

# Postgraduate Diploma Nuclear Medicine in Pediatrics





## Postgraduate Diploma Nuclear Medicine in Pediatrics

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

Website: [www.techtitute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-nuclear-medicine-pediatrics](http://www.techtitute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-nuclear-medicine-pediatrics)

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# 01

# Introduction

Pediatrics is one of the most sensitive areas of healthcare, as the care of children is a major social concern. For this reason, new diagnostic methods are continually being explored to anticipate or respond to the different pathologies that can affect this population group. Nuclear Medicine is one of these areas and offers innovative techniques with which to take care of your health. This qualification allows doctors to specialize in this discipline applied to pediatrics, so that they can improve as professionals and achieve greater prestige thanks to the innovative techniques with which they will help children to overcome their illnesses.





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*Become a great expert in Nuclear  
Medicine applied to Pediatrics and  
watch your professional prestige  
increase immediately”*

There are groups of the population that are particularly vulnerable. Children are one of them and, for this reason, more and more avenues are being explored to provide them with adequate treatment and diagnosis. One of the new paths followed to achieve this objective is Nuclear Medicine, which offers the possibility of detecting numerous pathologies with great precision and providing the corresponding solution.

Thus, this area is one of the most demanded in medicine today, since it is an innovative discipline capable of responding to different conditions that can attack children. Thus, this Postgraduate Diploma in Nuclear Medicine in Pediatrics is the best way to provide patients with new treatments, achieving a significant professional advance thanks to what has been learned in this qualification.

Throughout this program, students will be able to delve into different aspects of this area applied to pediatric patients, such as gammagraphic studies and PET tracers, among many others. And they will achieve this thanks to TECH's innovative 100% online learning method, which focuses on practice and offers students the possibility to learn through the analysis of clinical cases.

This **Postgraduate Diploma in Nuclear Medicine in Pediatrics** contains the most complete and up-to-date educational program on the market. Its most notable features are:

- ♦ The development of case studies presented by experts in Nuclear Medicine and Pediatrics
- ♦ The graphic, schematic, and eminently 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 to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*Pediatrics requires specialized treatments and Nuclear Medicine can offer numerous solutions. Enroll and advance professionally thanks to this qualification”*

“

*The way to remain a relevant professional is to update your knowledge. With this Postgraduate Diploma you will achieve it"*

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 training programmed to train 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. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Nuclear Medicine is the Present and the Future. Specialize and advance professionally.*

*Apply Nuclear Medicine to pediatrics and improve your patient's treatments.*



# 02 Objectives

The main objective of this Postgraduate Diploma in Nuclear Medicine in Pediatrics is to enable students to obtain the professional advancement they are looking for, either by obtaining new specialized knowledge in this field or by updating their competencies and skills in this area. To this end, this qualification offers them a first level learning process with which they will achieve excellence in the field of Nuclear Medicine applied to Pediatrics.





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*Achieve all your professional and personal goals thanks to this Postgraduate Diploma"*



## General objectives

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- ♦ Update the specialist in Nuclear Medicine
- ♦ Perform and interpret functional tests in an integrated and sequential manner
- ♦ Achieve diagnostic guidance for patients
- ♦ Assist in deciding the best therapeutic strategy, including radiometabolic therapy, for each patient
- ♦ Apply clinical and biochemical criteria for the diagnosis of infections and inflammations
- ♦ Understand the particularities of Nuclear Medicine applied to pediatric patients
- ♦ Learn about the new therapies of Nuclear Medicine

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*Enroll and immediately see how you can make significant career advancements”*





## Specific objectives

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### Module 1. Nuclear Medicine in Pediatrics

- ♦ Delve into the specific characteristics of Nuclear Medicine studies in Pediatrics
- ♦ Cover aspects of test indication, acquisition protocols with appropriate choice of radiopharmaceutical and instrumentation characteristics
- ♦ Optimization of dosimetric parameters
- ♦ Interpret images and know the different pathologies by organs and systems and differential diagnosis
- ♦ Understand the best diagnostic strategy with proper sequencing of tests while minimizing radiation
- ♦ Avoid tests that do not provide information for the management of the child

### Module 2. Infection/Inflammation

- ♦ Delve into the application of molecular and morphofunctional imaging techniques in the field of Nuclear Medicine in the diagnosis, assessment of the extent and response to treatment of infectious/inflammatory pathology in the different organs and systems
- ♦ Delve into the techniques applied in the specific clinical context
- ♦ Accurate diagnosis with the least consumption of resources and radiation for the patient

### Module 3. Nuclear Medicine

- ♦ Delve into the knowledge of the basics of Nuclear Medicine in its fundamental elements, such as radioactivity and the type of disintegrations, image detection and generation, radiopharmaceuticals and radioprotection

# 03

# Course Management

This Postgraduate Diploma has a high level teaching staff that will be able to offer students the most innovative knowledge in the areas of Nuclear Medicine and Pediatrics. Thus, at the end of this qualification, students will have become true specialists, being able to apply everything they have learned in their professional environments, thus improving the monitoring and treatment of their patients, which will lead them to increase their prestige as physicians.





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*The best faculty teaches you what you need to be a great specialist in Nuclear Medicine applied to Pediatrics”*

## Management



### Dr. Mitjavila, Mercedes

- Head of Nuclear Medicine Service Puerta de Hierro University Hospital Majadahonda, Madrid
- Project Manager of the Nuclear Medicine Unit in the Diagnostic Imaging Department of the Alcorcón Foundation University Hospital
- Head of Service of Nuclear Medicine of the Puerta de Hierro Hospital Majadahonda. Competitive examination BOCM
- Degree in Medicine and General Surgery from the University of Alcalá de Henares
- MIR in Nuclear Medicine Specialist by the MIR System
- PhD in Medicine and General Surgery from the University of Alcalá de Henares
- Interim Physician of the Nuclear Medicine Service of the Ramón y Cajal Hospital
- Interim Physician in the Nuclear Medicine Unit at Getafe University Hospital



## Professors

### **Dr. García Cañamaque, Lina**

- ♦ Head of Service, Sanchinarro Hospital
- ♦ Start-up of three Nuclear Medicine services (Nuestra Señora de América Hospital, Sanchinarro Hospital and Puerta del Sur Hospital)
- ♦ Specialist in Nuclear Medicine
- ♦ Official Doctoral Program in Biomedicine and Pharmacy San Pablo CEU University
- ♦ Supervisor of 2nd category radioactive facilities Nuclear Safety Council

### **Dr. Martí Climent, Josep M.**

- ♦ Director of the Clinic's Radiophysics and Radiological Protection Service
- ♦ Navarra University
- ♦ Deputy Director of the Nuclear Medicine Service of the University Clinic of Navarra
- ♦ Graduate in Sciences (Autonomous University of Barcelona)
- ♦ D. in Sciences (Autonomous University of Barcelona)
- ♦ Specialist in Hospital Radiophysics (Ministry of Education and Science)

### **Dr. Rodríguez Alfonso, Begoña**

- ♦ Elective Puerta de Hierro University Hospital
- ♦ Elective La Paz University Hospital
- ♦ Elective Ciudad Real General Hospital
- ♦ Degree in Medicine and Surgery from the Complutense University of Madrid
- ♦ Official Doctoral Program in Medicine and Surgery Autonomous University of Madrid

# 04

## Structure and Content

This Postgraduate Diploma in Nuclear Medicine in Pediatrics is composed of 3 modules, through which students will learn all about the application of Nuclear Medicine in pediatric patients. These are very sensitive subjects but they can improve the lives of many people, so it is an area that can bring great prestige to the professional. Therefore, completing this qualification can be a huge boost to your reputation.







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*This syllabus has been specially designed for you to become the leading expert in Nuclear Medicine applied to Pediatrics"*

## Module 1. Nuclear Medicine in Pediatrics

- 1.1. Pediatric Nuclear Medicine
  - 1.1.1. Management of the Child in Nuclear Medicine: Information to Parents and/or Guardians, Preparation and Scheduling, Appropriate Environments
  - 1.1.2. Dose Optimization
  - 1.1.3. Sedation and Anaesthesia
  - 1.1.4. Physical Aspects in Pediatric Patients: Image Acquisition and Processing
- 1.2. PET/PET-CT/PET-MRI in Pediatric and Young Adult Patients
  - 1.2.1. Protocol Optimization
  - 1.2.2. Indications
  - 1.2.3. Non-FDG Tracers
- 1.3. Central Nervous System/LCR
  - 1.3.1. Brain Maturation Patterns
  - 1.3.2. Epilepsy and Vascular Disorders
  - 1.3.3. Brain Tumors
  - 1.3.4. Hydrocephalus and Cerebrospinal Fluid Fistula
- 1.4. Endocrine
  - 1.4.1. Thyroid Pathology: Hypothyroidism, Hyperthyroidism, Thyroid Nodule
  - 1.4.2. Hyperinsulinism
- 1.5. Cardiopulmonary
  - 1.5.1. Congenital Heart Disease: Shunt Right-Left, Shunt Left-Right
  - 1.5.2. Bronchopulmonary Pathology: Congenital and Acquired
- 1.6. Gastrointestinal System
  - 1.6.1. Dynamic Esophagogastric Studies
  - 1.6.2. Gastroesophageal Reflux, Bronchopulmonary Aspiration
  - 1.6.3. Hepatobiliary Gammagraphy: Biliary Tract Atresia
  - 1.6.4. Intestinal Bleeding: Mekel's Diverticulum, Intestinal Duplication
- 1.7. Nephrourology
  - 1.7.1. Hydronephrosis Assessment
  - 1.7.2. Renal Cortical Assessment: in Infections, Ectopy
  - 1.7.3. Vesicoureteral Reflux: Diagnosis and Monitoring
  - 1.7.4. Others: Renal Malformations, Renal Transplantation, Kidney Transplantation

- 1.8. Osteoarticular System
  - 1.8.1. Benign Lesions in Pediatric Patients: Fractures, Tumors
  - 1.8.2. Avascular Necrosis: Perthes' Disease and Others
  - 1.8.3. Sympathetic - Reflex Dystrophy
  - 1.8.4. Low Back Pain
  - 1.8.5. Infection: Osteomyelitis, Spondylodiscitis
- 1.9. Neuroblastoma
  - 1.9.1. Diagnostic Studies: Bone Scintigraphy, MIBG and other PET Radiotracers
  - 1.9.2. Radiometabolic Treatment: MIBG, <sup>177</sup>Lu-DOTATATE
- 1.10. Other Tumours
  - 1.10.1. Osteosarcoma: Diagnosis, Response Assessment and Monitoring
  - 1.10.2. Bone Tracers and <sup>18</sup>F-FDG-PET/CT PET/CT Study
  - 1.10.3. Ewing's Disease: Diagnosis, Response Assessment and Monitoring
  - 1.10.4. Bone Tracers and <sup>18</sup>F-FDG-PET/CT Study
  - 1.10.5. Lymphoma: <sup>18</sup>F-FDG PET/CT in Diagnosis, Response Assessment, Monitoring
  - 1.10.6. Rhabdomyosarcoma and Soft Tissue Sarcomas: <sup>18</sup>F-FDG PET/CT in Diagnosis, Response Assessment and Monitoring

## Module 2. Infection/Inflammation: Gammagraphic Studies and PET Tracers

- 2.1. Osteoarticular
  - 2.1.1. Osteomyelitis: Previously Healthy Bone, Diabetic Patient, Spine Surgery
  - 2.1.2. Prosthesis: Septic vs. Aseptic Mobilization
- 2.2. Cardiac
  - 2.2.1. Endocarditis: Native Valve, Prosthetic Valve
  - 2.2.2. Myocarditis: Infectious vs. Inflammatory
  - 2.2.3. Intracardiac Devices
- 2.3. Vascular
  - 2.3.1. Inflammatory Vasculitis
  - 2.3.2. Prosthetic Graft Infection
- 2.4. Encephalitis: PET-FDG Study
  - 2.4.1. Paraneoplastic
  - 2.4.2. Infectious: Patterns and Differential Diagnosis

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- 2.5. Fever of Unknown Origin
    - 2.5.1. Immunosuppressed Patients
    - 2.5.2. Postoperative Fever and Recurrent Sepsis
  - 2.6. Systemic Disease
    - 2.6.1. Sarcoidosis: Diagnosis, Extent and Response to Treatment
    - 2.6.2. Ig4-related Disease
  - 2.7. Other Locations
    - 2.7.1. Hepatorenal Polycystic Kidney Disease: Localization of the Infectious Focus
    - 2.7.2. Hepatobiliary: Post-surgical Patient
  - 2.8. Covid-19
    - 2.8.1. Nuclear Medicine Studies in Acute Phase: Pulmonary Inflammation, Pulmonary Thromboembolism, Oncology Patient and Covid-19
    - 2.8.2. Utility of Nuclear Medicine in Postcovid Pathology: Pulmonary, Systemic
    - 2.8.3. Organizational Changes in a Pandemic Situation

### Module 3. The Nuclear Medicine

- 3.1. Physical Bases of Ionizing Radiations
  - 3.1.1. Ionizing Radiation and Radioactive Isotopes
  - 3.1.2. Types of Radiation
- 3.2. Biological Effects of Ionizing Radiations
  - 3.2.1. Classification of Effects according to: Time of Occurrence
  - 3.2.2. Biological and Dose Dependent Effect
  - 3.2.3. Interaction of Ionizing Radiation with Matter
  - 3.2.4. Ionizing Radiation-Cell Interaction: Characteristics, Direct and Non-Direct Effects
  - 3.2.5. Radiosensitivity
  - 3.2.6. Adaptive Response
- 3.3. Radiopharmaceuticals
  - 3.3.1. The Radiopharmaceutical
  - 3.3.2. Conventional Diagnostic Radiopharmaceuticals
  - 3.3.3. Radionuclide Generators
  - 3.3.4. Localization Mechanisms

- 3.3.5. Positron Emission Tomography Radiopharmaceuticals
- 3.3.6. Synthesis Scheme
- 3.3.7. Metabolic Pathway Substrates
- 3.3.8. Radiopharmaceuticals with Therapeutic Effect
  - 3.3.8.1. Characteristics that Must be Met
  - 3.3.8.2. Design and Approval
- 3.4. Radiopharmacy
  - 3.4.1. Regulatory Framework
  - 3.4.2. Operation
  - 3.4.3. Quality Control
- 3.5. Image Acquisition and Processing
  - 3.5.1. Planar Image
  - 3.5.2. Components
  - 3.5.3. Performance: Resolution and Sensitivity
  - 3.5.4. Acquisition Modes: Static, Dynamic, Synchronized
  - 3.5.5. Reconstruction
  - 3.5.6. Single Photon Tomography (SPECT)
    - 3.5.7. Acquisition
    - 3.5.8. Reconstruction
  - 3.5.9. Positron Emission Tomography (PET)
    - 3.5.10. Components
    - 3.5.11. Acquisition of Data
    - 3.5.12. Operating Parameters
- 3.6. Quantification Techniques: Basis
  - 3.6.1. In Cardiology
  - 3.6.2. In Neurology
  - 3.6.3. Metabolic Parameters
  - 3.6.4. The Image of TC





- 3.7. Image Generation
  - 3.7.1. Acquisition and Reconstruction Parameters
  - 3.7.2. Protocols and Contrast Media
  - 3.7.3. Head and Neck
  - 3.7.4. Thorax: Cardiology, Lung
  - 3.7.5. Abdomen: General, Liver, Renal
- 3.8. The Image of RM
  - 3.8.1. Resonance Phenomenon
  - 3.8.2. Tissue Contrast: Sequence Knowledge
  - 3.8.3. Diffusion
  - 3.8.4. Paramagnetic Contrasts
- 3.9. The Multimodality Image
  - 3.9.1. SPECT/TC
  - 3.9.2. PET/TC
  - 3.9.3. PET/RM
- 3.10. Radioprotection
  - 3.10.1. The Radioprotection
  - 3.10.2. Special Situations: Pediatrics, Pregnancy and Lactation
  - 3.10.3. Regulatory Framework: Implementation
  - 3.10.4. Dosimetry

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*You will be one of the most respected physicians in the service when you complete this qualification"*

# 05 Methodology

This training program provides you with 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.



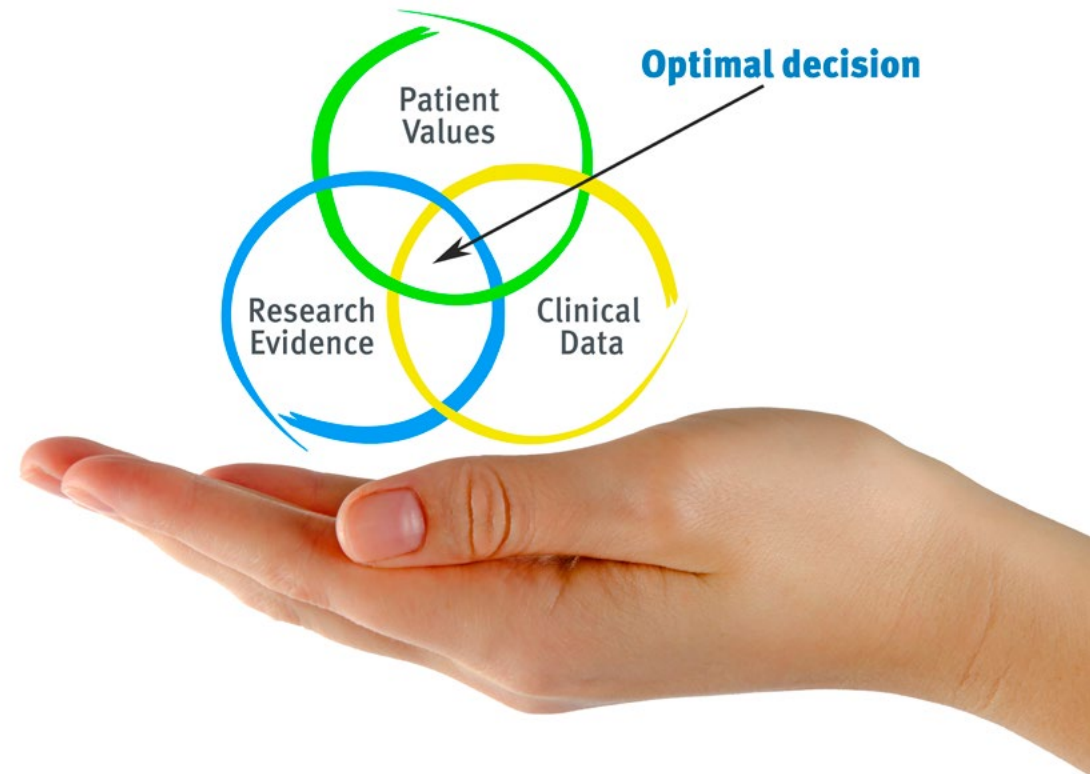
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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## 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.



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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 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.

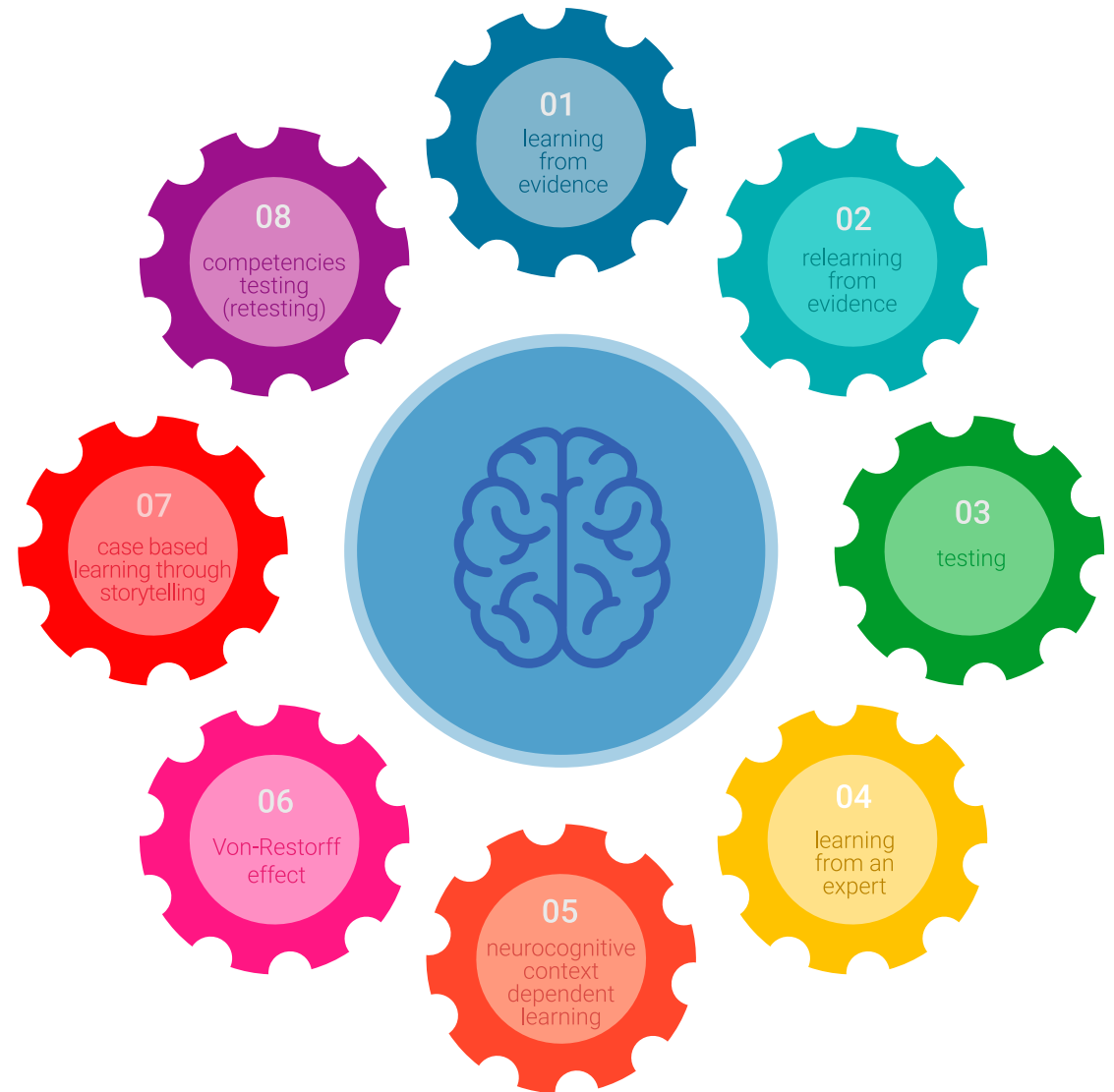


## Relearning Methodology

At TECH we enhance the Harvard 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.

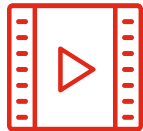
*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

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.

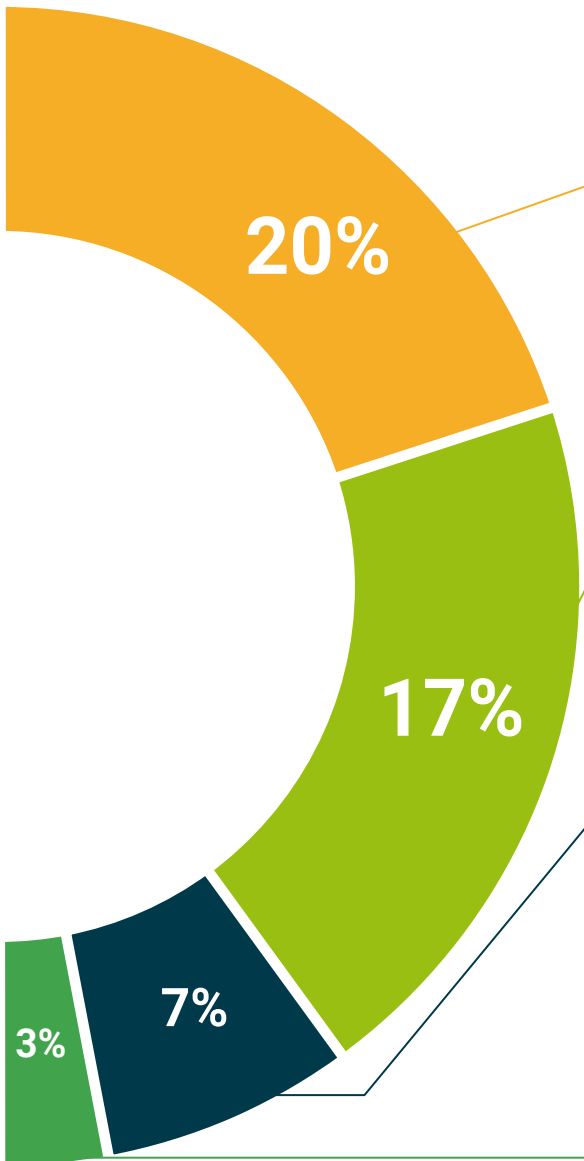
This exclusive multimedia content presentation training Exclusive system was awarded by Microsoft as a "European Success Story".



#### 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 your goals.



#### Classes

There is scientific evidence on the usefulness of learning by observing experts: The system termed Learning from an Expert strengthens knowledge and recall capacity, and generates confidence in the face of difficult decisions in the future.



#### 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.



# 06 Certificate

The Postgraduate Diploma in Nuclear Medicine in in Pediatrics guarantees, iguarantees you, in addition to the most rigorous and updated 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”*

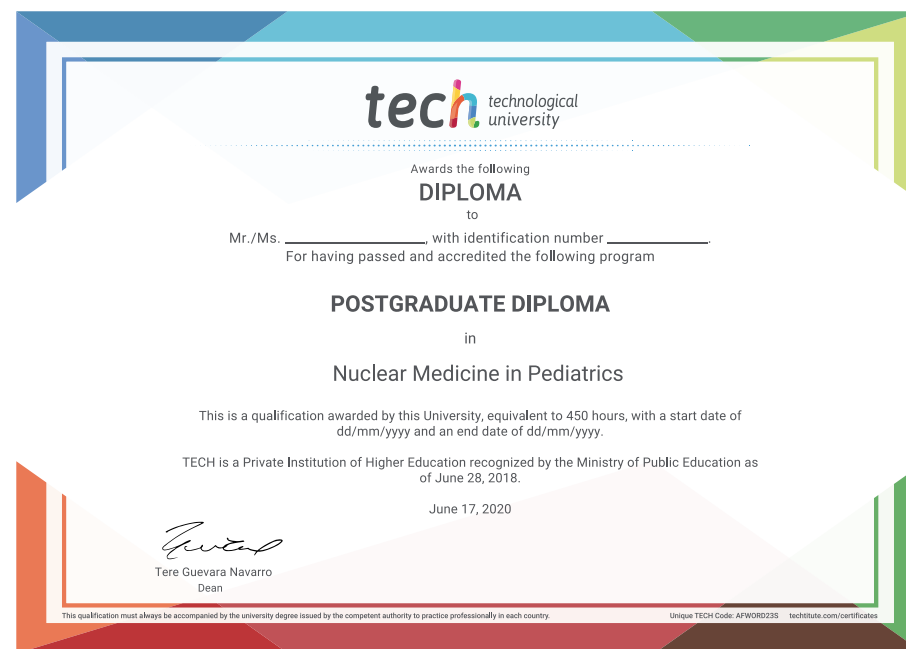
This **Postgraduate Diploma in Nuclear Medicine in Pediatrics** contains the most complete and updated scientific program on the market.

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

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

Title: **Postgraduate Diploma in Nuclear Medicine in Pediatrics**

Official N° of hours: **450 h.**



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



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

**tech** technological  
university

**Postgraduate Diploma**  
Nuclear Medicine  
in Pediatrics

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

# Postgraduate Diploma

## Nuclear Medicine in Pediatrics