

Postgraduate Certificate

Radiophysics in Nuclear Medicine



Postgraduate Certificate Radiophysics in Nuclear Medicine

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

Website: www.techtute.com/us/medicine/postgraduate-certificate/radiophysics-nuclear-medicine

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01

Introduction

Every year many new treatments and diagnoses emerge thanks to the rise of Nuclear Medicine. It is not surprising that this discipline has become one of the most demanded specializations in the health sector, since it allows early diagnosis of pathologies such as bone disorders and even kidney problems. In this sense, physicians need to remain up to date in order to be able to provide optimum care to their patients. Likewise, this is only possible if they obtain exhaustive knowledge and acquire the necessary skills for its correct implementation. Faced with this reality, TECH has developed the most complete academic program and offers specialists a unique opportunity to become radio tracers. And all this by means of the exclusive *Relearning* methodology.



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Thanks to TECH, you will perfect your knowledge about the treatment of pathologies such as Thyroid Cancer through radioactive radionuclides"

Using revolutionary 3D technology, physicians obtain more detailed representations of the distribution of radiopharmaceuticals in the body. This is especially helpful in the detection and diagnosis of disease, as well as in the assessment of the function of specific organs. Moreover, 3D acquisition can be combined with CT to produce hybrid images that also show the patient's anatomy. In this way, specialists improve the accuracy of their approaches by providing more detailed anatomical and functional information in a single illustration.

In this context, TECH has implemented a pioneering university program that will delve into the latest technologies in patient dosimetry. The curriculum, designed by an experienced teaching group, will delve into the instrumentation that makes up a Nuclear Medicine service. In this sense, the agenda will develop in detail the operation of gamma cameras and positron emission tomography. At the same time, it will focus on components of both tomographs, such as their physical mechanisms and image reconstruction. The didactic materials will also pay special attention to the quality controls that must be ensured for the safety of both patients and medical staff.

Moreover, the academic itinerary will be taught using the *Relearning* system, consisting of the repetition of key contents. This ensures a natural and progressive updating throughout the entire syllabus. Along these lines, all doctors will need to expand their knowledge is a device with Internet access. In this way, they will access the Virtual Campus to enrich themselves with the most updated and complete didactic materials available on the academic market. In addition, you will be able to download the modules to view them whenever you wish, from anywhere in the world.

This **Postgraduate Certificate in Radiophysics in Nuclear Medicine** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ The development of case studies presented by experts in Radiophysics
- ♦ 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 self-assessment process can be carried out to improve learning
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



You'll tackle random event correction within Nuclear Medicine with TECH, the world's top digital university according to Forbes"

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You will master MIRD Formalism to accurately estimate radiation doses in radiopharmaceutical therapy procedures"

The program's teaching staff includes professionals from the sector who bring to this program the experience of their work, in addition to recognized specialists from prestigious reference societies and 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. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

Do you want to perform a correct activimeter calibration? Achieve identical model responses with this state-of-the-art program.

You will reinforce your key knowledge through the innovative Relearning methodology for an effective assimilation of the subject.



02 Objectives

This university program will enable students to enter the Nuclear Medicine departments of the most prestigious institutions. Upon completion of this training, graduates will obtain a comprehensive approach that will allow them to develop knowledge related to gamma cameras and positron emission tomography. In this way, experts will have at their disposal the most advanced tools to support advanced dosimetry concepts in patients.



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Prepare yourself about the main advances in Nuclear Medicine with this Postgraduate Certificate and incorporate its most disruptive methods with this very complete program"



General Objectives

- ♦ Analyze the basic interactions of ionizing radiation with tissues
- ♦ Establish the effects and risks of ionizing radiation at the cellular level
- ♦ Analyze elements of photon and electron beam measurement in external radiotherapy
- ♦ Examine the quality control program
- ♦ Identify the different treatment planning techniques for external radiotherapy treatment planning techniques
- ♦ Analyze the interactions of protons with matter
- ♦ Examine radiation protection and radiobiology in Proton Therapy
- ♦ Analyze the technology and equipment used in intraoperative radiation therapy
- ♦ Examine the clinical outcomes of brachytherapy in different oncological contexts
- ♦ Analyze the importance of the Radiological Protection
- ♦ Assimilate the existing risks derived from the use of ionizing radiation
- ♦ Develop the international regulations applicable to radiation protection





Specific Objectives

- Distinguish between modes of image acquisition from a patient with radiopharmaceuticals
- Develop expertise on MIRDo methodology in patient dosimetry

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You will be able to access the Virtual Campus at any time and download the contents to consult them whenever you wish”

03

Course Management

This program is formed by a group of experts in the field of disorders related to body image distortion. These professionals have an extensive work background, being part of prestigious health entities.

In their commitment to improve the quality of life, they pour into this training their years of experience and skills so that students can perfect their diagnostic skills.



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The diversity of talents and skills of the teaching staff will generate a dynamic and unique learning environment. Get up to date with the best!"

Management



Dr. De Luis Pérez, Francisco Javier

- ♦ Specialist in Hospital Radiophysics
- ♦ Head of the Radiophysics and Radiological Protection Service at Quirónsalud Hospitals in Alicante, Torrevieja and Murcia
- ♦ Research Group in Personalized Multidisciplinary Oncology, Universidad Católica San Antonio de Murcia
- ♦ PhD in Applied Physics and Renewable Energies, University of Almeria
- ♦ Degree in Physical Sciences, specializing in Theoretical Physics, University of Granada
- ♦ Member of: Spanish Society of Medical Physics (SEFM), Royal Spanish Society of Physics (RSEF), Illustrious Official College of Physicists and Consulting and Contact Committee, Proton Therapy, Center (Quirónsalud)

Professors

Dr. Rodríguez, Carlos Andrés

- ♦ Specialist in Hospital Radiophysics
- ♦ Physician in Hospital Radiophysics at the University Clinical Hospital of Valladolid, head of the Nuclear Medicine section
- ♦ Principal Tutor of residents of the Department of Radiophysics and Radiological Protection of the Hospital Clínico Universitario de Valladolid
- ♦ Degree in Hospital Radiophysics
- ♦ Degree in Physics at the University of Salamanca



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

04

Structure and Content

This Postgraduate Certificate will delve into radionuclides and their application as radiopharmaceuticals in the specialty of Nuclear Medicine. With the support of an experienced teaching staff, the syllabus will cover the use of instruments such as intraoperative probes and gamma cameras. In addition, the training will address in detail the quality controls carried out by radiophysicists to ensure safety in the various therapies. Moreover, the training materials will analyze patient dosimetry based on the MIRD formalism. Therefore, students will develop specialized knowledge in the estimation of absorbed doses in users.





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A Postgraduate Certificate designed based on the latest trends in Radiophysics in Nuclear Medicine to guarantee the most advanced care skills”

Module 1. Nuclear Medicine

- 1.1. Radionuclides used in Nuclear Medicine
 - 1.1.1. Radionuclides
 - 1.1.2. Typical Diagnostic Radionuclides
 - 1.1.3. Typical Therapy Radionuclides
- 1.2. Typical Radionuclides in Therapy
 - 1.2.1. Obtaining Artificial Radionuclides
 - 1.2.2. Cyclotron
 - 1.2.3. Generators
- 1.3. Instrumentation in Nuclear Medicine
 - 1.3.1. Activimeters. Calibration of Activimeters
 - 1.3.2. Intraoperative Probes
 - 1.3.3. Gamma Camera and SPECT
 - 1.3.4. PET:
- 1.4. Quality Assurance Program in Nuclear Medicine
 - 1.4.1. Quality Assurance in Nuclear Medicine
 - 1.4.2. Acceptance, Reference and Constancy Tests
 - 1.4.3. Good Practice Routine
- 1.5. Nuclear Medicine Equipment: Gamma Cameras
 - 1.5.1. Image Formation
 - 1.5.2. Image Acquisition Modes
 - 1.5.3. Standard Patient Protocol
- 1.6. Nuclear Medicine Equipment: SPECT
 - 1.6.1. Tomographic Reconstruction
 - 1.6.2. Synogram
 - 1.6.3. Reconstruction Corrections
- 1.7. Nuclear Medicine Equipment: PET:
 - 1.7.1. Physical Basis
 - 1.7.2. Detector Material
 - 1.7.3. 2D and 3D Acquisition. Sensitivity
 - 1.7.4. Time of Flight





- 1.8. Image Reconstruction Corrections in Nuclear Medicine
 - 1.8.1. Attenuation Correction
 - 1.8.2. Dead Time Correction
 - 1.8.3. Random Event Correction
 - 1.8.4. Scattered Photon Correction
 - 1.8.5. Standardization
 - 1.8.6. Image Reconstruction
- 1.9. Quality Control of Nuclear Medicine Equipment
 - 1.9.1. International Guidelines and Protocols
 - 1.9.2. Planar Gamma Cameras
 - 1.9.3. Tomographic Gamma Cameras
 - 1.9.4. PET:
- 1.10. Dosimetry in Nuclear Medicine Patients
 - 1.10.1. MIRD Formalism
 - 1.10.2. Uncertainty Estimation
 - 1.10.3. Erroneous Administration of Radiopharmaceuticals



No rigid schedules or evaluation timelines. That's what this TECH university program is all about!"

05

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.





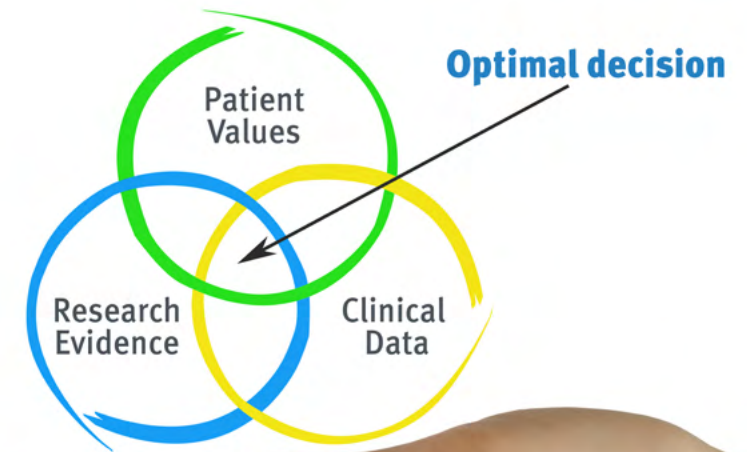
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Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

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. 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 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 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.



06 Certificate

The Postgraduate Certificate in Radiophysics in Nuclear Medicine guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.



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

This **Postgraduate Certificate in Radiophysics in Nuclear Medicine** contains the most complete and up-to-date scientific on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

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

Title: **Postgraduate Certificate in Radiophysics in Nuclear Medicine**

Official N° of Hours: **150 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.



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