# Postgraduate Diploma

## Arrhythmias and Devices

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# Postgraduate Diploma
## Arrhythmias and Devices

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

Website: www.techtitute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-arrhythmias-devices

# Index

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# Introduction

Cardiac bradyarrhythmias and arrhythmias are one of the cardiology fields that attract the interest of specialists from all over the world. The latest developments in devices such as the ICD or resynchronizer open up an excellent framework of action for this type of pathology. For this reason, the specialist must maintain a high level of updating at all times, having the most recent scientific and practical evidence available. TECH, with this premise in mind, has prepared this university program that compiles the main scientific postulates and clinical practice regarding arrhythmias, bradyarrhythmias and cardiac devices.

*You will be able to access the most up-to-date and recent didactic material on Arrhythmias and Devices"*

The different techniques for implantation of pacing devices, as well as the mechanisms themselves, have advanced considerably in recent years. This, in turn, has led to much more detailed and precise monitoring of pathologies such as bradyarrhythmias or the radiological and cardiac anatomy itself, focused on arrhythmias.

It is for this reason that TECH, along with a group of renowned professionals in the field of cardiology, has developed this Postgraduate Diploma in Arrhythmias and Devices. The specialist will find a complete and up-to-date syllabus on the most recent advances, combining both the first level practical experience of the entire teaching team with the scientific contents of the first line of research in cardiology.

All this in the best possible academic offer, offered in a completely online format that respects the priorities and responsibilities of the specialist who takes the course. All the content of the Postgraduate Diploma is available in the virtual classroom from the beginning of the program, and can be downloaded from any device with an internet connection. This allows the necessary flexibility to combine the academic, professional and personal facets of the specialists, being able to study when, where and how they want.

This **Postgraduate Diploma in Arrhythmias and Devices** contains the most complete and up-to-date program on the market. The most important features include:

- The development of practical cases presented by experts in Cardiology
- 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 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

*You will find extensive topics on pacemakers, ICDs, resynchronizers, diagnostic studies aimed at bradyarrhythmias or cardiac anatomy focused on arrhythmias, among many other useful topics"*

*Get up to date in everything related to Arrhythmias and Devices accompanied by a prestigious teaching staff in the field of cardiology"*

*Lean on the world's largest online academic institution and take advantage of the many educational and technological resources you will find at TECH.*

*Choose where, when and how. You will be able to distribute the course workload according to your own interests, without face-to-face classes or fixed schedules.*

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

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

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. This will be done with the help of an innovative system of interactive videos made by renowned experts.

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# Objectives

The main objective of this Postgraduate Diploma is, precisely, to offer the specialist the most recent advances in antiarrhythmic drugs, arrhythmia physiology, cardiac device implantation techniques and other contents of special interest in this specialty. All the educational material can be incorporated into daily practice in a progressive and natural way throughout the program, resulting in a comprehensive, thorough and profitable qualification for the specialist.

*Thanks to TECH's teaching methodology, you won't have to invest long hours of study to update yourself on all the cardiological issues covered in the syllabus"*

## General Objectives

- Update general knowledge as well as the most innovative aspects of cardiological processes involving cardiac rhythm disorders
- Delve into the clinical management and indications of the different procedures performed for the diagnosis and treatment of these cardiac conditions
- Delve into the diagnosis and treatment of arrhythmias based on clinical and electrocardiographic aspects, as well as invasive techniques and electrophysiological studies
- Broaden knowledge in the operation, monitoring and implantation technique of the main implantable devices used for the treatment of arrhythmias
- Delve into the problems in cardiac rhythm disorder that can arise across the spectrum of patients
- Achieve a mastery of the rhythm disorder problems present in the various scenarios faced by the cardiologist in his or her routine clinical practice

## Specific Objectives

### Module 1. Arrhythmias. Fundamental Concepts

- Know the fundamental mechanisms that produce arrhythmias, including cellular physiology, the conduction system, cardiac anatomy of arrhythmias (including a radiological approach) and the role of genetics
- Review the most common antiarrhythmic drugs, focusing on their most important indications, contraindications and common adverse effects
- Review basic diagnostic techniques and common procedures in the Electrophysiology Department

### Module 2. Bradyarrhythmias

- Know the definition and types of Bradyarrhythmias, as well as their basic mechanisms
- Review the studies available for its diagnosis and characterization
- Study in depth the fundamental groups of Bradyarrhythmias (sinus node disease and AV block), with special emphasis on diagnosis and treatment
- Delve into the study of the patient with syncope, from mechanisms and causes to diagnosis and treatment
- Review in detail the current indications for pacemaker implantation

### Module 3. Devices (Pacemaker, ICD and Resynchronizer)

- Review in detail the indication of pacemakers, their implantation technique, their basic operation, as well as the modes of programming and other aspects of monitoring
- Review in detail the indication for ICD, as well as the particularities of the implantation technique, operation and programming/monitoring
- Know the differential aspects of the novel physiological pacing techniques, as well as their current indications and future perspectives
- Learn about other current implantable devices: wireless pacemakers and subcutaneous ICDs. Review their indications
- Update on the electrode extraction technique and its indications

*You will see your professional updating objectives fulfilled even before finishing the program, having the constant support of all TECH's teaching and technical staff"*

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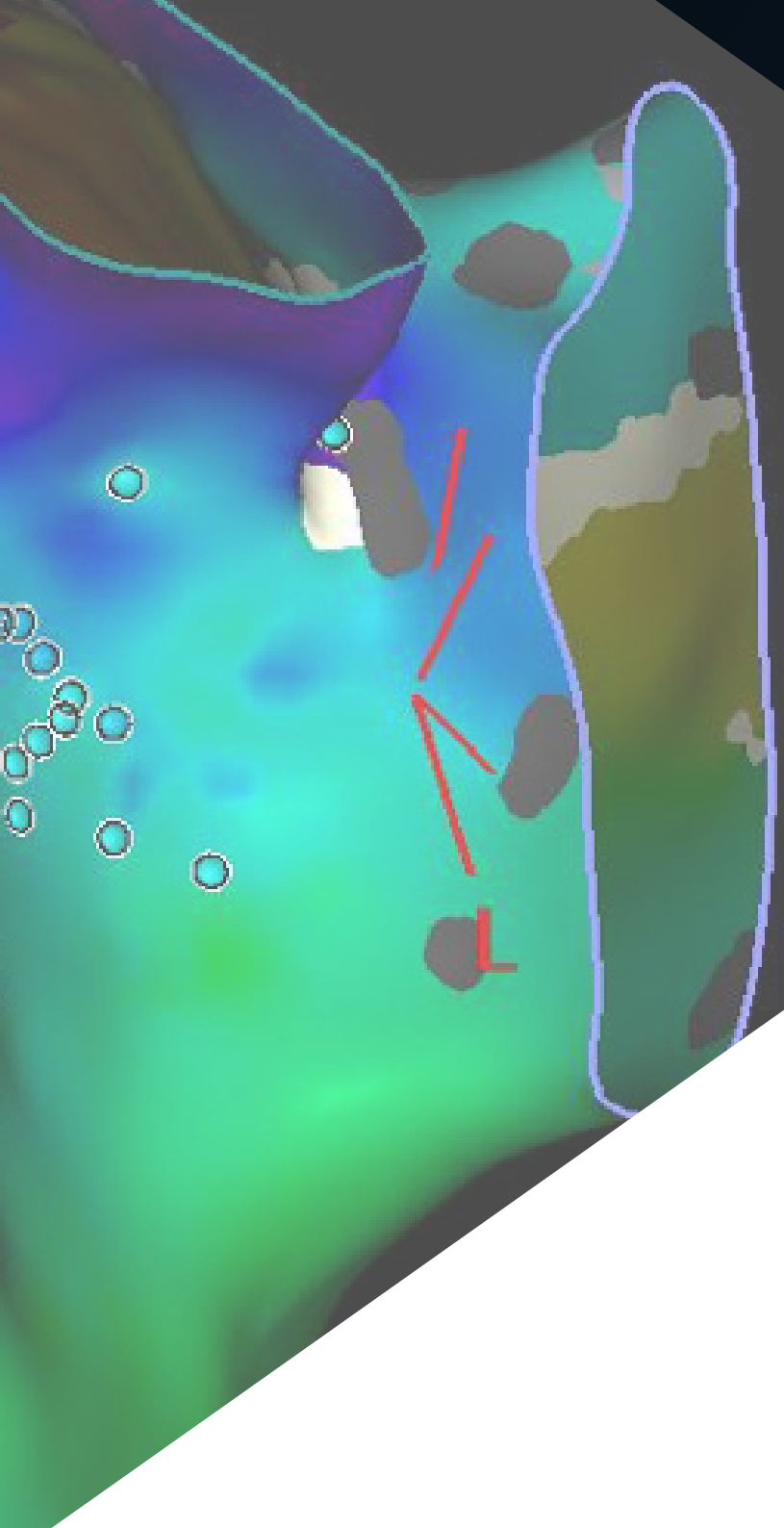
# Course Management

To develop all the contents of this Postgraduate Diploma, TECH has drawn on a diverse team of specialists with great prestige and experience in the area of cardiology. Thus, its theoretical and practical contribution is a plus in quality for all the contents of the program, based on real cases, which incorporates the most efficient and specific current approach in bradyarrhythmias, and management of cardiac devices.



*The entire teaching team has extensive experience in dealing with different cardiological pathologies, providing you with both their practical vision and the latest scientific theory in Arrhythmias and Devices"*

## International Guest Director

Awarded the "Outstanding Patient Experience Award" on multiple occasions for his excellence in patient care, Dr. Konstantinos Aronis has become a prestigious **Cardiac Electrophysiologist**. In this sense, his clinical specialty is based on the **Invasive Management of Arrhythmias** in patients suffering from **Adult Congenital Heart Disease**.

He has developed his professional work in health institutions of international reference, including the **Johns Hopkins Hospital** in Maryland or the **Beth Israel Deaconess Medical Center** in Massachusetts. In this way, he has contributed to optimizing the quality of life of numerous individuals suffering from diseases ranging from **Atrial Fibrillation** or **Ventricular Tachycardia** to **Structural Malformations of the heart**. To do so, he has employed a variety of advanced technological tools such as **Computational Modeling, Holder Monitors** and even **Magnetic Resonance Imaging**.

Among his main contributions, he has promoted the **Complex Ablation Program for Congenital Heart Diseases**. This has consisted in the use of **computed tomography** images to create **3D printed models** of hearts with complicated anatomies, which has made it possible to plan medical interventions with greater precision and efficiency. It has also carried out the first **intraoperative excision** for **Atrial Tachycardia**, performing the procedure in real time during cardiac surgery. This innovation made it possible to address cardiac rhythm disturbances that could not be treated conventionally without damaging nearby critical structures.

On the other hand, he balances this work with his role as a **Clinical Researcher** in Cardiac Electrophysiology. In fact, he has published numerous **scientific articles** in high-impact specialized journals. His clinical findings have contributed to the advancement of the knowledge of health professionals in areas such as **Atrial Fibrillation, Resynchronization** therapies or personalized **Cardiac Prototypes**.

## Dr. Aronis, Konstantinos

- Physician at Johns Hopkins Hospital, Maryland, United States
- Cardiovascular Disease and Clinical Cardiac Electrophysiology Investigator at Johns Hopkins Hospital
- Translational Investigator at Beth Israel Deaconess Medical Center, Massachusetts
- Internal Medicine Residency at Boston University Medical Center, Massachusetts
- Internship in Computational Electrophysiology at the Institute of Computational Medicine at Johns Hopkins Hospital
- Doctorate in Internal Medicine, University of Patras
- Degree in Medical Sciences from the University of Patras
- American College of Cardiology
- American Heart Association
- Heart Rhythm Society

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

## Management

**Dr. Jiménez Sánchez, Diego**

- Assistant specialist in Cardiology at the University Hospital El Escorial
- Attending Doctor Specialist at Unit of the Puerta De Hierro University Hospital
- Degree in Medicine and Surgery from the Autonomous University of Madrid
- Residency in the specialty of Cardiology at the Puerta de Hierro University Hospital
- Fellowship in electrophysiology at the Arrhythmia Unit of the Puerta de Hierro University Hospital
- Master's degree in diagnostic and therapeutic cardiac electrophysiology at San Pablo CEU University

**Dr. Vázquez López-Ibor, Jorge**

- Assistant Cardiology Specialist at University Hospital El Escorial
- Assistant Cardiology Specialist at the Heart Failure Unit of the Puerta de Hierro Hospital
- Degree in Medicine and Surgery from the Complutense University of Madrid
- Residency in the specialty of Cardiology at the Puerta de Hierro University Hospital
- Theoretical and practical Master in Critical and Advanced Heart Failure (MICCA) at the Gregorio Marañón Hospital
- Theoretical and practical training in Cardiovascular Research at the National Center for Cardiovascular Research (CNIC)
- Fellowship in Advanced Heart Failure, Heart Transplantation and Pulmonary Hypertension at the Puerta de Hierro University Hospital

**Dr. Castro Urda, Víctor**

- Assistant Specialist in the Arrhythmia Unit of the Cardiology Service of the Puerta de Hierro Hospital
- Degree in Medicine and Surgery from the Complutense University of Madrid
- Residency in the specialty of Cardiology at the Puerta de Hierro University Hospital
- Training stay at the Electrophysiology and Cardiology Department of the Hospital UZ Brussel, Belgium
- Master in Diagnostic and Therapeutic Cardiac Electrophysiology at the Complutense University of Madrid

## Professors

**Dr. Aguilera Agudo, Cristina**

- Assistant Specialist Physician in the Cardiology Service of the Puerta de Hierro Hospital
- Personal Physician of Continuous Care at the University Hospital of Guadalajara
- Degree in Medicine and Surgery at the University of Granada
- Diploma in Statistics in Health Sciences at the Autonomous University of Barcelona
- Studying a Master's Degree in Diagnostic and Therapeutic Cardiac Electrophysiology at San Pablo CEU University

**Dr. García Rodríguez, Daniel**

- Fellow in Electrophysiology and Arrhythmias at the Arrhythmia Unit of the Puerta de Hierro University Hospital
- Graduated in Medicine at the Autonomous University of Madrid
- Residency in the specialty of Cardiology at the Puerta de Hierro University Hospital
- Master's Degree in Diagnostic and Therapeutic Cardiac Electrophysiology at San Pablo CEU University

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# Structure and Content

The contents of this program are the result of the joint effort of the entire teaching team to provide the most up-to-date and current teaching material possible. Thus, the 3 modules that make up the program review in detail everything related to arrhythmias, bradyarrhythmias and cardiac devices; including a large amount of supplementary material in the form of supplementary readings and exercises based on real cases.


*You will be able to consult video summaries, in detail and real clinical cases on all the topics provided in this Postgraduate Diploma"*

## **Module 1.** Arrhythmias. Fundamental Concepts

1.1. Physiology
- 1.1.1. Special Features of Myocardial Cells
- 1.1.2. Action Potential
- 1.1.3. Main Ionic Currents Involved

1.2. Genetics of Arrhythmias

1.3. Cardiac Conduction System
- 1.3.1. Sinus Node and AV Node
- 1.3.2. His-Purkinje System

1.4. Mechanisms of Arrhythmias
- 1.4.1. Automatism
- 1.4.2. Triggered Activity
- 1.4.3. Re-Entry
- 1.4.4. Micro-Entry

1.5. Antiarrhythmic Drugs
- 1.5.1. Type I
- 1.5.2. Type I
- 1.5.3. Type III
- 1.5.4. Type IV

1.6. Basic Diagnostic Techniques Used in Arrhythmias
- 1.6.1. Holter
- 1.6.2. Tilt Test
- 1.6.3. Pharmacological Tests
- 1.6.4. Insertable Holter
- 1.6.5. Wearables and Other Devices

1.7. Common Procedures Performed for the Diagnosis and Treatment of Arrhythmias
- 1.7.1. EPS and Ablation
- 1.7.2. Electroanatomical Mapping Systems. Browsers

1.8. Cardiac Anatomy Focused on Arrhythmias

1.9. Radiological Anatomy

1.10. Organization and Operation of Arrhythmia Units

## **Module 2.** Bradyarrhythmias

2.1. Bradyarrhythmia
2.2. Types of Bradyarrhythmias
2.3. Mechanisms/Physiopathology of Bradyarrhythmias
2.4. Diagnostic Studies Aimed at Bradyarrhythmias
2.5. Sinus Node Disease
2.6. AV Blocks
2.7. Syncope.
  2.7.1. Causes of Syncope
  2.7.2. Mechanisms of Syncope
  2.7.3. Diagnostic Study and Differential Diagnosis
2.8. Indication for Pacemaker Implantation. Indications for Transient PM Implantation.
  2.8.1. Sinus Dysfunction
  2.8.2. AV Blocks
2.9. EEF Study of Bradyarrhythmias

## **Module 3.** Devices (Pacemaker, ICD and Resynchronizer)

3.1. Pacemaker
  3.1.1. Operation of a Pacemaker
  3.1.2. Indications for Pacemaker Implantation
3.2. Pacemaker Implantation Technique
  3.2.1. Venous Canalization
  3.2.2. Surgical Pocket Creation
  3.2.3. Ventricular Electrode Implantation
  3.2.4. Atrial Electrode Implantation
3.3. Basic Pacemaker Programming
  3.3.1. Programming at Discharge After Implantation
  3.3.2. Follow-Up Protocol in the Consultation Room
3.4. ICD
  3.4.1. Operation of an ICD
  3.4.2. Indications for ICD Implantation
3.5. ICD II
  3.5.1. ICD Implantation Technique. Peculiarities with Respect to Pacemaker.
  3.5.2. Programming at Discharge After Implantation
  3.5.3. Follow-Up Protocol in the Consultation Room
3.6. Resynchronization Therapy
  3.6.1. Theoretical Basis
  3.6.2. Indications for Cardiac Resynchronization Device Implantation
3.7. Resynchronization Therapy II
  3.7.1. CRS Implantation Technique. Peculiarities with Respect to Other Devices
  3.7.2. Programming at Discharge After Implantation
  3.7.3. Follow-Up Protocol in the Consultation Room
3.8. Physiological Stimulation
  3.8.1. Hisian Stimulation
  3.8.2. Left Bundle Branch Stimulation
3.9. Other Implantable Devices
  3.9.1. Wireless Pacemakers
  3.9.2. Subcutaneous ICD
3.10. Electrode Removal
  3.10.1. Indications for Electrode Extraction
  3.10.2. Extraction Procedure

*The educational material you will have at your disposal is very useful even as reference material, with numerous complementary readings and high-quality audiovisual material"*

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# Methodology

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

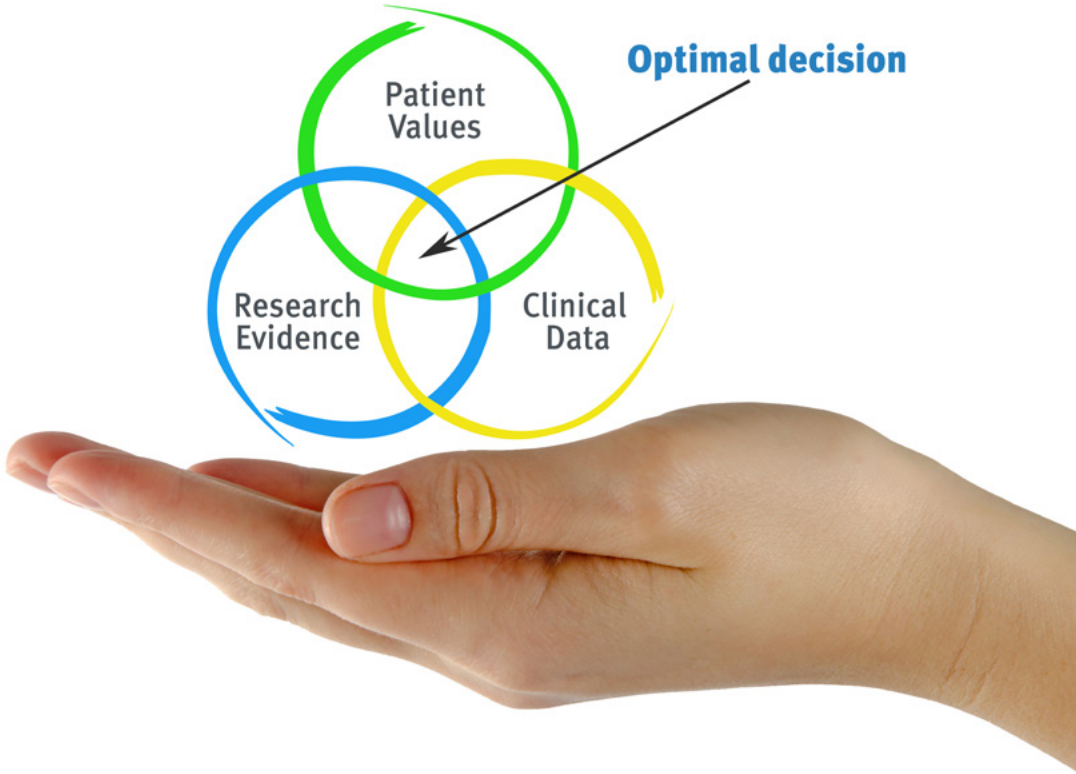
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

*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:**

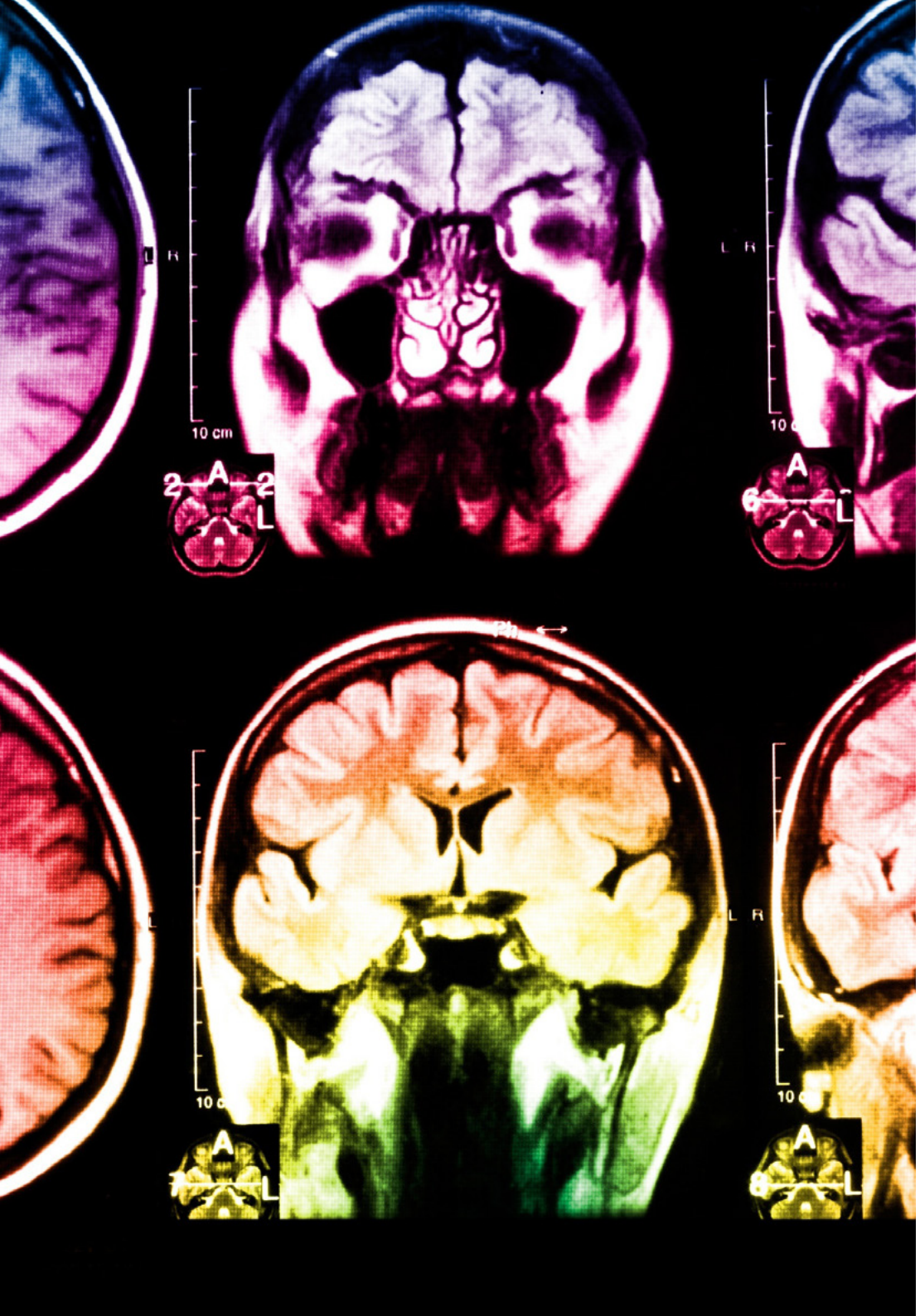
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better 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.

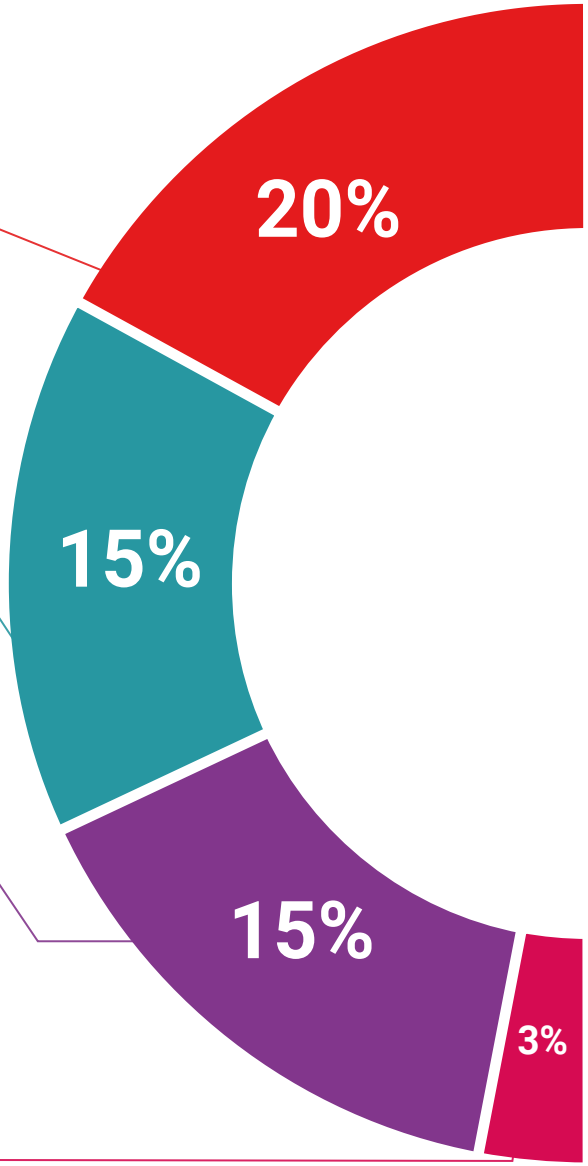
### Interactive Summaries

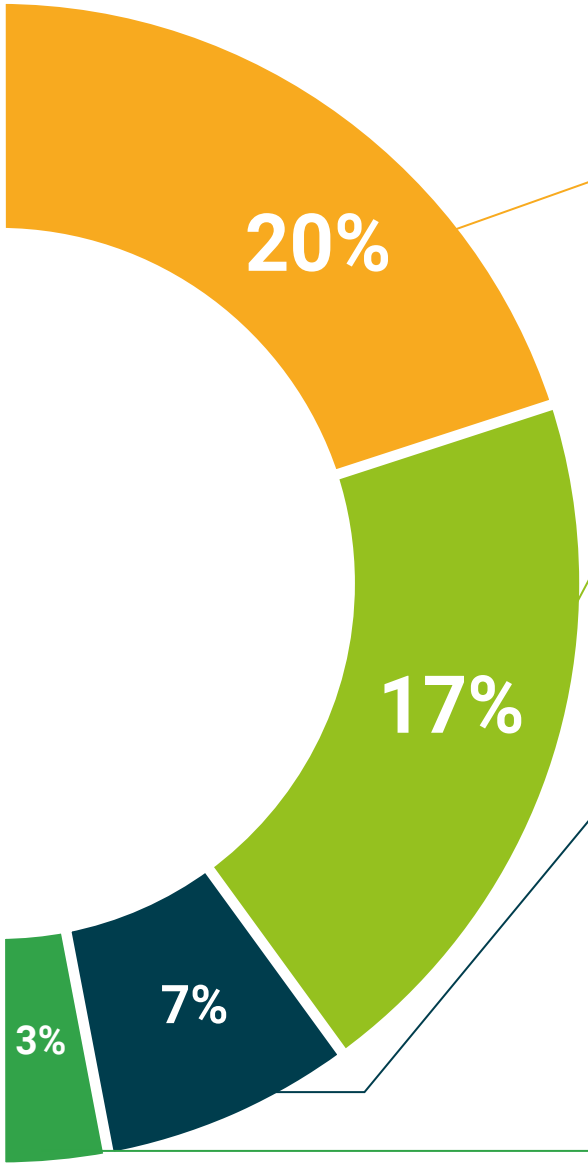
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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.

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# Certificate

The Postgraduate Diploma in Arrhythmias and Devices guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate 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 program will allow you to obtain your **Postgraduate Diploma in Arrhythmias and Devices** 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: **Postgraduate Diploma in Arrhythmias and Devices**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**


tech global university

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

**Postgraduate Diploma in Arrhythmias and Devices**

This is a private qualification of 540 hours of duration equivalent to 18 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: AFWORD23S techtitute.com/certificates

*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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