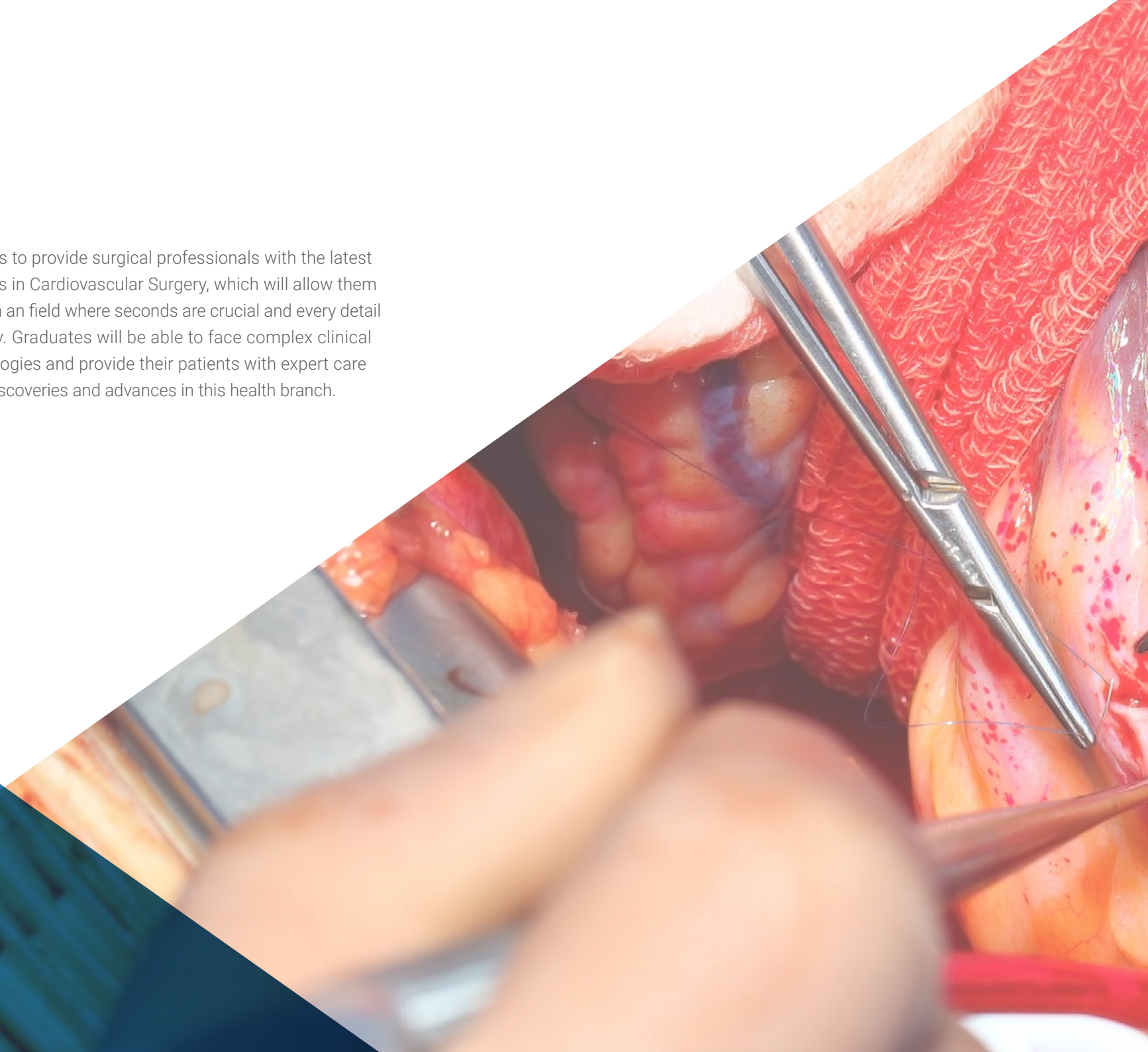
- ◆ Delve into the less common but influential aspects of Cardiovascular Surgery
- ◆ Evaluate new technologies in Cardiovascular Surgery for the improvement of therapies
- ◆ Raise the level of interpretation of cardiovascular imaging
- ◆ Elaborate and understand studies through statistical analysis
- ◆ Delve into the concepts of care management and research methodology
- ◆ Analyze the evolution of Cardiovascular Surgery and its future perspectives



You will have the attention and support you need during the development of the program to make satisfactory progress”

03 Skills

The ultimate goal of this program is to provide surgical professionals with the latest knowledge on up-to-date processes in Cardiovascular Surgery, which will allow them to perform accurately and quickly in an field where seconds are crucial and every detail must be observed instantaneously. Graduates will be able to face complex clinical situations related to cardiac pathologies and provide their patients with expert care adapted to the most avant-garde discoveries and advances in this health branch.





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Thanks to this program you will be able to apply the knowledge of new technologies applied to extracorporeal circulation methods, to improve your professional practice"

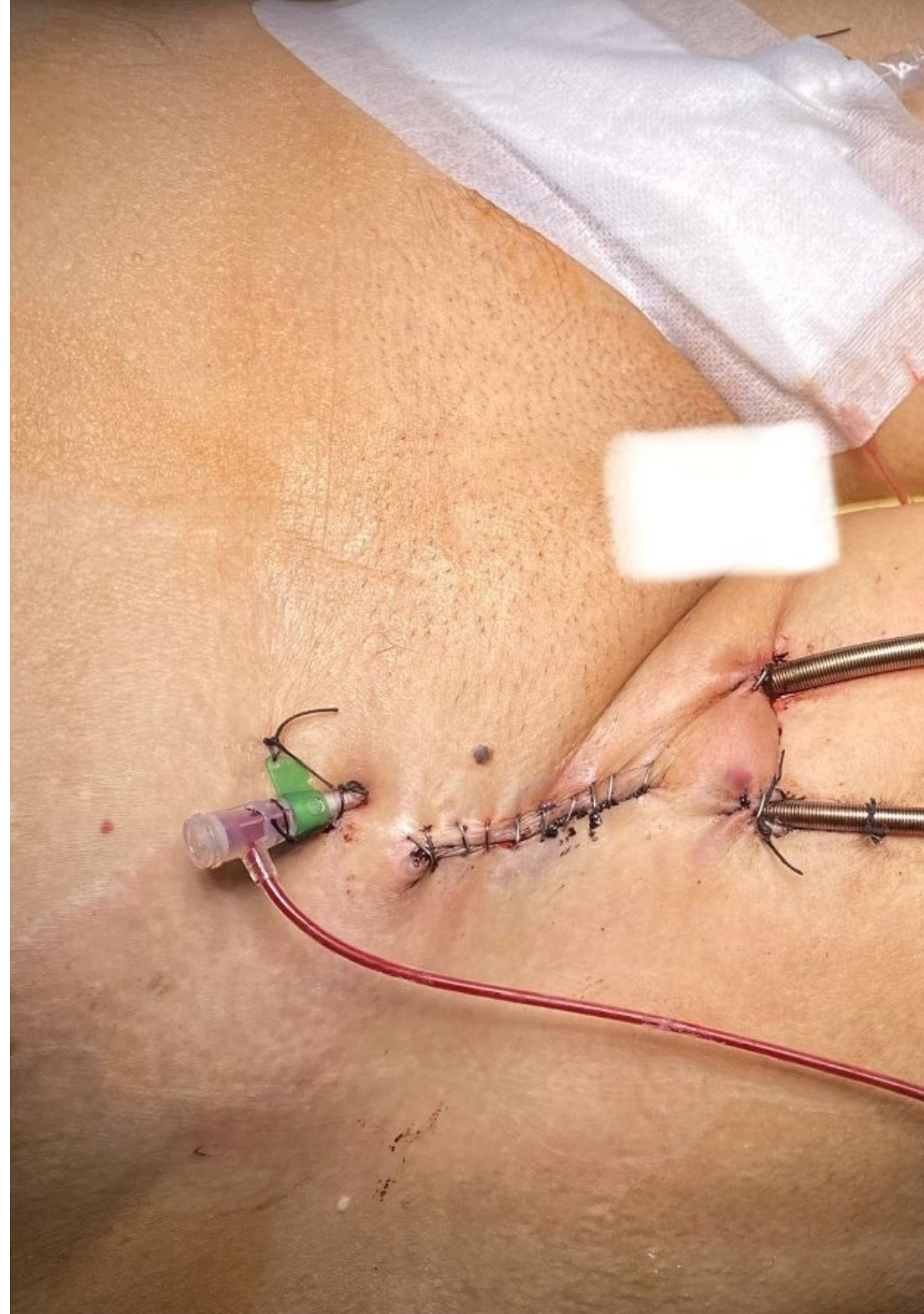


General Skills

- ◆ Acquire an in-depth knowledge that provides an opportunity in the context of Cardiovascular Surgery
- ◆ Apply acquired knowledge and problem-solving skills in large, solvent clinical settings
- ◆ Face complex clinical situations related to cardiovascular diseases, including reflections related to the application of knowledge
- ◆ Communicate your findings to both specialized and non-specialized audiences in a clear and unambiguous manner
- ◆ Develop autonomously in a learning process with an innovative study methodology of advanced prestige and technology

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The right decision at the right time requires a lot of observation and also updating of the latest cases presented. This program will allow you advance in your career efficiently”





Specific Skills

- ◆ Create a global and up-to-date vision of Cardiovascular Surgery, acquiring a useful and deep knowledge
- ◆ Approach all heart valve diseases from the surgical point of view
- ◆ Develop perioperative measures and strategies in surgical patients
- ◆ Master the new technologies implemented in surgical patients
- ◆ Generate interest to broaden knowledge in this area and discover its application to daily clinical practice
- ◆ Integrate less common aspects in Cardiovascular Surgery of great importance for the complete development of the specialty
- ◆ Approach different cardiac pathologies, as well as valvulopathies and ischemic cardiopathy and their surgical treatment
- ◆ Know the most relevant diagnostic techniques and therapeutic aspects in this field of medicine

04

Course Management

With the premise of providing quality education to today's medical professionals, TECH has chosen the most distinguished physicians in the field of Cardiovascular Surgery to design this program and to be able to offer updates on the most advanced techniques. Considering their reputed experience, both work and teaching, this program's faculty is comprised of high-quality professionals, which has a multidisciplinary approach suitable for high-levels of demand, combining the most recent scientific theses and the most successful clinical practice.





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Leading Doctors in Cardiovascular Surgery will share their most outstanding knowledge and advanced techniques in ischemic heart disease complications”

International Guest Director

With pioneering contributions in the field of **cell therapy** for **cardiovascular diseases**, Dr. Philippe Menasché is considered one of the most prestigious surgeons in the world. The researcher has been awarded several prizes such as the **Lamonica of Cardiology** laureates of the **French Academy of Sciences** and the **Matmut for Medical Innovation**, as well as the **Earl Bakken Award** for his scientific achievements.

His work has established him as a reference in the understanding of **Heart Failure**. In relation to this disease, he stands out for having participated in the **first intramyocardial transplant of autologous skeletal myoblasts**, marking a true therapeutic milestone. He has also led **clinical trials** on the use of **cardiac progenitors** derived from **human embryonic stem cells**, as well as the application of **tissue therapy combined** with these progenitors in patients with **terminal heart disease**.

His research has also revealed the **crucial role** of **paracrine signals** in **cardiac regeneration**. As a result, his team has succeeded in developing cell therapy strategies based exclusively on the **use of the secretome**, with the aim of optimizing the clinical effectiveness and transmissibility of these procedures.

At the same time, this specialist maintains an active work as a surgeon at the **European Hospital Georges Pompidou**. In this institution, he also directs the **Inserm 970 Unit**. On the other hand, in the academic field, he is a professor in the **Department of Biomedical Engineering** at the University of Alabama at Birmingham, as well as at the University of Paris Descartes.

He holds a **PhD in Medical Sciences** from the Faculty of Paris-Orsay. He has also served as Director of the **French National Institute of Health and Medical Research** and, for almost two decades, he managed the **Biosurgical Research Laboratory of the Carpentier Foundation**.



Dr. Menasché, Philippe

- Director of the National Institute of Health and Medical Research (INSERM), Paris, France
- Clinical Surgeon in the Heart Failure Unit of the European Hospital Georges Pompidou
- Regenerative Therapies for Heart and Vascular Diseases Team Leader
- Professor of Thoracic and Cardiovascular Surgery at the Paris Descartes University
- Academic Consultant to the Department of Biomedical Engineering at the University of Alabama at Birmingham
- Former Director of the Biosurgical Research Laboratory of the Carpentier Foundation
- Doctor of Medical Sciences from the Faculty of Paris-Orsay
- Member of: National Council of Universities, Medical and Scientific Council of the Agency for Biomedicine, Working Group on Regenerative and Reparative Cardiovascular Medicine of the European Society of Cardiology



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

Management



Dr. Rodríguez-Roda, Jorge

- Chief of Cardiovascular Surgery Service at the Ramón and Cajal University Hospital
- Cardiac Surgeon of the Cardiovascular Surgery Unit at the Montepríncipe Hospital
- Clinical Professor in the Department of Surgery at the University of Alcalá de Henares
- Care Coordinator Department of the Gregorio Marañón General University Hospital
- Attending Physician of Cardiovascular Surgery at Gregorio Marañón General University Hospital, Central Hospital de la Defensa Gómez Ulla and Hospital del Aire
- Resident physician of the Cardiovascular Surgery, specialty in the Cardiovascular and Thoracic Surgery Service Puerta de Hierro University Hospital. Madrid
- Medical Officer in the Military Health Corps of Spain
- Bachelor's Degree in Medicine and Surgery from the Complutense University of Madrid
- Executive Master's Degree in Healthcare Organization Management ESADE
- Healthcare Organization Leadership Program at Georgetown University
- Resident Medical Intern in the specialty of Cardiovascular Surgery in the Department of Cardiovascular and Thoracic Surgery, Puerta de Hierro Autonomous University Hospital of Madrid
- Diploma of Advanced Studies (DEA) of the Department of Surgery of the Faculty of Medicine of the Complutense University of Madrid
- General Practitioner in the Spanish National Health System and in the Public Social Security Systems of the Member States of the European Communities

Professors

Dr. Varela Barca, Laura

- ◆ Resident Intern at the Adult Cardiovascular Surgery Department of the Ramón y Cajal University Hospital of Madrid
- ◆ Assistant Physician of the Adult Cardiovascular Surgery Service of the Son Espases University Hospital of Palma de Mallorca
- ◆ Attending Physician of the Cardiovascular Surgery Department of the Jiménez Díaz Foundation University Hospital
- ◆ PhD from the University of Alcalá de Henares in Health Sciences
- ◆ Bachelor's Degree in Medicine. Faculty of Medicine, University of Valladolid
- ◆ Master's Degree in Cardiovascular Emergencies. Alcalá de Henares University

Dr. Miguelena Hycka, Javier

- ◆ Specialist in Cardiovascular Surgery at the University Hospital Ramón y Cajal
- ◆ Tutor of Cardiovascular Surgery Service at the Ramón and Cajal University Hospital
- ◆ Master's Degree teacher of Cardiac Emergencies at the University of Alcalá
- ◆ Teacher in Master's Degree from Pacemakers, Resynchronizer and Cardiac Defibrillation in the University of Alcalá
- ◆ Doctor of Medicine and Surgery from the University of Zaragoza
- ◆ Degree in Medicine and Surgery from the University of Zaragoza
- ◆ Master's Degree in Research Methodology in Health Sciences, Autonomous University of Barcelona
- ◆ Diploma in Design and Statistics in Health Sciences by the Autonomous of Barcelona
- ◆ Diploma of Advanced Studies in the Faculty of Medicine by the University of Alcalá
- ◆ Specialization in Cardiovascular Surgery by the Ministry of Health and Consumption

Dr. Martin, Miren

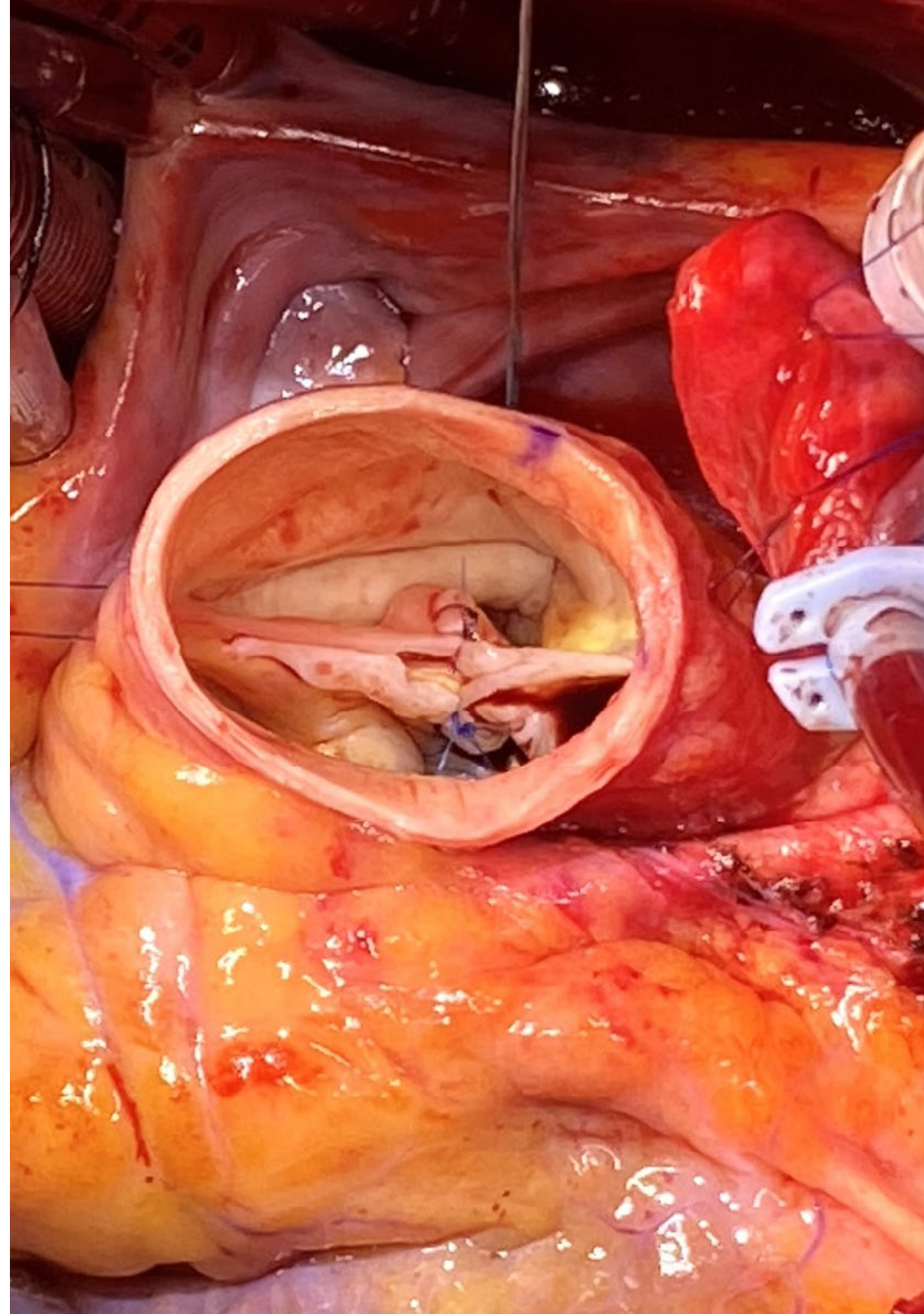
- ◆ Specialist in Cardiovascular Surgery at the Ramón y Cajal University Hospital
- ◆ Medical Internal Resident at Ramón y Cajal University Hospital
- ◆ Degree in Medicine and Surgery from the University of the Basque Country
- ◆ Master's Degree in Minimal Access Surgery from the University of Málaga
- ◆ Master's Degree in Cardiac Emergencies from the University of Alcalá
- ◆ Specialization in Clinical Research Methodology for Residents from the University of Alcalá
- ◆ Specialist in Cardiovascular Surgery at the Ramón y Cajal University Hospital

Dr. Pedraz Prieto, Álvaro

- ◆ Specialist of the Cardiovascular Surgery Service at the Gregorio Marañón General University Hospital
- ◆ Specialist of the Intensive Care Medicine Department at the HM Montepríncipe University Hospital
- ◆ Collaborating Doctor of Practical Teaching in the Department of Surgery of the Faculty of Medicine at the Complutense University of Madrid
- ◆ Guest Observer in the Cardiovascular Surgery Service at the Icahn School of Medicine at Mount Sinai
- ◆ Degree in Medicine from the University of Salamanca
- ◆ Master's Degree in Research Methodology in Health Sciences from the University of Salamanca
- ◆ Specialist in Cardiovascular Surgery at the Gregorio Marañón General University Hospital

Dr. López Menéndez, José

- ◆ Specialist in Cardiovascular Surgery at the Ramón y Cajal University Hospital
- ◆ Specialist in Cardiovascular Surgery at the Central de Asturias University Hospital
- ◆ Clinical Professor in the Department of Surgery at the University of Alcalá de Henares
- ◆ Resident tutor. Internal Medical Resident training in Cardiovascular Surgery at the Gregorio Marañón General University Hospital
- ◆ Specialist Physician at the Central University Hospital of Asturias
- ◆ Doctor of the Official Postgraduate Program in Health Sciences and Biomedicine of the University of Oviedo
- ◆ Degree in Medicine and Surgery from the University of Oviedo
- ◆ Extraordinary End of Bachelor's Degree Award from the University of Oviedo
- ◆ Master's Degree in Research Methodology in Health Sciences from Autonomous University of Barcelona
- ◆ Master's Degree in "Innovations in Cardiovascular Surgery" by the Scuola Superiore Sant'Anna, University of Pisa. Italy
- ◆ Postgraduate in Statistics and Health Sciences at the Autonomous University of Barcelona
- ◆ Specialization in Cardiovascular Surgery at the Gregorio Marañón General University Hospital



Dr. Pérez-Caballero Martínez, Ramón

- ◆ Attending Physician of Pediatric Cardiovascular Surgery at the Gregorio Marañón General University Hospital
- ◆ Attending Physician of Pediatric Cardiovascular Surgery (Dr. R. Greco) at the Sanitas La Zarzuela Hospital
- ◆ Attending Physician of Pediatric Cardiovascular Surgery (Dr. R. Greco) at the Sanitas La Moraleja Hospital
- ◆ Attending Physician of Pediatric Cardiovascular Surgery (Dr. R. Greco) at the Nisa Pardo de Aravaca Hospital
- ◆ Attending Physician of Pediatric Cardiovascular Surgery (Dr. R. Greco) at the Quirónsalud University Hospital Pozuelo, Spain
- ◆ Attending Physician in Pediatric Cardiovascular Surgery at the Pediatric Heart Institute of the 12 de Octubre University Hospital
- ◆ PhD in Surgery from the Complutense University of Madrid
- ◆ Degree in Medicine from the Faculty of Medicine of Santander at the University of Cantabria
- ◆ Specialist in Cardiovascular Surgery at the Gregorio Marañón General University Hospital
- ◆ Honorary Collaborator of the Department of Surgery, Complutense University of Madrid
- ◆ Diploma of Advanced Studies. Synchronized Ventricular Assistance
- ◆ He has numerous publications in the Area of Cardiovascular Surgery and Transplantation in Pediatrics

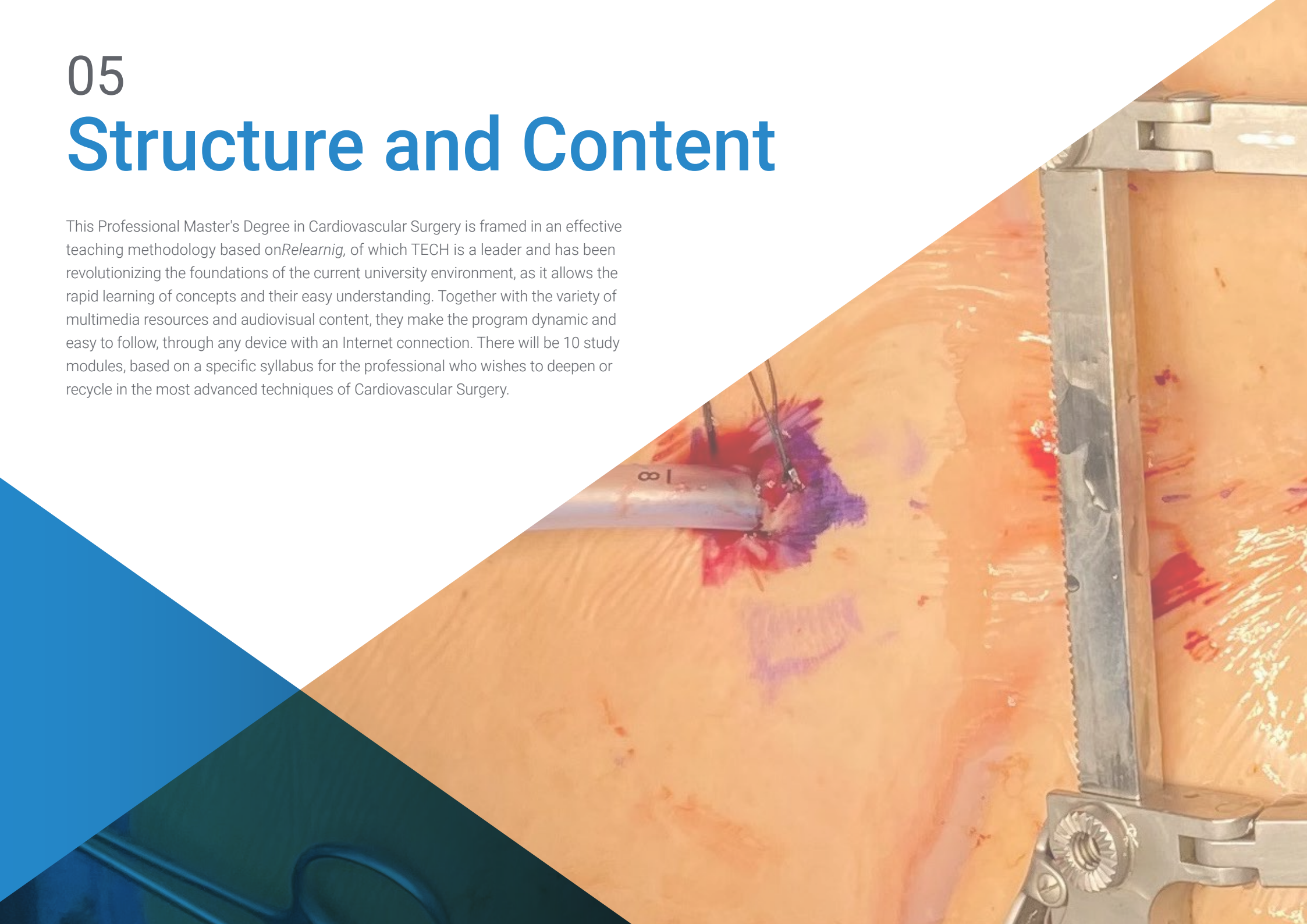


Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"

05

Structure and Content

This Professional Master's Degree in Cardiovascular Surgery is framed in an effective teaching methodology based on *Relearnig*, of which TECH is a leader and has been revolutionizing the foundations of the current university environment, as it allows the rapid learning of concepts and their easy understanding. Together with the variety of multimedia resources and audiovisual content, they make the program dynamic and easy to follow, through any device with an Internet connection. There will be 10 study modules, based on a specific syllabus for the professional who wishes to deepen or recycle in the most advanced techniques of Cardiovascular Surgery.





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A program that shows you the most cutting-edge techniques and the most up-to-date procedures in the medical environment in Cardiovascular Surgery”

Module 1. Anatomy and Pathophysiology of the Cardiovascular System

- 1.1. Embryology
- 1.2. Anatomy
 - 1.2.1. Cardiac Cavities
 - 1.2.2. Atrial Septum and Interventricular Septum
 - 1.2.3. Heart Valves
- 1.3. Biochemistry of the Heart
 - 1.3.1. Metabolic Regulation
 - 1.3.2. Regulation of Oxygen Consumption
 - 1.3.3. Plasma Lipoproteins
- 1.4. Conduction System
- 1.5. Coronary Anatomy and Coronary Pathophysiology
- 1.6. Large Vessels and Peripheral Vascular System
- 1.7. Physiology of the Cardiovascular Apparatus
- 1.8. Anatomophysiology of Pulmonary Circulation
- 1.9. Hemostasis and Blood Coagulation
- 1.10. Update on Cardiovascular Pharmacology

Module 2. Extracorporeal Circulation ECC

- 2.1. The History of ECC
- 2.2. General Principles of ECC
- 2.3. ECC Components
 - 2.3.1. Mechanical Pumps
 - 2.3.2. Oxygenators
 - 2.3.3. Heat Exchanger
 - 2.3.4. Circuits and Filters
- 2.4. Hypothermia
 - 2.4.1. Physiology of Hypothermia
 - 2.4.2. pH Control
 - 2.4.3. Hypothermia Techniques

- 2.5. Ischemia-Reperfusion
 - 2.5.1. Free radicals
 - 2.5.2. High-Energy Phosphates
 - 2.5.3. Calcium
 - 2.5.4. Vascular Endothelium
- 2.6. Myocardial Protection Methods
 - 2.6.1. Basic Principles of Cardioplegia
 - 2.6.2. Types of Cardioplegia
- 2.7. Secondary Effects of ECC
 - 2.7.1. Coagulation Alterations
 - 2.7.2. Pulmonary Alterations
 - 2.7.3. Neurological Alterations
 - 2.7.4. Renal Disorders
 - 2.7.5. Inflammatory Response
- 2.8. Monitoring During ECC
 - 2.8.1. Cardiovascular Monitoring
 - 2.8.2. Safety Devices
 - 2.8.3. Pump Flows
 - 2.8.4. Blood Gases
 - 2.8.5. Heparinization
- 2.9. Cannulation Techniques
 - 2.9.1. Types of Cannulas
 - 2.9.2. Access for Cannulation
 - 2.9.3. Special Situations
- 2.10. Incidents in ECC

Module 3. Perioperative Care

- 3.1. Preoperative Optimization
 - 3.1.1. Risk Assessment
 - 3.1.2. Nutritional Status
 - 3.1.3. Anemia
 - 3.1.4. Diabetes Mellitus
 - 3.1.5. ATB Prophylaxis
- 3.2. Intraoperative
 - 3.2.1. Monitoring
 - 3.2.2. Anesthetic Induction and Maintenance
 - 3.2.3. Fluid Use
 - 3.2.4. Pulmonary Hypertension
- 3.3. Cardiovascular System
 - 3.3.1. Volemia and Contractility
 - 3.3.2. Postoperative AMI
 - 3.3.3. Arrhythmias
 - 3.3.4. Cardiopulmonary Arrest and Cardiopulmonary Resuscitation
- 3.4. Low-Energy Expenditure Syndrome
 - 3.4.1. Monitoring and Diagnosis
 - 3.4.2. Treatment
- 3.5. Respiratory System
 - 3.5.1. Postoperative Changes in Pulmonary Function
 - 3.5.2. Ventilator Management
 - 3.5.3. Pulmonary Complications
- 3.6. Kidney Function
 - 3.6.1. Kidney Pathophysiology
 - 3.6.2. Predisposing Factors for Kidney Failure
 - 3.6.3. Prevention of Kidney Failure
 - 3.6.4. Treatment of Kidney Failure

- 3.7. Nervous System. Neurological Damage
 - 3.7.1. Types of Neurological Damage
 - 3.7.2. Risk Factors
 - 3.7.3. Etiology and Prevention
 - 3.7.4. Neuropathy in Critically Ill Patients
- 3.8. Hematological Complications
 - 3.8.1. Postoperative Bleeding
 - 3.8.2. Diagnosis of Coagulopathies
 - 3.8.3. Prevention of Bleeding
 - 3.8.4. Treatment
- 3.9. Infections
 - 3.9.1. Pneumonia Associated with Mechanical Ventilation
 - 3.9.2. Infection of Surgical Wounds
 - 3.9.3. Infections Associated with Catheter Devices
 - 3.9.4. Antibiotic Prophylaxis
- 3.10. Optimization of Blood Derivative Transfusion

Module 4. Ischemic Heart Disease

- 4.1. Clinical Manifestations of Myocardial Ischemia and Myocardial Infarction
 - 4.1.1. Coronary Circulation: Pathophysiology of Cardiac Ischemia
 - 4.1.2. Stable Angina
 - 4.1.3. Non-ST-Elevation Acute Coronary Syndrome (NSTEMI)
 - 4.1.4. ST-Elevation Acute Coronary Syndrome (STEMI)
- 4.2. Diagnosis
 - 4.2.1. Electrocardiographic Criteria
 - 4.2.2. Enzymatic Modifications
 - 4.2.3. Non-Invasive Imaging Techniques
 - 4.2.4. Stress Test. Myocardial Feasibility Studies
 - 4.2.5. Non-Invasive Imaging Techniques

- 4.3. Clinical Decisions
 - 4.3.1. *Heart Team*
 - 4.3.2. Complexity Assessment of Coronary Artery Disease and Surgical Risk
 - 4.3.3. Analysis of Clinical Practice Guidelines
 - 4.3.4. Decision on the Priority of Intervention
 - 4.3.5. Medical Treatment of Ischemic Heart Disease
- 4.4. Management and Treatment of NSTEMI-ACS
 - 4.4.1. The Heart Attack Code
 - 4.4.2. Thrombolytic Treatment
 - 4.4.3. Percutaneous Treatment
- 4.5. Technical Considerations in the Surgical Treatment of Ischemic Heart Disease I
 - 4.5.1. Cannulation: Exposure of the Coronary Arteries
 - 4.5.2. Types of Grafts. Graft Extraction
 - 4.5.3. Graft Configuration. Types of Anastomoses
 - 4.5.4. Compound Grafts
- 4.6. Technical Considerations in the Surgical Treatment of Ischemic Heart Disease II
 - 4.6.1. Non-ECC Surgery
 - 4.6.2. Flow Measurement of Coronary Grafts
 - 4.6.3. MIDCAB: TECAB. Robotics
 - 4.6.4. Results
- 4.7. Technical Considerations in the Surgical Treatment of Ischemic Heart Disease III
 - 4.7.1. Acute Ischemic Mitral Insufficiency
 - 4.7.2. Post-Infarction VSD
 - 4.7.3. Free Wall Breakage
 - 4.7.4. Ventricular Aneurysm
- 4.8. Technical Considerations in the Surgical Treatment of Ischemic Heart Disease IV
 - 4.8.1. Surgery for Chronic Ischemic Mitral Insufficiency
 - 4.8.2. Coronary Artery Surgery Combined with Peripheral Vascular Disease
 - 4.8.3. Coronary Surgery and Pre-Operative Antiplatelet Therapy

- 4.9. Cardiogenic Shock Management
 - 4.9.1. Medical Treatment
 - 4.9.2. IABP
 - 4.9.3. ECMO
 - 4.9.4. Ventricular Assistance Devices
- 4.10. Relevant Studies in Ischemic Heart Disease
 - 4.10.1. SYNTAX
 - 4.10.2. EXCEL and NOBLE. Left Main Coronary Artery Pathology
 - 4.10.3. ARTS Arterial Grafts
 - 4.10.4. FAME. Multivessels

Module 5. Valvular Heart Disease

- 5.1. Etiopathogenesis
- 5.2. Valvular *Heart Team*. Specific Units
- 5.3. Types of Valve Prostheses
 - 5.3.1. Historical Evolution of Valve Prostheses
 - 5.3.2. Mechanical Prostheses
 - 5.3.3. Biological Prostheses
 - 5.3.4. Homograft
 - 5.3.5. Xenografts
 - 5.3.6. Autografts
- 5.4. Mitral Valve
 - 5.4.1. Anatomy and Function
 - 5.4.2. Pathophysiology
 - 5.4.3. Replacement and Repair Techniques
- 5.5. Tricuspid Valve
 - 5.5.1. Anatomy and Function
 - 5.5.2. Pathophysiology
 - 5.5.3. Replacement and Repair Techniques

- 5.6. Aortic Valve
 - 5.6.1. Anatomy and Function
 - 5.6.2. Pathophysiology
 - 5.6.3. Replacement and Repair Techniques
- 5.7. Pulmonary Valve
 - 5.7.1. Anatomy and Function
 - 5.7.2. Pathophysiology
 - 5.7.3. Replacement and Repair Techniques
- 5.8. Minimally Invasive Surgery
- 5.9. Results of Valvular Surgery. Studies
- 5.10. Endocarditis
 - 5.10.1. Etiology
 - 5.10.2. Indications
 - 5.10.3. Risk Scores
 - 5.10.4. Treatment

Module 6. Aortic Pathology

- 6.1. Anatomy and Function of the Aortic Root
- 6.2. Pathology and Treatment of the Aortic Root
- 6.3. Thoracic Aortic Aneurysm
 - 6.3.1. Etiopathogenesis
 - 6.3.2. Natural History
 - 6.3.3. Treatment
- 6.4. Thoracoabdominal Aneurysm
- 6.5. Acute Aortic Syndrome
 - 6.5.1. Classification
 - 6.5.2. Diagnosis
- 6.6. Surgical Treatment of Acute Aortic Syndrome
- 6.7. Adjuvant Techniques in the Surgical Treatment of Acute Aortic Syndrome
- 6.8. Aortic Arch Surgery
- 6.9. Percutaneous Treatment
- 6.10. Aortitis

Module 7. Congenital Heart Disease

- 7.1. General Physiology of Congenital Heart Disease
 - 7.1.1. Major Syndromes
 - 7.1.2. Palliative Techniques
- 7.2. Patent Ductus Arteriosus
 - 7.2.1. Aortopulmonary Window
 - 7.2.2. Fistula of the Sinus of Valsalva
 - 7.2.3. Aorto-Ventricular Tunnel
- 7.3. Obstructions to Systemic Flow
 - 7.3.1. Aortic Subvalvular Stenosis
 - 7.3.2. Valvular Aortic Stenosis
 - 7.3.3. Supravalvular Aortic Stenosis and Aortic Coarctation
 - 7.3.4. Interrupted Aortic Arch
- 7.4. Atrial Septal Defect and Ventricular Septal Defect
 - 7.4.1. Atrioventricular Canal
 - 7.4.2. Truncus Arteriosus
- 7.5. Tetralogy of Fallot
 - 7.5.1. Pulmonary Atresia with VSD and MAPCAS
- 7.6. Transposition of the Main Arteries. Double Outlet Right Ventricle
- 7.7. Hypoplastic Left Heart Syndrome
 - 7.7.1. Three-Stage Management of Univentricular Physiology
- 7.8. Pulmonary Venous Return Anomalies
 - 7.8.1. Total and Partial Anomalous Pulmonary Venous Return
 - 7.8.2. Heterotaxia
- 7.9. Congenitally Corrected Transposition of the Great Arteries
- 7.10. Vascular Rings. Coronary Abnormalities

Module 8. Arrhythmias

- 8.1. Cardiac Electrophysiology
 - 8.1.1. Cellular Electrophysiology
 - 8.1.1.1. Membrane Potential
 - 8.1.1.2. Ion Channels
 - 8.1.1.3. Action Potential
 - 8.1.1.4. GAP Junctions
 - 8.1.1.5. Cardiac Muscle Properties
 - 8.1.2. Classification and Mechanisms of Arrhythmias
- 8.2. 12-Lead Electrocardiogram: General Information for Its Correct Interpretation
- 8.3. Sudden Death of Cardiac Origin and Ventricular Tachycardia
 - 8.3.1. Associated Diseases
 - 8.3.2. Triggering Mechanisms. Patients at Risk
 - 8.3.3. Prevention
- 8.4. Tachyarrhythmias
 - 8.4.1. Atrial Fibrillation
 - 8.4.2. *Flutter*
 - 8.4.3. Supraventricular Tachycardias
- 8.5. Bradyarrhythmias
 - 8.5.1. Sinus Dysfunction
 - 8.5.2. Sinoatrial Block
 - 8.5.3. Atrioventricular Block
 - 8.5.4. Intraventricular Conduction Abnormalities
- 8.6. Electrostimulation Devices I
 - 8.6.1. Pacemaker
 - 8.6.2. Defibrillators
 - 8.6.3. Cardiac Resynchronization Therapy (CRT)
 - 8.6.4. Indications
- 8.7. Electrostimulation Devices II
 - 8.7.1. Implantation Techniques
 - 8.7.2. Complications

- 8.8. Removal of Electrostimulation Electrodes
- 8.9. Atrial Fibrillation Surgery
 - 8.9.1. Theoretical Principles and History
 - 8.9.2. Available Tools
 - 8.9.3. Surgical Technique
- 8.10. Left Atrial Appendage Closure
 - 8.10.1. Research. Prevail. Protect. Laos
 - 8.10.2. Percutaneous Closure
 - 8.10.3. Surgical Closure

Module 9. Treatment of Other Cardiovascular Diseases, Transcatheter Valve Implantation and Concomitant Conditions

- 9.1. Surgical Management of Cardiac and Great Vessel Trauma
 - 9.1.1. Blunt
 - 9.1.2. Open
- 9.2. Cardiomyopathies
 - 9.2.1. Dilated Cardiomyopathy
 - 9.2.2. Hypertrophic Cardiomyopathy
 - 9.2.3. Restrictive Cardiomyopathy
- 9.3. Pericardial Diseases
 - 9.3.1. Pericardial Effusion and Tamponade
 - 9.3.2. Constrictive Pericarditis
 - 9.3.3. Cysts and Tumors
- 9.4. Cardiac Tumors
- 9.5. Pulmonary Embolism
 - 9.5.1. Pathophysiology, Prevention and Treatment
 - 9.5.2. Pulmonary Thromboendarterectomy
- 9.6. Ventricular Assists and ECMO
- 9.7. Cardiac Transplantation
 - 9.7.1. History of Heart Transplant
 - 9.7.2. Surgical Techniques
 - 9.7.3. Donor and Recipient Selection
 - 9.7.4. Immunosuppression

- 9.8. Transcatheter Valvular Treatment of the Aortic Valve
- 9.9. Transcatheter Valvular Treatment of the Mitral Valve
 - 9.9.1. Transcatheter Mitral Valve Implantation
 - 9.9.2. Transapical Neo-String Implantation
- 9.10. Cardiovascular Surgery and Concomitant Diseases
 - 9.10.1. Preoperative Assessment
 - 9.10.2. Fragility
 - 9.10.3. Renal Insufficiency
 - 9.10.4. Respiratory Failure
 - 9.10.5. Digestive Pathology
 - 9.10.6. Coagulation Disorders
 - 9.10.7. Pregnancy

Module 10. New Technologies and Imaging Techniques. Statistics

- 10.1. New Technologies in Cardiovascular Surgery
 - 10.1.1. New Polymer Prostheses
 - 10.1.2. Vest/Duragraft
 - 10.1.3. 3D Printing
 - 10.1.4. Augmented Reality
 - 10.1.5. Robotics
- 10.2. Transthoracic Echocardiography
- 10.3. Transesophageal Echocardiogram
- 10.4. Imaging Techniques in Cardiac Pathology
 - 10.4.1. Cardiac CT
 - 10.4.2. Cardiac MRI
 - 10.4.3. Perfusion Studies
 - 10.4.4. PET/CT
- 10.5. Statistics I for Surgeons
 - 10.5.1. Sample Collection
 - 10.5.2. Graphic Representation

- 10.6. Statistics II for Surgeons
 - 10.6.1. Statistical Inference
 - 10.6.2. Proportion Comparison
 - 10.6.3. Comparison of Averages
- 10.7. Statistics III for Surgeons
 - 10.7.1. Regression Analysis
 - 10.7.2. Linear Regression
 - 10.7.3. Logistic Regression
 - 10.7.4. Survival Studies
- 10.8. Care Management
 - 10.8.1. Quality Criteria
 - 10.8.2. Records and Databases
 - 10.8.3. Criteria for the Timing of Cardiovascular Interventions
- 10.9. Research Methodology
 - 10.9.1. Design
 - 10.9.2. Ethics
 - 10.9.3. Critical Reading of Articles
 - 10.9.4. Evidence-Based Medicine
- 10.10. Past, Present and Future of Cardiovascular Surgery



You will be able to ask the teachers any questions you may have about the syllabus, with full and personalized assistance”

06

Study Methodology

TECH is the world's first university to combine the **case study** methodology with **Relearning**, a 100% online learning system based on guided repetition.

This disruptive pedagogical strategy has been conceived to offer professionals the opportunity to update their knowledge and develop their skills in an intensive and rigorous way. A learning model that places students at the center of the educational process giving them the leading role, adapting to their needs and leaving aside more conventional methodologies.



“

TECH will prepare you to face new challenges in uncertain environments and achieve success in your career”

The student: the priority of all TECH programs

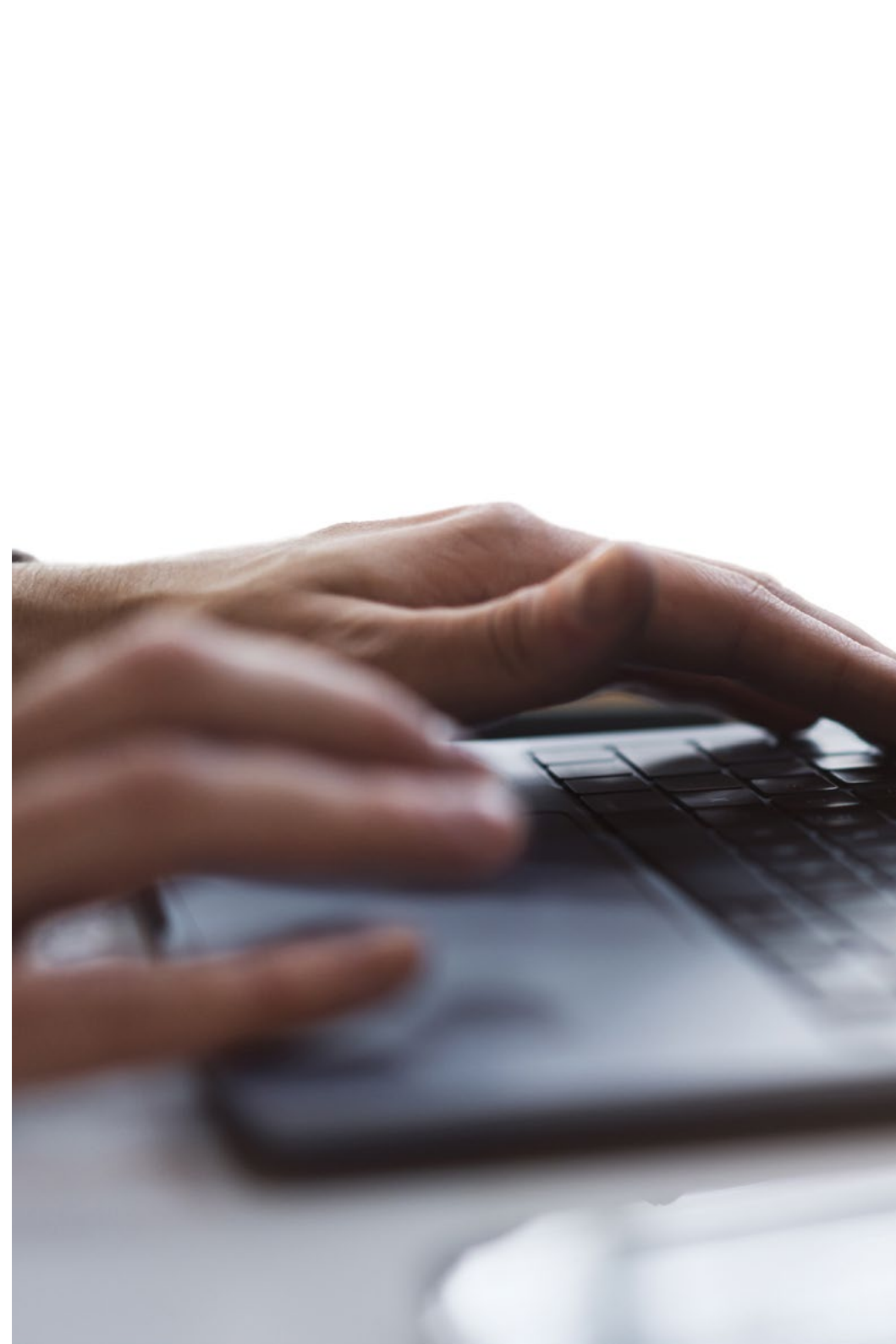
In TECH's study methodology, the student is the main protagonist.

The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.

“

*At TECH you will NOT have live classes
(which you might not be able to attend)”*



The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.

“

TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want”

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.



Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

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.



A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.



The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule”

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 assess 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.

The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the quality of teaching, quality of materials, course structure and objectives is excellent. Not surprisingly, the institution became the best rated university by its students on the Trustpilot review platform, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.



As such, the best educational materials, thoroughly prepared, will be available in this program:



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.

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.



Practicing Skills and Abilities

You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.



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 exclusive educational system for presenting multimedia content 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 education.





Case Studies

Students will complete a selection of the best case studies in the field. Cases that are presented, analyzed, and supervised by the best specialists in the world.



Testing & Retesting

We periodically assess and re-assess your knowledge throughout the program. We do this on 3 of the 4 levels of Miller's Pyramid.



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 for 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 Surgery guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree diploma issued by TECH Global University.





“

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

This private qualification will allow you to obtain a **Professional Master's Degree in Cardiovascular Surgery** endorsed by **TECH Global University**, the world's largest online university.

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

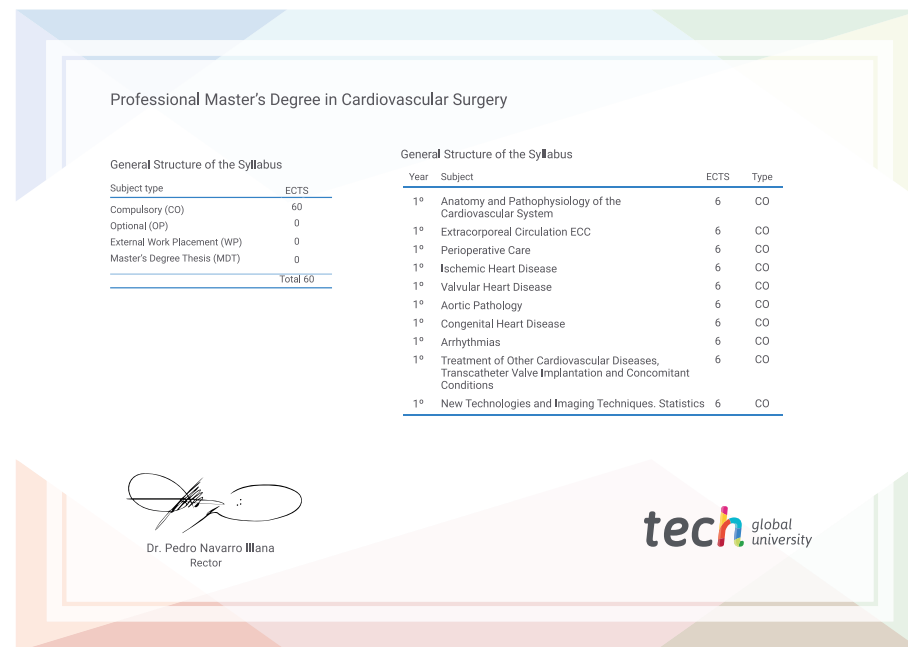
This **TECH Global University** private qualification is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Professional Master's Degree in Cardiovascular Surgery**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**



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



Professional Master's Degree

Cardiovascular Surgery

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

Professional Master's Degree Cardiovascular Surgery