

# Postgraduate Diploma

## Diagnostic Techniques and Cardiovascular Diseases in Clinical Genetics



## Postgraduate Diploma Diagnostic Techniques and Cardiovascular Diseases in Clinical Genetics

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/in/medicine/postgraduate-diploma/postgraduate-diploma-diagnostic-techniques-cardiovascular-diseases-clinical-genetics](http://www.techtute.com/in/medicine/postgraduate-diploma/postgraduate-diploma-diagnostic-techniques-cardiovascular-diseases-clinical-genetics)

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01

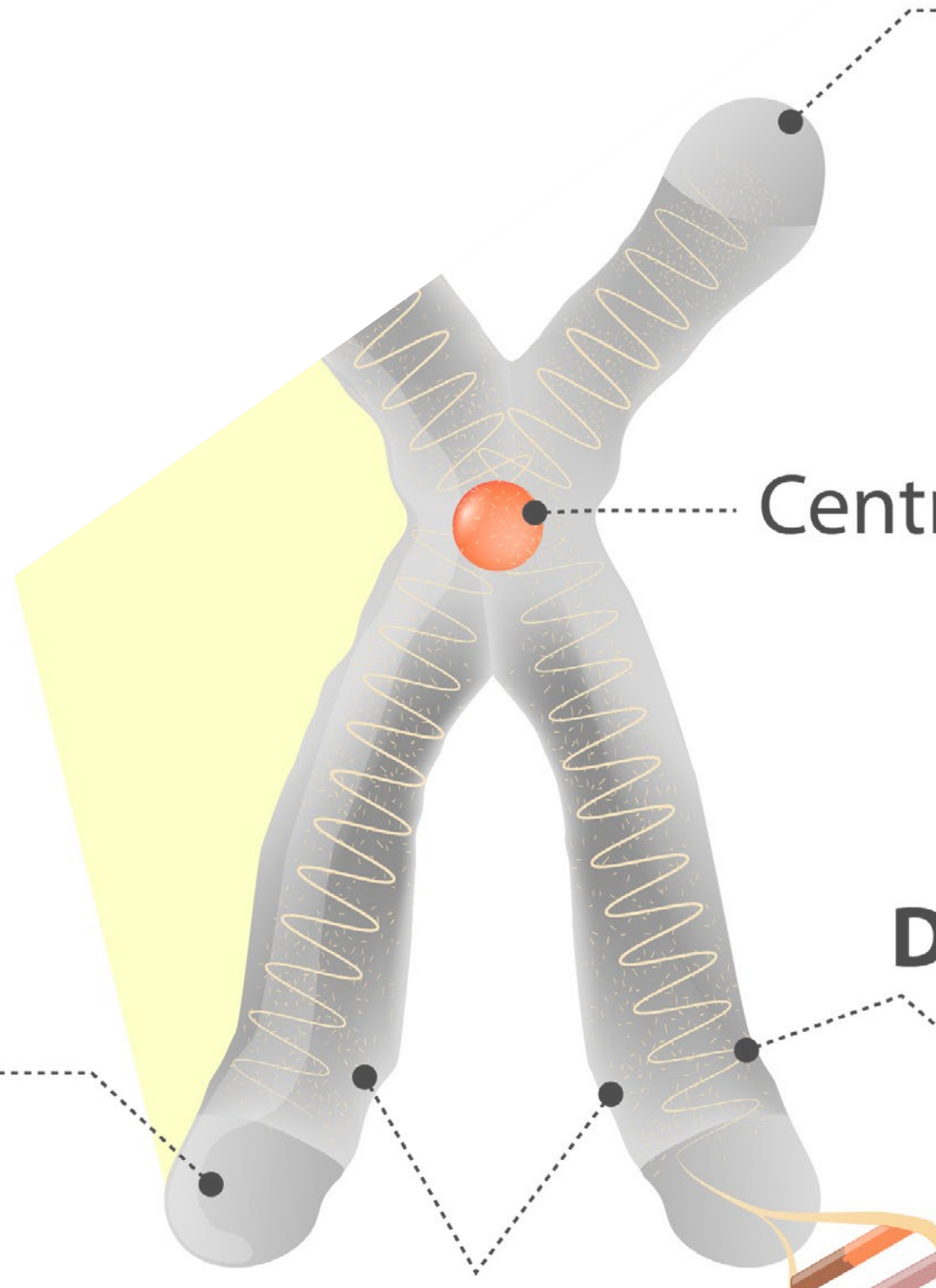
# Introduction

Incorporating the necessary knowledge to diagnose genetic pathologies offers the professional a highly interesting way of working. In the context of cardiovascular diseases, this diagnosis offers ways of working that go beyond treatment, incorporating prevention and family diagnosis. This training program has been configured to provide you with the answer to this need, with quality, currentness and flexibility.

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DNA

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*Acquire the knowledge required for advanced genetic interventions in the field of cardiovascular diseases"*

This Postgraduate Diploma offers a review of basic concepts in the subject. It addresses inheritance models and their applicability in daily clinical practice. It shows the variability of the human genome and its significance and impact at the clinical level. It offers a practical methodology in the gathering of information necessary for the construction of the genogram, exposing the symbology and graphic representation of such information, as well as practical exercises for the handling and mastery of this tool.

The use of genetic analysis for diagnostic purposes is being integrated into routine care exponentially in recent years, so it is important to provide students with knowledge to familiarize them with the technical approaches and ethical implications of these methods. All the techniques currently used for diagnosis in clinical genetics, their advantages and limitations will be described.

The great development of cardiogenetics in recent years has led to the redefinition of numerous heart diseases with the consequent change in therapeutic management. In modern medicine, a complete knowledge of the genetic and pathophysiological basis of these diseases is essential. This module combines the fundamental bases of molecular biology, genetics, cardiac imaging, electrophysiology and clinical cardiology for a comprehensive practical and applied view of inherited cardiovascular diseases.

This online Postgraduate Diploma offers you the benefits of a high-level scientific, educational and technological course. These are some of its most notable features:

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



*An intensive and comprehensive way of working that will allow you to acquire new professional skills in the field of genetic cardiology"*

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*A training program that masterfully combines intensity and flexibility, making its objectives easily and comfortably achievable for the professional"*

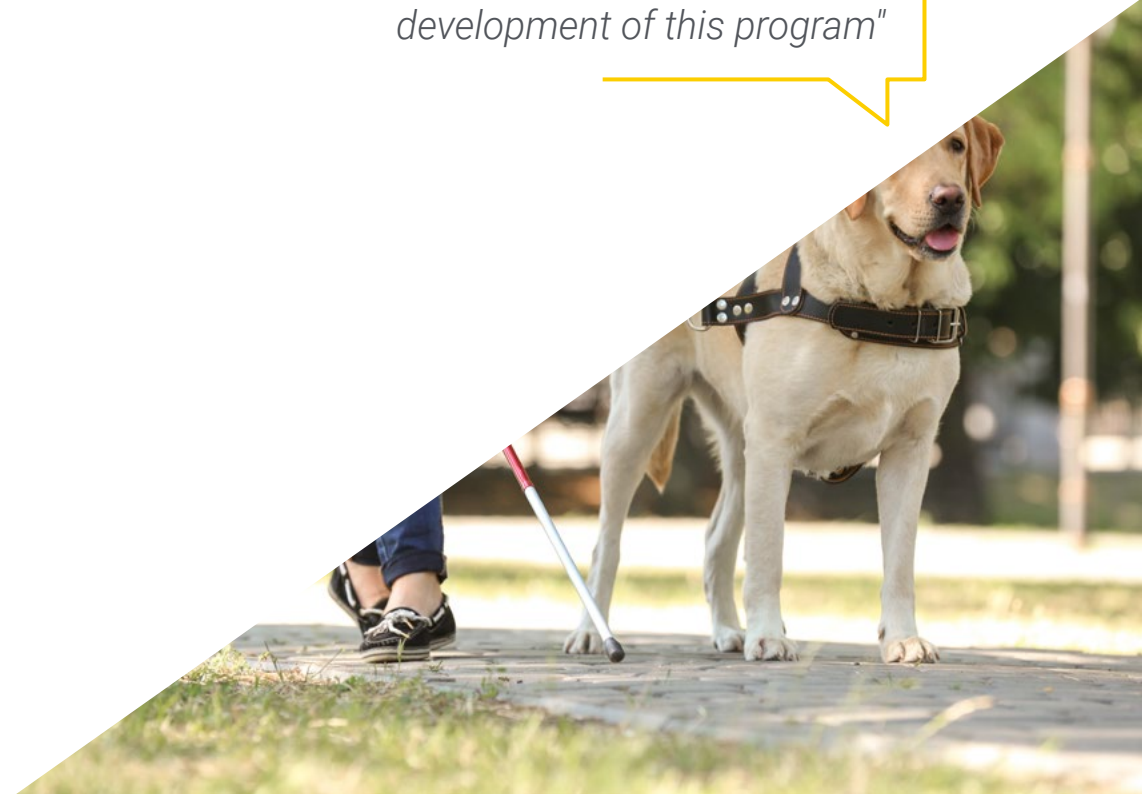
This program has been developed by professionals from different clinical genetics clinics in which they contribute their experience in daily practice, in the care of patients and families with a variety of hereditary disorders, both in genetic counseling and in prevention programs and prenatal and preconception counseling. The faculty involved in the Postgraduate Diploma also carries out important research work in the field of Genetics.

The Postgraduate Diploma addresses, in its different modules, the basic and necessary knowledge for the management of patients and their diseases in a clinical genetics practice. It offers a practical approach to the different techniques most commonly used for the diagnosis of hereditary diseases, as well as the interpretation of their results. It offers an approach to the diseases that cause the highest number of consultations in daily practice in a Clinical Genetics service.

The diploma contains theoretical text about the subject matter, and practical examples taken from clinical cases that will facilitate understanding and the acquisition of in-depth knowledge.

*Increase your decision-making confidence by updating your knowledge with this University Expert course.*

*You will be trained by professionals with extensive experience in the sector, who have contributed all their knowledge and experience in the development of this program"*



# 02 Objectives

Currently not all hospitals have genetics units and it is foreseeable that all healthcare centers will have genetics units in the coming years. Students in this program will deepen the knowledge required to work as clinical geneticists both in the field of diagnosis and counseling in these units or to be part of multidisciplinary groups of medical services, where patients with hereditary diseases are treated.





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*A comprehensive and fully up-to-date approach to the diseases that cause the greatest number of consultations in daily practice, in the field of a Clinical Genetics service"*



## General Objectives

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- Know the historical evolution of knowledge in the area of genetics.
- Learn the use of genetic analysis for diagnostic purposes.
- Learn about all known hereditary cancer syndromes.
- Learn about all known hereditary cancer syndromes.
- Recognize genetic diseases affecting the sensory organs and know how to manage them.
- Detail the molecular basis and mechanisms for the diagnosis of endocrine diseases.
- Know the genetic diseases affecting the central and peripheral nervous system.
- Learn about genetic nephrourological diseases, such as Fabry disease or Alport Syndrome.
- Addressing the different major pediatric diseases.
- Review hematological, metabolic and deposit, cerebral and small vessel diseases.





## Specific Objectives

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### Module 1: Introduction to Genetics

- ◆ Update on the history and evolution of knowledge in clinical genetics.
- ◆ Knowledge of fundamental concepts about the structure and organization of the human genome.
- ◆ Deepen in the different models of inheritance of hereditary diseases.
- ◆ Genetic counseling in clinical practice.
- ◆ Recurrence risk calculation.
- ◆ Prenatal, preimplantational and preconceptional genetic counseling.
- ◆ Ethical and legal aspects in Genetics/Genomics.
- ◆ Resolution of practical cases

### Module 2: Genetic Diagnostic Techniques

- ◆ Update on currently available techniques for cytogenetic and molecular diagnostics.
- ◆ Request optimization strategies and diagnostic interpretation in genetics.  
Resolution of practical cases

### Module 3: Cardiovascular Diseases.

- ◆ Acquire knowledge about the importance of familial heart disease in the context of cardiovascular disease.
- ◆ Deepen in the aspects of familial heart disease: basic genetics, relevant aspects on diagnosis and prognosis of the different hereditary cardiomyopathies: hypertrophic, dilated, noncompaction and arrhythmogenic.
- ◆ Deepen in relevant aspects of aortic syndromes.

03

# Course Management

For our course to be of the highest quality, we are proud to work with a teaching staff of the highest level, chosen for their proven track record. Professionals from different areas and fields of expertise that make up a complete, multidisciplinary team. A unique opportunity to learn from the best.





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*A course created and directed by experts in clinical genetics who will take you through the most up-to-date and complete knowledge and give you the real and contextual vision of this area of work"*

## Management



### Dr. S. Tahsin Swafiri Swafiri, M.D.

- ◆ Degree in Medicine and General Surgery (University of Extremadura - Badajoz).
- ◆ Specialist in Clinical Biochemistry and Molecular Pathology (Puerta de Hierro University Hospital, Majadahonda).
- ◆ Master's Degree in Rare Diseases (University of Valencia).
- ◆ Positions.
- ◆ Attending physician in Clinical Genetics at the University Hospitals of Infanta Elena, Rey Juan Carlos I, Fundación Jiménez Díaz and General de Villalba.
- ◆ Associate Professor of Genetics at the Francisco de Vitoria University School of Medicine (Pozuelo de Alarcón- Madrid).
- ◆ Health Research Institute - Jiménez Díaz Foundation University Hospital.

## Professors

### Dr. Lorda Sánchez, Isabel María

- ◆ Degree in Medicine and Surgery from the University of Zaragoza. 1988
- ◆ Doctor of Medicine from the University of Zurich. Year 1991.
- ◆ Validated in 1993
- ◆ Personal Professional Accreditation in Human Genetics (AEGH)
- ◆ Certifications
- ◆ Member of the Spanish Association of Human Genetics (AEGH).
- ◆ Member of the European Cytogenetics Association (ECA)

### Dr. Pinilla. PhD, MD, Elvira Rodríguez

- ◆ Attending Physician. Genetics Service. Jiménez Díaz Foundation University Hospital. Madrid. 2017-2020.
- ◆ Degree in Medicine and General Surgery from the Complutense University of Madrid (1972-1979).
- ◆ Doctor of Medicine and Surgery, Complutense University of Madrid (1992).
- ◆ Diploma: "Epidemiology in Action: a course for public health professional". U.S. Department of Health and Human Services. Public Health Service. Centers for Disease Control. Atlanta, Georgia (USA) (1988).
- ◆ Accredited in Human Genetics by the Spanish Association of Human Genetics. (2005).
- ◆ Puericulturist Medical Doctor. Diploma in Puericulture and Preventive Pediatrics. School of Puericulture of the Spanish Society of Puericulture: Course XXVII (87th Promotion). Course 2011- 2012.

**Dr. Kelly. PhD, MD, Fiona Blanco**

- ♦ Adjunct physician of the genetics service of the Jiménez Diaz Foundation University Hospital. Institute for Health Research-FJD.
- ♦ Adjunct Physician (Area Specialist) of the Genetics Service of the Jiménez Diaz Foundation University Hospital.
- ♦ Degree in Medicine and Surgery from the Faculty of Medicine of the Complutense University of Madrid (2004).
- ♦ Area Specialist in Clinical Biochemistry since 2009.
- ♦ Doctorate in Medicine in 2012
- ♦ Professional Master's Degree in Rare Diseases, University of Valencia, Valencia, Spain 2017.
- ♦ Postdoctoral Course: University Expert in Clinical Genetics of the University of Alcalá de Henares, Madrid, Spain 2009
- ♦ Honorary Research Associate at the Institute of Ophthalmology (IoO), University College London (UCL), London, UK (01/2016-31/12/2020).
- ♦ Secretary of the Training and Dissemination Commission of the Spanish Association of Human Genetics.

**Dr. Almoguera Castillo, Berta**

- ♦ D. in Genetics and Cell Biology. Juan Rodés Researcher (JR17/00020; ISCIII) at the Genetics Service of the Jiménez Díaz Foundation. Madrid.
- ♦ 2011: D. in Genetics and Cell Biology. Autonomous University of Madrid. Thesis Title: "Utility of pharmacogenetics to predict the efficacy and safety of risperidone in the treatment of schizophrenia." Directors: Dr. Carmen Ayuso and Dr. Rafael Dal-Ré
- ♦ 2009: Specialized Health Training (FSE) in Clinical Biochemistry. Puerta de Hierro University Hospital, Madrid.
- ♦ 2007: Diploma of Advanced Studies with the title "Molecular characterization of mitochondrial diseases with predominant phenotypic expression in cardiac muscle" directed by the Dr. Belén Bornstein Sánchez. Complutense University of Madrid
- ♦ 2018-Present: Juan Rodés Researcher (JR17/00020; ISCIII) at the Genetics Service of the Jiménez Díaz Foundation. Madrid.
- ♦ 2015 - 2018: Research Scientist at the Center for Applied Genomics, The Children's Hospital of Philadelphia (USA).

# 04

# Structure and Content

The contents of this program have been developed by the different experts of this course, with a clear purpose: to ensure that our students acquire each and every one of the skills they require to become true experts in this field.





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*A comprehensive and well-structured program that will take you to the highest standards of quality and success”*

## Module 1: Introduction to Genetics

- 1.1. Introduction.
- 1.2. Basic Structure of DNA.
  - 1.2.1. The Gene.
  - 1.2.2. Transcription and Translation.
  - 1.2.3. Regulation of Gene Expression.
- 1.3. Chromosomopathies.
- 1.4. Numerical Alterations.
- 1.5. Structural Alterations.
  - 1.5.1. Phases of Mendelian Genetics.
- 1.6. Autosomal Dominant Inheritance.
- 1.7. Recessive Autosomal Inheritance.
- 1.8. X-linked Inheritance.
  - 1.8.1. Mitochondrial Genetics.
  - 1.8.2. Epigenetics.
  - 1.8.3. Genomic Imprinting.
  - 1.8.4. Genetic Variability and Disease.
- 1.9. Genetic Counseling.
  - 1.9.1. Genetic Counseling Pretest.
  - 1.9.2. Genetic Counseling Posttest.
  - 1.9.3. Preconception Genetic Counseling.
  - 1.9.4. Prenatal Genetic Counseling.
  - 1.9.5. Preimplantation Genetic Counseling.
- 1.10. Ethical and Legal Aspects



**Module 2: Genetic Diagnostic Techniques**

- 2.1. Fluorescence In Situ Hybridization (FISH).
- 2.2. Quantitative Fluorescent Polymerase Chain Reaction (QF-PCR).
- 2.3. Comparative Genomic Hybridization (CGH Array).
- 2.4. Sanger Sequencing.
  - 2.4.1. Digital PCR.
- 2.5. Massive Next-Generation Sequencing (NGS).
- 2.6. Multiplex Ligation-Dependent Probe Amplification (MLPA).
- 2.7. Microsatellites and TP-PCR in DNA Repeat Expansion Diseases.
- 2.8. Fetal DNA Study in Maternal Blood.

**Module 3: Cardiovascular Diseases.**

- 3.1. Familial Hypertrophic Cardiomyopathy.
- 3.2. Arrhythmogenic Cardiomyopathy of the Right Ventricle.
- 3.3. Familial Dilated Cardiomyopathy.
- 3.4. Left Ventricular Non-Compaction Cardiomyopathy.
- 3.5. Aortic Aneurysms.
  - 3.5.1. Marfan Syndrome.
  - 3.5.2. Loeys-Dietz Syndrome.
- 3.6. Long QT Syndrome.
- 3.7. Brugada Syndrome.
- 3.8. Catecholaminergic Polymorphic Ventricular Tachycardia.
  - 3.8.1. Idiopathic Ventricular Fibrillation.
- 3.9. Short QT Syndrome.
- 3.10. Genetics of Congenital Malformations in Cardiology.

05

# Methodology

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

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



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

## At TECH we use the Case Method

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

*With TECH you can experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gervas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching potential or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in professional medical practice.

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

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

1. Students who follow this method not only grasp concepts, but also develop their mental capacity by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Re-Learning Methodology

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

Our University is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, which represent a real revolution with respect to simply studying and analyzing cases.

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





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

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

*Re-learning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (we learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

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



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



#### Study Material

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



#### Latest Techniques and Procedures on Video

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



#### Interactive Summaries

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

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



#### Additional Reading

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





#### Expert-Led Case Studies and Case Analysis

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



#### Testing & Re-testing

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



#### Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an expert strengthens knowledge and memory, and generates confidence in our future difficult decisions.



#### Quick Action Guides

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



# 06 Certificate

The **Postgraduate Diploma in Diagnostic Techniques and Cardiovascular Diseases in Clinical Genetics** guarantees you, in addition to the most accurate and up-to-date training, access to a Postgraduate Diploma issued by **TECH Technological University**.





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*Successfully complete this training and receive your university degree without travel or laborious paperwork”.*

After the student has passed the evaluations, they will receive their corresponding Postgraduate Diploma issued by **TECH Technological University**.

The certificate issued by **TECH Technological University** will specify the qualification obtained through the Postgraduate Diploma, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Diploma in Diagnostic Techniques and Cardiovascular Diseases in Clinical Genetics**

ECTS: **18**

Official Number of Hours: **450**



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

health future  
confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
online training  
development language  
virtual classroom



**Postgraduate Diploma**  
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