

# Postgraduate Certificate

## Radiophysics in Diagnostic Imaging



## Postgraduate Certificate Radiophysics in Diagnostic Imaging

- » 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-diagnostic-imaging](http://www.techtute.com/us/medicine/postgraduate-certificate/radiophysics-diagnostic-imaging)

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# 01

# Introduction

The rise of new technologies in the medical field has made it possible to explore hitherto unknown horizons. For example, fluoroscopy equipment such as computed tomography allows physicians to obtain images of the entire body to detect tumors or evaluate traumatic injuries. In this way, they can obtain valuable and precise information to design customized radiation therapy treatments to minimize exposure of surrounding healthy tissues. However, the rapid advancement of procedures requires clinicians to update their knowledge frequently and apply new technological tools to their professional practice. In this sense, TECH implements a pioneering and 100% online program that covers the keys to the production of images that contribute to the early formulation of diagnoses against tumors.





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*Get up to date on the most advanced radiodiagnostic methods for the visualization of the movement of internal organs such as the heart or the gastrointestinal tract"*

Faced with the increasing rate of patients with heart disease, more and more healthcare institutions are looking to incorporate into their teams experts who are proficient in the implementation of devices such as fluoroscopy equipment. The main reasons for this is that this technique captures moving images to check the functioning of organs and tissues in real time. At the same time, this tool is useful during surgery to assess the alignment of bone fractures and to perform tissue correction procedures. In order to take advantage of these scientific and healthcare opportunities, specialists must stay on the cutting edge of technology if they are to differentiate their clinical practice from the rest.

In this context, TECH has developed a Postgraduate Certificate that will allow professionals to handle the most advanced techniques in Diagnostic Imaging. Designed by a teaching staff of excellence, the study plan will delve into the most advanced digital image recording systems. The syllabus will delve in depth into general quality control checks, thus ensuring the well-being of patients at all times. In addition, the program will address user dose estimation in X-ray facilities. Similarly, the didactic materials will analyze dosimetric procedures that allow to know the doses given to patients.

On the other hand, the program is based on the revolutionary *Relearning* method, of which TECH is a pioneer. This learning system consists of the repetition of the most relevant contents, so that they remain engraved in the students' memory in a progressive and natural way. The program will also offer various clinical case studies, which will allow students to get closer to the reality of medical care. Along the same lines, students will have access at all times to a digital library full of audiovisual materials (explanatory videos, interactive summaries or infographics).

This Postgraduate Certificate in Radiophysics in Diagnostic Imaging 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 will master the main mammography equipment and you will promote early detection of breast cancer after studying this Postgraduate Certificate"*

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*You will delve into the mechanisms of quality control mechanisms in radiodiagnosis and your clinical practices will stand out for their safety through this program”*

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

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

This program's design focuses on Problem-Based Learning, through which the professional must try to solve the different professional practice situations that arise during the academic program. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will learn the correct generation of the X-rays needed to produce detailed and accurate images and you will achieve a practice of excellence.*

*You will have access to Relearning, a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.*



# 02 Objectives

This university program will allow students to obtain specialized knowledge about the physical elements for obtaining X-ray beams. Likewise, graduates will master the most advanced equipment to obtain optimal images for diagnosis. Along the same lines, students will identify the different types of radiological images (static and dynamic) in order to apply the most appropriate technologies in patient dosimetry.







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*You will implement the most innovative technology and ensure the proper functioning of equipment in radiodiagnostics”*



## General Objectives

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- ♦ 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

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- Develop specialized knowledge about the operation of an X-ray tube and a digital image detector
- Identify the different types of radiological images (static and dynamic), as well as the advantages and disadvantages offered by the various technologies currently available
- Analyze the international protocols for quality control of radiology equipment
- Delve into the fundamental aspects in the dosimetry of patients undergoing radiological tests

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*Do not miss the opportunity to expand your skills and handle the most disruptive radiological tests of the moment thanks to TECH”*

# 03

## Course Management

In its commitment to offer the highest quality of education, TECH has selected a high-level teaching staff. Each of these professionals has an extensive professional background, which has allowed them to be part of prestigious health institutions. In this sense, they have achieved positive results in the field of Diagnostic Imaging Radiophysics, contributing to patients receiving high quality diagnostic care. In this way, students will have the guarantees they require to specialize in a sector that offers multiple job opportunities.





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*An syllabus prepared by specialists and top-level teaching materials are the keys to a successful professional career"*

## Management



### Dr. De 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
- ♦ Ph.D. 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



# 04

## Structure and Content

This Postgraduate Certificate from TECH will analyze the physics underlying conventional radiology, addressing the generation of X-rays for the processing of images that have diagnostic validity. In this sense, the syllabus will delve into general radiology equipment (including fluoroscopy or computed tomography) that enable the use of detailed doses during therapeutic treatments. Finally, it will delve into quality assurance protocols to prevent the population from being exposed to radiation of medical origin.



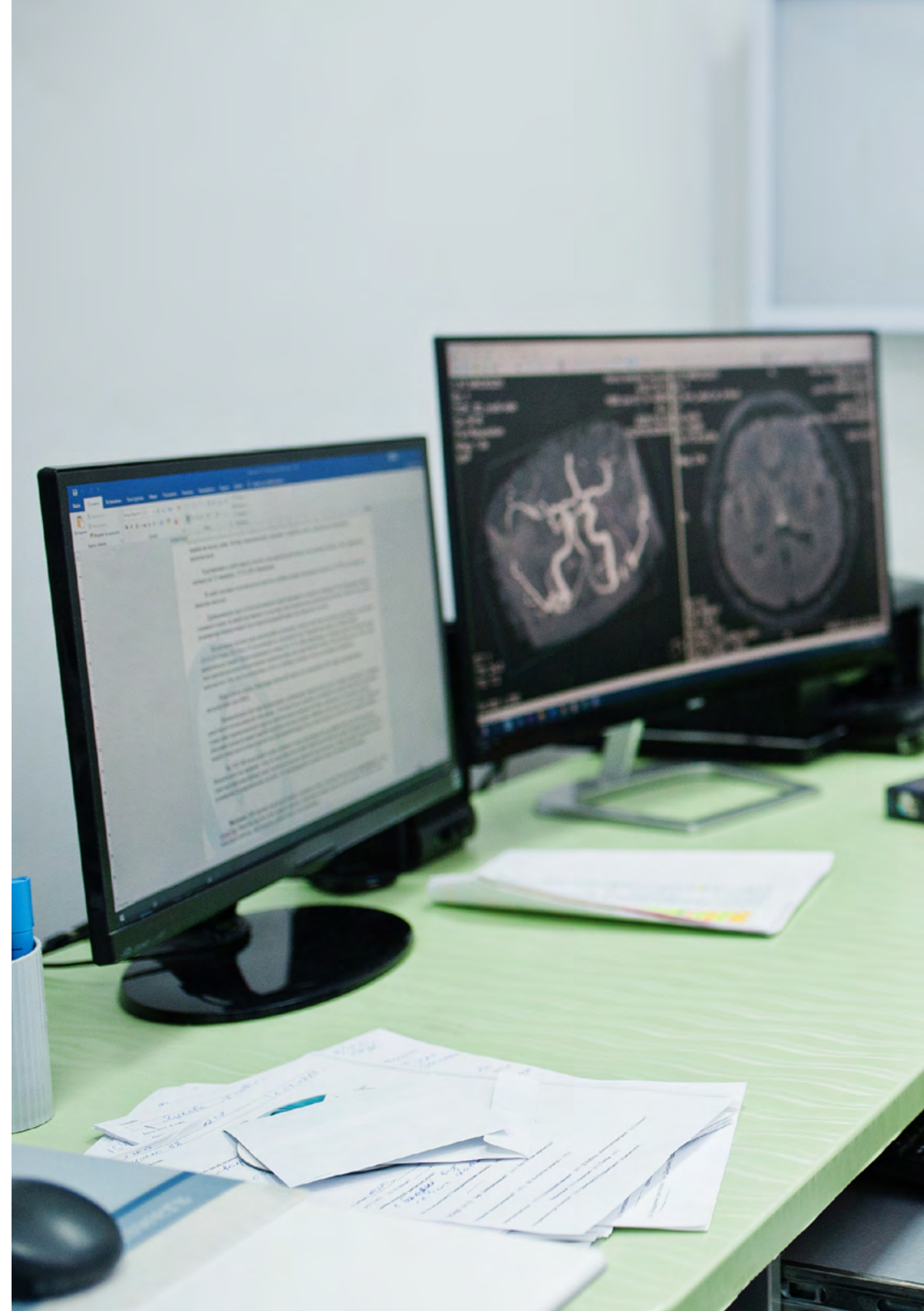


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*Do you want to enhance diagnostic efficiency and safety in patient care? Achieve it through 150 hours of the best professional update and in 100% digital format"*

## Module 1. Advanced Diagnostic Imaging

- 1.1. Advanced Physics in X-Ray Generation
  - 1.1.1. X-ray Tubes
  - 1.1.2. Radiation Spectra Used in Radiodiagnosis
  - 1.1.3. Radiological Technique
- 1.2. Imaging in Radiology
  - 1.2.1. Digital Image Recording Systems
  - 1.2.2. Dynamic Imaging
  - 1.2.3. Radiodiagnostic Equipment
- 1.3. Quality Control in Radiodiagnostics
  - 1.3.1. Quality Assurance Program in Radiodiagnosis
  - 1.3.2. Quality Protocols in Radiodiagnostics
  - 1.3.3. General Quality Control Checks
- 1.4. Patient Dose Estimation in X-Ray Installations
  - 1.4.1. Patient Dose Estimation in X-Ray Installations
  - 1.4.2. Patient Dosimetry
  - 1.4.3. Diagnostic Dose Reference Levels
- 1.5. General Radiology Equipment
  - 1.5.1. General Radiology Equipment
  - 1.5.2. Specific Quality Control Tests
  - 1.5.3. Doses to Patients in General Radiology
- 1.6. Mammography Equipment
  - 1.6.1. Mammography Equipment
  - 1.6.2. Specific Quality Control Tests
  - 1.6.3. Dose to Patients in Mammography
- 1.7. Fluoroscopy Equipment. Vascular and Interventional Radiology
  - 1.7.1. Fluoroscopy Equipment
  - 1.7.2. Specific Quality Control Tests
  - 1.7.3. Dose to Patients in Interventions





- 1.8. Computed Tomography Equipment
  - 1.8.1. Computed Tomography Equipment
  - 1.8.2. Specific Quality Control Tests
  - 1.8.3. Dose to Patients in CT
- 1.9. Other Radiodiagnostics Equipment
  - 1.9.1. Other Radiodiagnostics Equipment
  - 1.9.2. Specific Quality Control Tests
  - 1.9.3. Non-ionizing Radiation Equipment
- 1.10. Radiological Image Visualization Systems
  - 1.10.1. Digital Image Processing
  - 1.10.2. Calibration of Display Systems
  - 1.10.3. Quality Control of Visualization Systems

“ You will be prepared to overcome emerging challenges in Diagnostic Imaging Radiophysics and improve diagnostic processes in the hospital field. Enroll now!”

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. 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 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 Diagnostic Imaging 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 Diagnostic Imaging** 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 Diagnostic Imaging**

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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Radiophysics in  
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